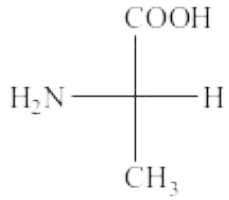
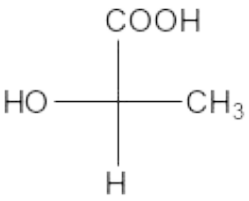
B. Sc. II Sem-III Chemistry: Paper- V Organic Chemistry

(w.e.f. June 2020)

Q.2 Answer the followings:

i) Assign the 'R' and 'S' configuration to the following

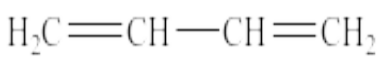
a) 

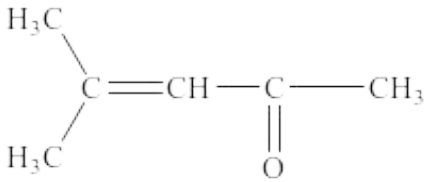
b) 

ii) Define: a) Chromophore b) Auxochrome

iii) What are auxochrome. Give two examples.

iv) How will you distinguish between the following pairs of compounds using UV Spectroscopy?

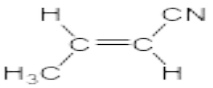
a) 

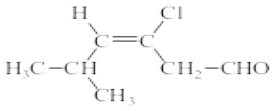
b) 

v) Explain aniline shows blue shift in acidic medium.

vi) Explain phenol shows red shift in alkaline medium.

vii) Assign 'E' and 'Z' configuration for following.

a) 

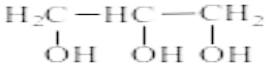
b) 

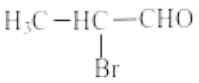
viii) Discuss geometrical isomerism with suitable examples.

ix) Discuss Newmann projection formulae for ethane and n-butane.

x) Explain the configuration of aldoximes.

xi) IUPAC names of the following compounds are:

a) 

b) 

xii) How will you prepare ethylene glycol from ethylene and ethyl dibromide?

xiii) How will you prepare glycerol from fats and oils?

xiv) What happens when glycerol is reacted with potassium hydrogen sulphate.

xv) Write a note on Kolbe's reaction.

xvi) Describe the structure and reactivity of carbonyl group.

xvii) Write the structure of the following compounds:

a) 2-methyl cyclohexanone b) 2-phenyl ethanal

xviii) How will you prepare anisole by Williamson's synthesis.

xix) How will you synthesis malic acid from:

a) Maleic acid b) α- bromosuccinic acid

xx) Define ethers? Explain simple ethers.

xxi) Discuss the synthesis of dichloroacetic acid and trichloroacetic acid by H.V.Z. reaction.

xxii) What happens when phthalic acid on treatment with a) Sodalime b) NH_3/ Heat.

xxiii) Define: a) Dicarboxylic acids b) Hydroxy acids

xxiv) Discuss the synthesis of Monochloroacetic acid with

a) KCN/C_2H_5OH b) KI

xxv) What happens when citric acid reacts with

a) Acetic anhydride b) HI

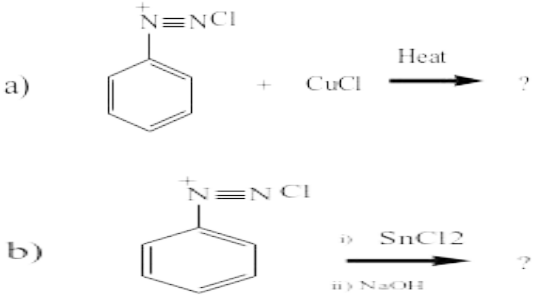
xxvi) How will you prepare benzene diazonium chloride from aniline?

xxvii) What happens when benzene diazonium chloride on treatment with

a) H_3PO_2 b) KI

xxviii) Write a note on Azo coupling.

xxix) Complete the following reaction:



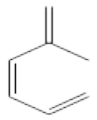
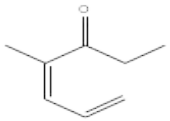
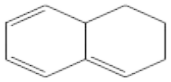
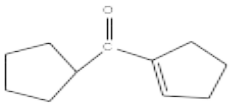
xxx) Write a note on Sandmeyer's reaction.

Q.3 Answer the followings.

i) Discuss in detail the effect of conjugation on the position of UV band in dienes and enones.

ii) Explain different types of electronic transition involved in UV spectroscopy.

iii) Calculate λmax values for followings structures.

a)  b)  c)  d) 

iv) Discuss in detail the mechanism involved in Reimer-Tiemann reaction.

v) Write a note on a) Fries rearrangement b) Gattermann reaction.

vi) Explain Aldol condensation reaction with mechanism.

vii) Write mechanism involved in Benzoin condensation.

viii) In Zeisel's method 1.38x 10^{-5} kg of methoxy compound gave 4.7x 10^{-5} kg of silver iodide. Calculate the percentage and number of methoxy group per molecule? Molecular weight of methoxy compound is 138.

ix) What is the action of following on ethylene oxide?

a) $CH_3Li/H_2O/H^+$ b) $CH_3MgBr/ H_2O/H^+$

c) CH_3NH_2 d) NH_3

x) How will you prepare malic acid from maleic acid and α-bromosuccinic acid? What is the action of a) Heat at 453 K b) HI on malic acid.

xi) What happens when citric acid treated with a) Acetic anhydride b) Heat at 425K c) HI. Write its uses.

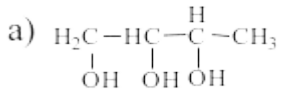
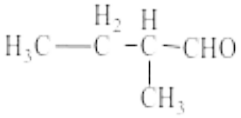
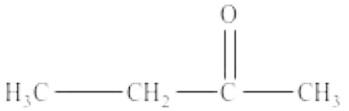
xii) How will you synthesize methyl orange? Write its uses.

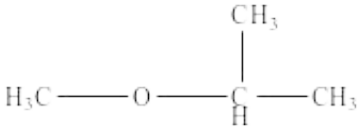
xiii) What is the action of following reagent on ethylene glycol?

a) Sodium metal b) HCl

c) HIO_4 d) $Pb(OAc)_4$

xiv) Write the IUPAC names of followings:

a)  b)  c) 

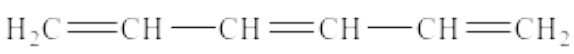
d) 

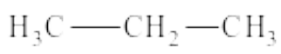
xv) How UV spectroscopy can be used to study geometrical isomerism?

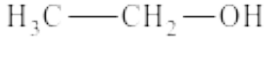
Q. 4 Answer the followings:

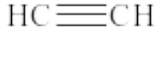
i) Describe the applications of UV spectroscopy.

ii) Mention the different types of electronic transition possible in following molecules.

a) 

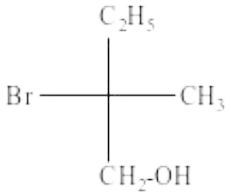
b) 

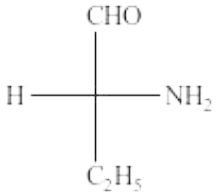
c) 

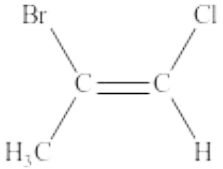
d) 

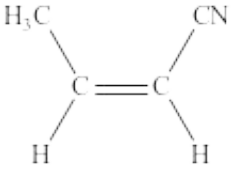
iii) Discuss the configuration of Ketoximes.

iv) Assign 'R' and 'S', E and Z configuration for following:

a) 

b) 

c) 

d) 

v) Explain 'D' and 'L' Nomenclature with examples.

vi) How will you prepare phenyl allyl ether from phenol? Explain Claisen rearrangement reaction.

vii) Discuss in detail the action of HI on glycerol.

viii) Explain Cannizzaro reaction with its mechanism.

ix) Discuss the mechanism of nucleophilic additions to carbonyl group.

x) An organic compound having the formula $C_8H_{10}O$ is subjected to Zeisel's method for estimating methoxy group. It was found that, 1.147×10^{-5} kg of this compound forms 2.21×10^{-5} kg of AgI. Calculate percentage and number of methoxy group present in the molecules.

xi) How the formula for percentage of methoxy group and number of methoxy group per molecule determined?

xii) How will you prepare citric acid from glycerol?

xiii) How will you synthesize cinnamic acid from benzaldehyde by Perkin reaction and Knoevenagel reaction?

xiv) Explain synthesis of congo red dye?

xv) What happens when benzene diazonium chloride reacts with:

a) CuBr b) CuCl

c) CuCN d) H_3PO_2

Q. 5 Answer the followings.

i) Explain the following terms in details:

a) Chromophores b) Auxochromes

c) Bathochromic shift d) Hypsochromic shift

e) Hyperchromic shift f) Hypochromic shift

ii) Write a note on

a) Beer-Lambert law b) Types of electronic transitions

iii) What is conformational isomerism? Explain conformational analysis of ethane with the help of energy profile diagram.

iv) Discuss geometrical isomerism in aldoximes and ketoximes. What is Beckmann rearrangement? How it is useful to determine the configuration of ketoximes?

v) How is Pinacol formed? Give the Pinacol-Pinacolone rearrangement reaction with mechanism.

vi) What is phenols? Explain the Reimer-Tiemann reaction with its mechanism.

vii) What are aldehydes and ketones? Explain in details Knoevenagel reaction with mechanism.

viii) How will you estimate methoxy group in an organic compound by Zeisel's method?

ix) What happens when

a) succinic acid is treated with $NaHCO_3$

b) phthalic acid is treated with sodalime (NaOH+CaO)

c) citric acid is treated with HI

d) acrylic acid is treated with Na/C_2H_5OH

x) Discuss the synthesis of citric acid from glycerol. What happens when it reacts with

a) Acetic anhydride b) HI c) Heat at 422K? Give its uses

B. Sc. Part - III (Semester-VI) CBCS Pattern

CHEMISTRY (Paper-XIII)

Physical Chemistry (w. e. f. June 2021)

QUESTION BANK

Q. 1: B) Attempt the following . (06)

1. Define normality.
2. Define molarity.
3. Define molality.
4. Define normality.
5. What is solute?
6. What is solvent?
7. What is binary solution?
8. What is dilute solution?
9. What is concentrated solution?
10. Define weight fraction.
11. Define percentage composition by weight.
12. Define percentage composition by volume.
13. Define wavelength.
14. Define frequency.
15. Define wave number.
16. Give fundamental equation for energy change.
17. What are the types of molecular spectra?
18. Give equation for total energy of all molecular transitions.
19. Give selection rule for rotational and vibrational transitions.
20. What is selection rule?
21. What is meant by isochore?
22. What is meant by isothermal?
23. Give equation for Gibbs free energy.
24. Give equation for Helmholtz function.
25. Give equation for relation between Gibbs free energy and Helmholtz function.
26. What is rate of a chemical reaction?
27. What is molecularity of a chemical reaction?
28. What is order of a chemical reaction?
29. Define third order reaction.
30. Give one example of third order reaction.

Q. 2: Solve any **Eight** of the following. (16)

1. What are hot bands?
2. What is fundamental equation?
3. Explain the term hot bands
4. What do you mean by overtone transitions?
5. Explain the terms: (1) Wavelength, (ii) Wave number and (iii) Frequency. How are they interrelated?
6. What is zero point energy?
7. Applications of vibrational spectra.
8. Explain Electromagnetic spectrum
9. What is Force constant?
10. Give various regions of electromagnetic spectrum.
11. Mention Maxwell - Boltzmann law. Give the significance of terms involved in

12. What is Rayleigh scattering?
13. What is stokes and anti-stokes lines?
14. What is Raman shift?
15. What are zeotropic mixtures?
16. What are azeotropic mixtures?
17. What are miscible and immiscible liquids? Give its examples.
18. State Raoult's law.
19. Mention different types of azeotropic mixtures.
20. What is steam distillation?
21. What are partially miscible liquids? Give its examples.
22. What are Conjugate Solutions?
23. What is critical solution temperature?
24. What is tie line?
25. What is the effect of impurities on CST values?
26. Explain the terms mole fraction
27. Mention types of solutions depending upon nature of solute and solvent
28. What is standard Gibb's free energy?

30. Give equations for change in Gibbs free energy and change in Helmholtz function in isothermal processes.
31. Give equations of Gibbs free energy variation with temperature and pressure.
32. Give equations of Helmholtz function variation with temperature and volume.
33. Give relation between Gibbs free energy and Helmholtz function
34. Give applications of Gibbs Helmholtz equation.
35. Write general Clapeyron equation. Give significance of terms involved in it.
36. Write general Clausius-Clapeyron equation. Give significance of terms involved in it.
37. State the law of mass action thermodynamically.
38. Apply the law of mass action to following equilibrium reaction,

$$2H_{2(g)} + O_{2(g)} = 2H_2O_{(g)}$$

39. Mention types of simultaneous reactions.
40. Mention steps involved in chain reactions.
41. Give two examples of reversible reactions.
42. Give two examples of reversible reactions.
43. Give one example of parallel reaction.
44. Give one example of consecutive reaction.
45. Give one example of chain reaction.
46. What is temperature coefficient?
47. Write temperature dependent Arrhenius equation. Give significance of terms involved in it
48. What is energy of activation?
49. Draw change of potential energy diagram for energy of activation.
50. Why rate of reaction increases with increase in temperature?

Q. 3: A) Attempt *any Two* of the following. (10)

1. What do you mean by overtone transitions? Explain these in detail with the help of energy level diagram.
2. What is plane polarized light? Discuss Concept of polarizability.
3. Mention different types of molecular spectra of diatomic molecules. What information do you get from these spectra?
4. Derive Raoult's equation connecting vapour pressure and mole fractions of constituents.
5. Discuss nicotine-water system.
6. Explain with V.P. -composition curves the various types of mixtures of miscible liquids.
7. Discuss Trimethylamine-water system.
8. Derive the relation between the equilibrium constant for a reaction and standard free energy change associated with it.
9. Starting from the equation, G = H-TS

Show that (i) $(dG/dT)p = -S$ (ii) $(dG/dP)_T = V$

10. Derive Gibb's Helmholtz equation in its standard form
11. Starting from the equation, $A = E - TS$
    Show that (i) $(dA/dV)_T = -P$ (ii) $(dV/dT)p = -S$
12. Discuss consecutive and parallel reactions with suitable examples.
13. Derive an equation for the third order reaction when three molecules of substance A react to form products.
14. Define chain reaction. Discuss photochemical combination of hydrogen and chlorine reaction in detail.
15. What are reversible reactions? Discuss different types of reversible reactions on the basis of order of forward and backward reactions. Give suitable examples.

Q. 3: B) Short note/Solve (06)

1. The first line, J=0 in rotational spectra of CO appears at $\tilde{\nu} = 8.423\ cm^{-1}$. Calculate rotational constant, moment of inertia, bond length and energy difference from J=0 to J=1.
   (Given, C = 12, O = 16, h= 6.62×10^{-27}, C= 3×10^{10}, π= 3.14)
2. Discuss in detail rotational energies of diatomic molecules. Diagrammatically show allowed rotational levels with their energy.
3. Derive thermodynamically the law of mass action.
4. Discuss partially miscible liquids with suitable solubility curves.
5. Explain the term order of a chemical reaction with respect to third order reactions.

Q. 4: A) Attempt *any Two* of the following. (08)

1. Explain how the bond length of a diatomic molecule can be determined from the rotational spectra
2. Explain the effect of isotopes in the study of rotational spectra.
3. What are limitations of infrared spectroscopy?
4. CO_2 does not show rotational spectra but show vibrational spectra. Give reason.
5. Write a short note on constant boiling mixtures of miscible liquids.
6. Discuss the system with B.P. minimum.
7. Explain how the weight ratio of the liquids is determined with the help of "tie-line "in case of partially
   miscible liquids.
8. Distinguish between ideal and non-ideal solutions.
9. How ΔG and ΔA are interrelated? Under what conditions, $\Delta G = \Delta A$?
10. Define Gibbs free energy. Explain its significance.
11. Describe Criteria of thermodynamic spontaneity and equilibrium.
12. Using Van't Hoff's isotherm, find the value of W_{max} for following reactions:
    (i) $2H_2\ (g) + O_2\ (g)\ H_2O\ (g)$
    (ii) $N_2\ (g) + 3H_2\ (g)\ 2NH_3\ (g)$
13. What is meant by third order reactions? Explain three cases of explaining such reactions.
14. If the rate of reaction gets doubled from 298 K to 305 K. Calculate the energy of activation.
    (R= 8.315 J)
15. The order of reaction $2NO + 2H_2 = N_2 + 2H_2O$ appears to be four but experimentally determined order is three. Give reason.

Q. 4: B) Describe/Explain/Solve (08)

1. Illustrate Raman effect by using classical theory.
2. Discuss in detail Fugacity and activity. Calculate the affinity of H_2 and I_2 in the reaction, $H_2 + I_2 = 2HI$ at 443 0C, if the value of equilibrium constant at 443 0C is 50.62.
3. What are azeotropic mixtures? Mention different types of azeotropic mixtures with suitable examples.
4. Discuss the theory of fractional distillation as applied to a mixture of two miscible liquids whose boiling points increase regularly.
5. What is energy of activation? Give a detail account of the activated complex theory of reaction rates.

Q. 5: Attempt *any Two* of the following. (16)

1. Discuss briefly rotational spectra of simple diatomic molecules. What do you understand by selection rule?
2. Derive an expression, $E_{rot} = h^2/8p^2 \times I\ J\ (J + 1)$ for the rotational energy of a diatomic molecule.
3. What is Raman effect? Illustrate Raman effect by using quantum.
4. Explain the effect of anharmonicity on vibrational spectra of diatomic molecules.
5. Discuss the distillation of a completely miscible binary liquid mixture where B.P. is increasing regularly. Illustrate your answer with suitable curves.
6. Discuss the mutual solubility of partially miscible liquids having maximum and minimum critical solution temperature.
7. What is an ideal solution? Derive Raoult's equation connecting vapour pressure and mole fractions of constituents.
8. Draw Vapour Pressure -composition curve for an ideal system at constant temperature. Under what conditions are (i) positive and (ii) negative deviations from ideal behavior to be expected? Draw the corresponding diagrams.
9. Derive Clausius-Clapeyron equation. What are its applications?
10. Derive the expression for Van't Hoff reaction isotherm. Give its importance.
11. Derive thermodynamically the relationship between the change of equilibrium constants with the temperature and the heat of reaction.
12. Derive thermodynamically Van't Hoff isochore.
13. Give a detail account of the collision theory of reaction rates. How does this theory explain the effect of temperature on the rate of reaction?
14. Derive an expression for the third order reaction when the initial concentration of all reactants is same.
15. What is Arrhenius equation? How is it used to determine the value of energy of activation? The velocity constant for a certain reaction is 4.82×10^{-4} at 45 ^{0}C and 3.46×10^{-5} 25 ^{0}C. Calculate the energy of activation of the reaction. (R = 8.314 J/mole.)

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PAHSUS

QUESTION BANK OF PHYSICS FOR B. Sc. III, Paper – X (Solid State Physics)

SHORT ANSWER TYPE QUESTIONS

1) Write any five differences between crystal and amorphous materials.
2) What is unit cell?
3) Explain basis and the crystal structure.
4) Write a note on some features of the crystals.
5) Calculate number of lattice points per unit cell.
6) Explain the classification of the Bravais lattices in 2 Dimensions.
7) Obtain the relation between lattice parameters and interplanar spacing.
8) What are Millar indices? Draw Millar indices for 001, 010 and 111 planes.
9) How Millar indices are obtained? Draw Millar indices for 101, 110 and 010 planes.
10) Write a note on close – packed crystal structures.
11) Write a note on loose – packed crystal structures.
12) Show that the 26 % of HCP crystal structure is an empty space.
13) Show that the 26 % of FCC crystal structure is an empty space.
14) Show that the packing fraction of BCC is 0.68.
15) Calculate the lattice spacing between (111) plane in an orthorhombic lattice, where a = 2.4 Å, b = 3.1 Å, and c = 1.9 Å.
16) Explain the concept of reciprocal lattice.
17) State four properties of reciprocal lattice.
18) Show that the volume of unit cell of reciprocal lattice is inversely proportional to the volume of the unit cell of direct lattice.
19) What is the principle of powder method of X – Ray diffraction?
20) What is reciprocal lattice? Obtain the relation between direct lattice and reciprocal lattice.
21) Show that the reciprocal of the reciprocal lattice is the direct lattice.
22) Show that every lattice vector is normal to the lattice plane of the crystal lattice.
23) Describe free electron gas model of the metal.
24) What is Widemann – Franz relation? Give the value of k/σ at room temperature.
25) Explain how the electrons are distributed in metal at different temperatures as per F – D distribution.
26) Explain Fermi – Dirac distribution law.
27) Derive an expression for electrical using the concept of free electron theory of metals.
28) Write any four points of the distinction between metal, semiconductor and insulator.
29) Describe Hall Effect.

30) Explain in short the formation of energy bands in solids.
31) What is valence band, conduction band and forbidden energy gap.
32) Obtain an expression for effective mass of an electron.
33) Explain formation of energy bands in solids.
34) Explain hysteresis loop in ferromagnetic materials.
35) Explain how energy is stored in ferromagnetic materials.
36) What are garnets?
37) What are spinnel?
38) Write a note on energy loss in hysteresis.
39) What are the properties of ferrimagnetic materials?
40) Write a note on: a) Ferromagnetic materials, b) Ferrites, c) Ferrimagnetic materials.
41) What are the properties of paramagnetic materials?
42) What are the properties of diamagnetic materials?
43) What are the properties of ferromagnetic materials?
44) What is superconductivity?
45) Explain superconductor.
46) What is Meissner effect?
47) What is soft conductor?
48) What is hard superconductor?
49) What are the applications of superconductors?
50) Explain what is the effect of magnetic field on superconductors?
51) Explain type – I and type – II on superconductors.
52) Draw a neat diagram of monoclinic and triclinic crystal structure with examples.
53) Draw the neat diagram of HCP crystal structure.
54) Show that the c / a ration of HCP crystal structure is 1.633. What is its significance?

LONG ANSWER TYPE QUESTIONS

1) Explain in details the periodicity in crystals.
2) What are Bravais Lattices in 3 dimensions? Explain it with neat diagram.
3) Describe powder photograph method of X – Ray diffraction in reciprocal lattice for analysis of cubic structure.
4) What is reciprocal lattice? Give graphical construction of reciprocal lattice in 1D, 2D, and 3D lattice.
5) Explain Bragg's law in reciprocal lattice.
6) Derive an expression for electrical and thermal conductivities and hence obtain Widemann – Franz relation on the basis of free electron theory.

7) Discuss F – D distribution of electron in metal.
8) Explain Sommerfeld's model of a metal. Derive an expression for the energy of a free electron.
9) Why effective mass of an electron is not same as the actual mass? Derive an expression for effective mass of an electron in two dimensional lattices.
10) What is Hall Effect? Obtain an expression for Hall voltage. Hall coefficient, mobility of charge carrier and conductivity of the metal on the basis of Hall Effect.
11) Discuss in detail about motion of electron in one – dimensional periodic potential.
12) What are ferromagnetic materials? State the properties of ferromagnetic materials. Explain hysteresis loop in ferromagnetic materials.
13) Give classification of magnetic materials. State their properties.
14) What is on superconductor? Explain type – I and type – II on superconductors.
15) State and explain Meissner Effect.
16) What is superconductor? Explain the effect of magnetic field on superconductor.
17) Find the energy of the electron in n^{th} state and relate it with the momentum lattice vector.
18) Explain the model of metal with the help of Sommerfeld's theory.

PAHSUS

QUESTION BANK OF PHYSICS FOR B. Sc. III, Paper – X (Solid State Physics)

SHORT ANSWER TYPE QUESTIONS

1) Write any five differences between crystal and amorphous materials.
2) What is unit cell?
3) Explain basis and the crystal structure.
4) Write a note on some features of the crystals.
5) Calculate number of lattice points per unit cell.
6) Explain the classification of the Bravais lattices in 2 Dimensions.
7) Obtain the relation between lattice parameters and interplanar spacing.
8) What are Millar indices? Draw Millar indices for 001, 010 and 111 planes.
9) How Millar indices are obtained? Draw Millar indices for 101, 110 and 010 planes.
10) Write a note on close – packed crystal structures.
11) Write a note on loose – packed crystal structures.
12) Show that the 26 % of HCP crystal structure is an empty space.
13) Show that the 26 % of FCC crystal structure is an empty space.
14) Show that the packing fraction of BCC is 0.68.
15) Calculate the lattice spacing between (111) plane in an orthorhombic lattice, where a = 2.4 Å, b = 3.1 Å, and c = 1.9 Å.
16) Explain the concept of reciprocal lattice.
17) State four properties of reciprocal lattice.
18) Show that the volume of unit cell of reciprocal lattice is inversely proportional to the volume of the unit cell of direct lattice.
19) What is the principle of powder method of X – Ray diffraction?
20) What is reciprocal lattice? Obtain the relation between direct lattice and reciprocal lattice.
21) Show that the reciprocal of the reciprocal lattice is the direct lattice.
22) Show that every lattice vector is normal to the lattice plane of the crystal lattice.
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Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc Entrepreneurship II examination Sem-IV 2021-2022
Title-Paper VIII –Food and Dairy Technology
(CBCS) Pattern w.e.f Nov -2019
Question Bank

Total Marks-40
Instructions:

1. All questions are compulsory.
2 Draw neat diagrams and give equations wherever necessary.
3. Figures to the right indicate full marks.
4. Use of logarithmic table and calculator is allowed.
(At. Wts H-1, C-12, 0-16, N= 14, Na -23, CI - 35.5)

Q. No.1) Multiple choice questions **(08)**

Q.No.2) Answer any four of the following (08)

1) Define Milk.

2) Uses of cream.

3) Write down the long form of LTH, HTST, UHT.

4) Write down the types of neutralizers.

5) Methods of whey making

6) Methods of ghee making

7) Methods of ice-cream making

8) Methods of butter making

9) Methods of cheese making

10) Define Cheese.

11) Define Milk.

12) What is Cream?

13) Uses of Cheese

15) What is Rennet?

16) What is Flavoured Milks?

17) Vitaminised milk

18) Fortified Milk

19) What is Tonned Milk

20) Names of Meat Product

21) Names of Fish Product

22) What is Canned Food?

23) Why Phosphate test used

24) Why Milk are Boiling

25) Pasteurized Milk

26) Types of Cheese

27) What is Table Butter?

28) What is Churning process of Curd?

29) What is Churning process of Cream?

30) Why MBRT Required?

Q.No.3 A) Write short notes on any two of the following (08)

1) Write note on the types of types of Butter

2) Write short notes on methods of butter making

3) Write down the Health Benefits of fermented Milk

4) Write short notes on methods of Cheese making

5) History of Cheese

6) Write short notes on Composition & Types of butter

7) Write short notes on Composition & Types of Cream

8) Write short notes on Composition & Types of Cheese

9) Write short notes on Composition & Types of Ice-cream

10) Explain the different types of milk & its Packaging

11) Define Ice-cream & write on Hardening process of Ice-cream

12) Write on different method of preservation of Food

13) Explain the Microbial Spoilage of Food

14) Explain the flavoured milk and tonned milk

15) Explain the method of pasteurization of milk.

Q. No.4) Answer any Two of the following (08)

1) Write down the health benefits of butter.

2) Write a note on various types of butter.

3) Write a note on various types of cheese.

4) Write a note on various types of cream.

5) Write a note on various types of ice-cream.

6) Write a note on various types of fruit and fruit products.

7) Write a note on various types of vegetable and vegetable products.

8) Write a note on factor involved in milk contamination.

9) Write a note on nutritive value of cream and its uses.

10) What is cheese and explain composition and types of cheese.

11) Write a note on process of canning of food.

12) Explain in detail milk product.

13) Explain in detail meat product.

14) Explain in detail fish product.

15) Write a note on classification of butter and defects of butter uses.

Q.No.5) Answer any one of the following (08)

1) What is cream and explain the manufacturing process of cream.

2) What is dye reduction test? Explain briefly the pasteurization method.

3) Write down the general principle of preservation of food and its methods.

4) Explain the manufacturing process of cheese and its history.

5) Write a note on classification of butter and composition of butter.

6) Explain the physical and chemical properties of food affecting microbial growth.

7) What is canned food and explain the canning process of food.

8) Explain the method of manufacturing of icecream and their storage.

9) Explain the microbial spoilage of meat and meat product.

10) Explain the microbial spoilage of fish and fish product.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE
EXAMINATION: March/April 2022
Class: B.Sc. - I SEMESTER II (CBCS w.e.f. June 2019)
Subject: BIOTECHNOLOGY
Paper: Plant Physiology-I

QUESTION BANK

Q.2: Answer the following questions briefly (any four): 08

1) What is permanent plant tissue?

2) What is simple plant tissue

3) What is complex plant tissue?

4) What are growth rings?

5) What is secondary growth?

6) Define diffusion.

7) Define osmosis.

8) Define guttation.

9) Define plasmolysis.

10) Define imbibition.

11) What are stomata?

12) What is a meristem?

13) Explain micronutrients with an example.

14) Explain macronutrients with an example.

15) Explain nitrogen deficiency symptoms in plants.

16) What is food in terms of plants?

17) Which are the conductive tissues for water and food in plants?

18) What is apical meristem?

19) What is lateral meristem?

20) Draw a neat labeled diagram of transverse section of shoot

Q.3: Write notes on any two of the following 08

1) Histological organization of shoot

2) Leaf anatomy (isobilateral leaf)

3) mechanism of water absorption

4) Mechanism of opening and closing of stomata

5) Roles of micronutrients in plant nutrition

6) mechanism of food transport

7) Primary structure of root

8) Secondary growth

9) Histological organization of apical meristem

10) Micro & macro nutrients in plant nutrition

Q.4: Write notes on any two of the following 08

1) Histological organization of root

2) Leaf anatomy (dorsiventral leaf)

3) Plant water relations: Importance of water for plant life

4) Transpiration

5) Roles of macronutrients in plant nutrition

6) Mechanism of uptake of nutrients in plants

7) source to sink transport of food in plants

8) Primary structure of shoot

9) Plant tissues.

10) Histological organization of shoot and root apical meristem

Q.5: Answer any one of the following 08

1) Explain in detail micro and macro nutrients and add a note on roles and deficiency symptoms of nutrients.

2) Give a detailed account on leaf anatomy (dorsi-ventral and isobilateral leaf).

3) Give a detailed account on transpiration.

4) Explain in detail plant tissues.

5) Explain Mechanism of uptake of nutrients

PUNYASHLOK AHILYADEVI HOLKAR SOLPAUR UNIVERSITY, SOLAPUR
Choice based credit system (CBCS) Semester Pattern (w.e.f. June 2019)
B.Sc. BIOTECHNOLOGY-I SEMESTER II EXAMINATION-2022
Animal Tissue Culture

Time: 2hrs. **Total Mark: 40**

Instructions:

1. All Questions are compulsory.
2. Draw neat diagrams and give equations whenever necessary.
3. Figures to right indicate full mark.
4. Use of logarithmic table and calculator is allowed.

Q.2. Answer any four of the following. **(08)**

1. Mention characteristics of animal cell culture.
2. What is natural media?
3. What is Karyotyping?
4. What is Organ culture?
5. What is aseptic condition
6. What is collagenase?
7. Define primary cell culture.
8. Define Warm trypsinization.
9. Define cold trypsinization.
10. Define cryopreservation.
11. Define sterilization
12. DefineCell line
13. Define subculture.
14. Define cell synchronization.
15. Define substrate.
16. Draw neat labelled diagram of LAF.
17. Draw neat labelled diagram of autoclave.
18. Mention and explain instruments required in ATC lab.
19. Write shot note on Agar gel method.
20. Write short note on serum.

Q.3.Write short note on any two of the following. **(08)**

1. What is sterilization? Explain its methods in detail.
2. What is culture media? Explain with serum containing media.
3. What is synthetic media? Explain with complete media in details.
4. What is organ culture? Explain plasma clot and Raft methods,
5. What is natural media? Add a note on biological fluids used in media.
6. Explain in details role played by CO_2 incubator in ATC lab with neat labelled diagram.
7. Explain in details mechanical cell disaggregation add note on its merits and demerits.
8. Explain in details the criterion for subculture.
9. Explain in details the cell counting methods.
10. Explain in details the karyotyping as a cell identification test.

Q.4. **Answer any two of the following.** **(08)**

11. Explain in details the strategies to maintain cell line.
12. Explain in details the isozyme as a cell identification method.
13. Explain in details tritiated thymidine pulse method.
14. Explain in details the flow cytometry method.
15. Explain in details the cell counting by haemocytometer.
16. Explain in details the history of Animal Tissue Culture.
17. Explain in details the methods of sterilization media and Antibiotics used in media.
18. Differentiate between the cold and warm trypsinization.
19. Write a note on substrate for cell growth.
20. Write a note on balanced salt solution.

Q.5. **Answer any one of the following.** **(08)**

1. Explain in details the layout ATC lab along with its application.
2. Explain in details the physio-chemical properties of media.
3. What is trypsinization? Explain its method in details.
4. What is cryopreservation? Mention its all methods with application.
5. What is cell synchronization? Explain physical and chemical methods.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc. Part-I(Semester- II) CBCS Examination

BOTANY

PaperIII- Plant Ecology

Question Bank

Q.2) Answer the following.

1. Define Ecology.
2. Defineautecology.
3. Definesynecology.
4. What are heliophytes?
5. What are sciophytes?
6. Enlist different soil separates
7. What is soil humus?
8. What is photoperiodism?
9. Define hydrophytes.
10. Write any two morphological adaptations of hydrophytes.
11. Write any two physiological adaptations in xerophytes.
12. What is plant density?
13. Give the formula for calculating density.
14. What is phenology?
15. Define cryptophytes.
16. Give two examples of geophytes.
17. Enlist biotic components of an ecosystem.
18. What is food chain?
19. What is ecological pyramid?
20. What is food chain?
21. What is food web?
22. Define ecosystem.
23. Enlist biotic components of an ecosystem.

24. Enlist abiotic components of an ecosystem.
25. What is plant succession?
26. Define Primary succession.
27. Define Secondary succession.
28. Enlist sequential steps that occur in the process of succession.
29. What is xerosere?
30. What is hydrosere?
31. Enlist various stages of hydrosere?
32. Enlist various stages of xerosere?
33. Enlist sequential steps that occur in the process of succession.
34. Define conservation ecology.
35. Define resource ecology.
36. Write useful effect of wind
37. What is ecesis
38. What is stratification
39. What is IVI
40. Define density & give its formula
41. Define frequency & give its formula

Q.3) Write short notes on the following.

1. Discuss 'Light' as a climatic factor
2. Comment up on the soil profile
3. Discuss about soil humus and soil organisms.
4. Morphological and two physiological adaptations in hydrophytes.
5. Morphological and anatomical adaptations in xerophytes.
6. Morphological and anatomical adaptations in hydrophytes.
7. Role of decomposers in an ecosystem.
8. Stratification in forest community.
9. Classification of plant community based on the habitat.
10. Biotic components of an ecosystem.
11. Abiotic components of an ecosystem.
12. Productivity of an ecosystem.
13. Pyramid of number in forest ecosystem.
14. Comment on primary succession.

15. Comment on secondary succession.
16. Write chemical properties of soil
17. What is capillary water
18. Describe soil profile
19. Explain water holding & field capacity of soil
20. Explain wind as ecological factor

Q.4) Answerthe following.

1. Explain in brief soil reaction and cation exchange capacity of soil
2. What is soil texture? Comment up on the 'Textural classes' of soil
3. Discuss in detail any three physical and any two chemical properties of soil.
4. What is the difference between weather and climate? Discuss any two climatic factors you have studied.
5. Describe any three important anatomical adaptations of hydrophytes.
6. Write any four morphological adaptations in hydrophytes.
7. What are xerophytes? Write any three anatomical adaptations in xerophytes.
8. Draw phenogram of any one plant species you have studied.
9. Comment on the association between Rhizobium and root nodule cells.
10. What is plant succession? Give an outline of possible trend of succession in aquatic environment.
11. What is plant succession? Give an outline of possible trend of succession in xeric environment.
12. What is plant succession? Comment on Primary succession.
13. What is plant succession? Comment on Secondary succession.
14. What is plant succession? Enlist sequential steps that occur in the process of succession.
15. Discuss the first two stages of xerosere.

Q. 5) Answerof the following.

1. Discuss the impact of light and wind on plant life.
2. Explain in detail formation of soil (Pedogenesis).
3. What are xerophytes? Explainmorphological andanatomical adaptations in xerophytes.

4. What are hydrophytes? Explain morphological andphysiological adaptations in hydrophytes.
5. What are synthetic characters of the community? Explain any two synthetic characters you have studied.
6. What are analytical characters of the plant community? Explain any two qualitative and any two quantitative characters of the plant community.
7. What is ecosystem? Enlist biotic and abiotic components of an ecosystem and comment on any two biotic and any one abiotic components of ecosystem.
8. What is plant succession? Describe various stages of hydrosere?
9. What is plant succession? Describe various stages of xerosere?
10. Write an account of process of plant succession.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc. Part-I(Semester- II) CBCS Examination

BOTANY

PaperIV- Taxonomy of Angiosperms

Question Bank

Q.2) Answer the following.

1. Define taxonomy.
2. What is classification?
3. What is mean by Empirical approach?
4. What is mean by Interpretative approach?
5. Define nomenclature.
6. Define natural classification.
7. Define artificial classification.
8. Define phylogenetic classification.
9. Enlist the series of sub-class Polypetalae.
10. Enlist the series of sub-class Gamopetalae.
11. Define identification.
12. What is binomial nomenclature?
13. What is Expert Determination?
14. What is Recognition?
15. What is Comparison?
16. Define Herbarium.
17. Draw format of Herbaria label.
18. What is Collection trip?
19. What is mean by Exploration?
20. Define poisoning of plants.
21. Enlist the characters of sub-division Angiospermae.
22. Enlist the characters of class Dicotyledonae.
23. Enlist the characters of class Monocotyledonae.

24. Enlist the characters of sub-class: Polypetalae & Gamopetalae.
25. Enlist the characters of orders: Polemoniales& Rosales.
26. Write habit and habitat of Liliaceae.
27. Enlist the plants of economic importance in Liliaceae.
28. Enlist the the plants of economic importance in Caesalpiiaceae.
29. Enlist the the plants of economic importance in Solanaceae.
30. Enlist the the plants of economic importance in Liliaceae.
31. Enlist the the plants of economic importance in Nyctaginaceae.
32. Enlist the the instruments required for collection of plant in the field.
33. Enlist steps of Herbarium method.
34. Write down correct botanical name of any plant species in ICBN format.
35. What is the full-form of ICBN?

Q.3) Write short notes onthe following.

1. Write short note on Empirical approach and Interpretative approach.
2. Explain in brief principles of Taxonomy.
3. Write in brief about 'Taxonomy and Systematics' in hands of different taxonomists.
4. Write a note on artifical cassification.
5. Write a note on natual cassification.
6. Write a note on phylogenetic cassification.
7. Write short note on Binomial nomenclature of plants.
8. Why scientific names are treated as Latin?
9. Write short note Need for Scientific Names.
10. Write a short note on significance of herbarium.
11. Functions of Lead Botanical Garden.
12. Write the systematic position of Solanaceae.
13. Write the systematic position of Caesalpiniaceae.
14. Write the systematic position of Nyctaginaceae.
15. Write the systematic position of Liliaceae.

Q.4) Answerthe following.

1. What are the principles of taxonomy?
2. What are the aims of taxonomy?

3. Write short note on Identification.
4. Write down the salient features of Bentham and Hooker's system of classification.
5. Write down the merits of Bentham and Hooker's System of classification.
6. Write down the demerits of Bentham and Hooker's System of classification.
7. Comment upon merits and demerits of Bentham and Hooker's system of classification.
8. Explain in brief need for 'scientific names' to plant species.
9. Which are the methods used for plant identification.
10. Enlist the correct steps in preparation of herbarium specimens.
11. Write a short note on collection of plant specimens for herbarium.
12. Write a short note on labeling and storage of plant specimen for herbarium.
13. Enlist the distinguishing characters of Solanaceae.
14. Enlist the distinguishing characters of Caesalpiniaceae.
15. Enlist the distinguishing characters of Nyctaginaceae.

Q. 5) Answerof the following.

1. Comment upon Identification, Nomenclature, and Classification in taxonomy.
2. Write an essay on introduction of taxnomy.
3. Comment upon aims of taxonomy.
4. Comment upon outline of the system of classification presented by Bentham and Hooker.
5. Comment up on characters considered before plant identification.
6. Write an essay on introduction and principles of ICBN.
7. Write an essay on Identification of plants.
8. What is Herbarium? Explain in detail method of preparation for herbarium specimens.
9. Write an essay on Lead Botanical Garden of Shivaji University Kolhapur.
10. Write systematic position, morphological characters & distinguishing characters and economic importance of Caesalpiniaceae.

Punyashlok Ahilyadev Holkar Solapur University, Solapur
B.Sc. I
Semester II
Question Bank
Text: Golden Petals

Question No: 2. Write the answers of the following.

1. Why does the student think that the teacher won't remember him?
2. What did happen to the failed out students?
3. How is school different from the student's home?
4. Why does the student want that teacher should be humble at least?
5. How it was proved that the teacher knew very little in actual life?
6. What type of our neighbor is next to us?
7. What is the meaning of that we can widen or contract our circle of neighbour?
8. What is the reason the author does feel that he is a bad townsman?
9. What are the natural claims of our neighbours?
10. What are our concepts about our neighbours?
11. What is the reason behind Jim Corbett's going for hunting the tiger?
12. What are two habits of tiger as mentioned in the lesson?
13. How much does a tiger eat food at one time?
14. Why did Jim Corbett unhappy killing the tiger?
15. Why did Jim Corbett regret after killing the tiger?
16. Explain the use if colour images used in the poem –Indian Weavers?
17. What are the different poetic devices used in the poem –Indian Weavers?
18. Whart are the imageries used in the poem-Indian Weavers?
19. Write about the three stages of human life as stated in the poem- Indian Weavers?
20. Write in short about the theme of the poem- Indian Weavers?
21. Why is the poet not able to accept the death of others?
22. What is the reaction of the pet against death?
23. What is the meaning of the country of no return as mentioned in the poem- When I Think of Death?
24. Write in short the theme of the poem - When I Think of Death?
25. How do disbelief and anger come to play in the poem - When I Think of Death?

Question No: 3. Write the answers of the following.

1. What are the common problems with Emails?
2. What is the importance of the use of correct language while writing emails?

3. Write an email to the company branch manager complaining about the no working of the washing machine that youpurchased one week before.
4. Write an email to the principal of your college requesting him to allow student to use night library facility as the exams are approaching.
5. What are the types of blogs and their uses? Explain briefly.
6. Explain in brief hoe to write blogs?
7. What is the meaning of Film Credit?
8. State basic etiquettes of email writing?

Question No: 4.

1. What are the different types of interviews?
2. Write in brief about preparing for the interview.
3. What is PAWS model? Explain in brief.
4. How to prepare for Group Discussion?
5. Write in brief abut the types of Group Discussions?
6. Write about DO'S and DON'T at the time of group discussion.
7. Mention the points we have to remember at the group discussion?

B. Sc. II BIOTECHNOLOGY SEMESTER III

Subject: DSC 1C: GENETICS (PAPER-I)

Question Bank

Q. No. 2) Answer the following Questions: 2 Marks Each

1. Mendelism
2. Mendel's experiment
3. Monohybrid Cross
4. Dihybrid cross
5. Genotypic and phenotypic ratio
6. Law of Dominance
7. Law of segregation
8. Law of independent Assortment,
9. Back cross
10. Test cross
11. Co-dominance
12. Incomplete dominance
13. Supplementary gene
14. Complementary genes
15. Inhibitory gene
16. Epistasis
17. Linkage
18. Types of linkage
19. Significance of linkage
20. Crossing over
21. Gene Mapping
22. Physical map and Genetic map
23. Ordered Tetrads
24. Alleles
25. Multiple alleles

26. ABO blood groups in human,

27. Self Incompatibility in plants

28. Pseudo alleles

29. Complementation test

30. Structure of Sex Chromosomes

31. Complete and incomplete sex linked genes

32. Y linked genes

33. X linked genes

34. Sex determination with examples.

35. Transformation

36. Conjugation

37. Transduction

38. F Plasmids

39. Bacterial Recombination

40. Three-point test crosses

Q. No. 3) Answer the following Questions: 4 Marks Each

1. Define Multiple alleles and Explain ABO blood groups in human.

2. What is Sex linked Inheritance and write a note on Structure of Sex Chromosomes

3. Write a note on Genetic Organization of Bacteria.

4. Write a detailed note on process transformation.

5. Define and Explain the process of conjugation.

6. Write a detailed note on process transduction

7. Discuss in detail about Genetic system in mitochondria.

8. Write a note on Genetic system in chloroplast.

9. Define Linkage and write a note on types of linkage

10. Define Linkage and write a note on significance of linkage.

11. Define Crossing over and write a note on types of Crossing over.

12. Define Crossing over and write a note on significance of Crossing over

13. Define Gene Mapping and write a note on physical map and genetic map.

14. Write a note on analysis of unordered and ordered Tetrads.
15. Define Mendelism and write a note on Mendel's experiment.
16. Write a note on Dihybrid cross with suitable example.
17. Write a note on Monohybrid cross with suitable example.
18. Define and Explain Genotypic and phenotypic ratio.
19. Add a note on Law of Dominance with suitable example.
20. Add a note on Law of segregation with suitable example.
21. Add a note on Law of independent Assortment with suitable example.
22. What is Test cross? Explain test cross with example.
23. What is Back cross? Explain Back cross with example.
24. Write a note on Modifications of Mendelian ratios.
25. Write a note on Co-dominance with suitable example.
26. Write a note on Incomplete dominance with suitable example.
27. Write a note on Interaction of complementary genes with suitable example.
28. Define epistasis and add a note on supplementary gene interaction.
29. Define epistasis and add a note on inhibitory gene interaction.
30. Write a note on theories and types of crossing over.

Q. No. 3) Answer the following Questions: 8 Marks Each

1. What is Gene Mapping and explain in detail about physical map and genetic map.
2. Write a detailed note on the analysis of unordered and ordered Tetrads.
3. Explain in detail about Genetic system in mitochondria and chloroplast.
4. What are Multiple Alleles? Explain ABO blood groups in human.
5. Discuss in detail about self-incompatibility in plants.
6. Discuss in detail about Complementation test.
7. Explain in detail about Complete and incomplete sex linked genes.
8. Explain Sex determination with examples.
9. Write a note on Y linked genes and X linked genes.
10. Explain folded fiber model of Genetic Organization.
11. Write a detailed note on Bacterial Recombination.

12. Discuss in detail about transformation.

13. Write in detail about conjugation.

14. Define transduction and Add a detailed note on transduction.

B. Sc. II BIOTECHNOLOGY SEMESTER III

Subject: DSC 1C: GENETICS (PAPER-II)

Question Bank

Q. No. 2) Answer the following Questions: 2 Marks Each

1. Chromosome
2. Heterochromatin
3. Euchromatin
4. Lampbrush Chromosome
5. Polytene Chromosome
6. Sex Chromosomes
7. Role Of Chromosome In Heredity
8. Mitosis
9. Mitosis
10. Karyotyping
11. Induced Mutation
12. Spontaneous Mutation
13. Chemical Mutagenic Agents
14. Physical Mutagenic Agents
15. Chromosomal Abrasion
16. Polyploidy
17. Aneuploidy
18. Euploidy
19. Transposable Elements
20. Insertion Sequences
21. Bacterial Transposons
22. Nonreplicative Transposition
23. Eukaryotic Trasnsposable Elements
24. DNA Transposases
25. Satellite DNA

26. Gene Frequency

27. Genetic Drift

28. Factors Affecting Gene Frequency

29. Significance Of Population Genetics

30. Multiple Factor Hypothesis

31. Transgressive Segregation

32. Mean

33. Mode

34. Median

35. Standard Deviation

36. Coefficient Of Variation

37. Quantitative Genetics

Q. No. 3) Answer the following Questions: 4 Marks Each

1. Define Chromosome and Explain its Structure and Organization.

2. Write a note on Lampbrush chromosome

3. Write a note on Heterochromatin and euchromatin

4. Write a detailed note on polytene chromosome

5. Define Sex chromosomes and Explain Role of chromosome in heredity.

6. Define and Explain process of Mitosis.

7. Discuss in detail about Meiosis.

8. Write a detailed note on Karyotyping

9. Define Mutation and write a note on Spontaneous and induced mutation

10. Discuss in detail about Effect of mutation and detection of mutants.

11. Define Chromosomal abrasion and Explain its types.

12. Define Transposable elements and write a note on types of bacterial transposons.

13. Define DNA transposases and write a note on LINES and SINES.

14. Write a note on Chemical, physical and biological mutagenic agents.

15. Add a note on replicative and non-replicative transposition.

16. Write a note on Numerical alteration in chromosome

17. Write a note on mini & micro satellite DNA.

18. Define gene frequency and enlist factors affecting gene frequency.
19. Add a note on principles of Hardy-Weinberg law.
20. Add a note on evolutions in some crop plants and animals.
21. Add a note on Multiple factor hypothesis.
22. What is population genetics? Explain Significance of population genetics.
23. Write a note on Multiple factor hypothesis
24. Describe Structure of chromosome with neat labelled diagram.
25. Explain the quantitative data range.

Q. No. 3) Answer the following Questions: 8 Marks Each

1. Write a detailed note on replicative and non-replicative transposition.
2. Write a detailed about Hardy-Weinberg law and factors affecting gene frequency.
3. Explain in detail about different types of bacterial transposons.
4. Explain in detail about stages of Mitosis.
5. Discuss in detail about Chemical, physical and biological mutagenic agents.
6. Discuss in detail about Numerical alteration in chromosome with suitable example.
7. Add a note on Lampbrush chromosome and polytene chromosome.
8. Define Chromosome and explain structure and organization of chromosome.
9. Write a detailed note on stages of Meiosis.
10. What is Chromosomal abrasion? Explain types of Chromosomal abrasion.

B. Sc. II BIOTECHNOLOGY SEMESTER III
Paper Title: Microbial Biotechnology
Subject: Paper-V- Genetics
Question Bank

Q. No. 2) Answer the following Questions: 2 Marks Each

1. Mendelism
2. Mendel's experiment
3. Monohybrid Cross
4. Dihybrid cross
5. Genotypic and phenotypic ratio
6. Law of Dominance
7. Law of segregation
8. Law of independent Assortment,
9. Back cross
10. Test cross
11. Co-dominance
12. Incomplete dominance
13. Supplementary gene
14. Complementary genes
15. Inhibitory gene
16. Epistasis
17. Linkage
18. Types of linkage
19. Significance of linkage
20. Crossing over
21. Transformation
22. Conjugation
23. Transduction
24. Bacterial Recombination
25. Chromosome
26. Structure of Chromosome

27. Types of chromosome
28. Chromosomal aberration
29. Mutagenic agent
30. Deletions and Duplications
31. Induced mutation
32. Spontaneous mutation
33. Transposable elements
34. Mean
35. Mode
36. Median
37. Chi-square Test

Q. No. 3) Answer the following Questions: 4 Marks Each

1. Define Mutation and Explain Mutagenic agents.
2. What is Chromosomal aberration and explain its types
3. Add a note on Induced and Spontaneous mutation
4. Write a detailed note on process transformation.
5. Define and Explain the process of conjugation.
6. Write a detailed note on process transduction
7. Define Linkage and write a note on types of linkage
8. Define Linkage and write a note on significance of linkage.
9. Define Crossing over and write a note on types of Crossing over.
10. Define Crossing over and write a note on factors affecting Crossing over
11. Define Mendelism and write a note on Mendel's experiment.
12. Write a note on Dihybrid cross with suitable example.
13. Write a note on Monohybrid cross with suitable example.
14. Define and Explain Genotypic and phenotypic ratio.
15. Add a note on Law of Dominance with suitable example.
16. Add a note on Law of segregationwith suitable example.
17. Add a note on Law of independent Assortment with suitable example.
18. What is Test cross? Explain test cross with example.

19. What is Back cross? Explain Back cross with example.
20. Write a note on Modifications of Mendelian ratios.
21. Write a note on Co-dominance with suitable example.
22. Write a note on Incomplete dominance with suitable example.
23. Write a note on Interaction of complementary genes with suitable example.
24. Define epistasis and add a note on supplementary gene interaction.
25. Define epistasis and add a note on inhibitory gene interaction.
26. Write a note on theories and types of crossing over.
27. Explain Monohybrid and Dihybrid crosses.
28. Explain types of Transposable elements.

Q. No. 3) Answer the following Questions: 8 Marks Each

1. Write a note on Monohybrid and Dihybrid crosses with suitable example.
2. Add a detailed note on Law of Co-dominance and Incomplete dominance.
3. Discuss in detail about Law of Independent assortment.
4. Define Chromosome and explain its structure and types.
5. What is Chromosomal aberration and explain its types.
6. Define Mutagenic agent and add a note on Induced and Spontaneous mutation.
7. Define Transposable elements and Explain types of Transposable elements.
8. Define Linkage and explain its types and significance.
9. Add a note on Types of Gene interactions.
10. Define Epistasis and explain supplementary gene interaction.
11. Write a detailed note on Bacterial Recombination.
12. Discuss in detail about transformation.
13. Write in detail about conjugation.
14. Define transduction and Add a detailed note on transduction.

B. Sc. II BIOTECHNOLOGY SEMESTER IV

Subject: DSC 1D: MOLECULAR BIOLOGY (PAPER-I)

Question Bank

Q. No. 2) Answer the following Questions: 2 Marks Each

1. Central Dogma
2. Draw structure of DNA
3. Enlist Salient features of double helix
4. Properties of Genetic code.
5. Denaturation of DNA
6. renaturation of DNA
7. cot curves
8. DNA topology
9. topoisomerases
10. RNA Structure
11. bidirectional replication
12. Semiconservative
13. Semi discontinuous
14. RNA priming
15. Prokaryotic DNA polymerases
16. DNA polymerases
17. DNA ligase
18. Primase
19. DNA damage
20. DNA Repair
21. Supercoiling of DNA
22. Solenoid structure of DNA.
23. Okazaki fragments.
24. Degeneracy of Genetic code.
25. Termination of replication in prokaryotes.

26. Draw structure of t-RNA
27. Draw structure of r-RNA

Q. No. 3) Answer the following Questions: 4 Marks Each

1. Explain properties of Genetic code.
2. Write a note on Mischer to Watson and Crick historic perspective.
3. Add a note on Salient features of double helix.
4. Discuss in detail about DNA with suitable diagram.
5. Write a note on Types of DNA.
6. Write in brief about DNA as genetic material.
7. Describe Molecular nature of Gene.
8. Write a note on evidences and properties of Genetic code.
9. Add a note on Denaturation and renaturation of DNA.
10. Discuss in detail about Cot curve.
11. Add a note on DNA topology and linking number.
12. Define topoisomerase and write a note on types of topoisomerases.
13. Discuss in detail about Organization of DNA in Prokaryotes.
14. Write a note on Organization of DNA in Eukaryotes
15. Add a note on Organization of DNA in Viruses.
16. Discuss about RNA Structure.
17. Explain Mitochondrial DNA.
18. Discuss chloroplast DNA.
19. Explain bidirectional replication of DNA.
20. Discuss Semiconservative mode of replication.
21. Describe Semi discontinuous replication.
22. Enlist Enzyme involved in DNA replication of prokaryotes
23. Add a note on DNA polymerases in prokaryotes.
24. Write a detailed note on Replication of DNA in Prokaryotes.
25. Discuss Θ (theta) mode of replication.
26. Explain replication of linear ds-DNA.
27. Add a note on D-loop (mitochondrial) replication model.

28. Discuss DNA polymerases of eukaryotes.
29. Write a detailed note on Replication of DNA in Eukaryotes.
30. Define DNA damage and add a note on Mismatch repair system.
31. Add a note on Excision repair mechanism.
32. Discuss in detail about Recombination repair mechanism.
33. Explain SOS repair mechanisms and its disorders.

Q. No. 3) Answer the following Questions: 8 Marks Each

1. Define DNA damage and add a note on Mismatch repair system.
2. Write a detailed note on Replication of DNA in Eukaryotes.
3. Write a detailed note on Excision repair mechanism.
4. Define topoisomerases and explain DNA topology-linking number.
5. Write a detailed note on Replication of DNA in Prokaryotes.
6. Discuss in detail about Enzyme involved in DNA replication of prokaryotes.
7. Add a note on Extra chromosomal DNA.
8. Discuss in detail about Enzyme involved in DNA replication of Eukaryotes.
9. Explian in brief about Mischer to Watson and Crick historic perspective.
10. What is DNA and discuss Salient features of double helix.
11. Add a detailed note on Organization of DNA in Eukaryotes.
12. Explain in brief about Types of DNA.
13. Discuss in detail about Enzyme involved in DNA replication of prokaryotes.
14. Discuss in detail about Enzyme involved in DNA replication of Eukaryotes.

B. Sc. II BIOTECHNOLOGY SEMESTER IV

Subject: DSC 1D : MOLECULAR BIOLOGY (PAPER-II)

Question Bank

Q. No. 2) Answer the following Questions: 2 Marks Each

1. RNA polymerase in prokaryotes.
2. Transcription.
3. RNA polymerase in Eukaryotes.
4. transcription unit
5. Operon concept
6. Repression and induction of genes
7. Repression and induction of genes
8. Promoter Sequence
9. Sigma factor and Rho protein
10. Introns.
11. Interrupted genes.
12. snRPs
13. Eukaryotic Activaters
14. Transcriptional Regulatory Protein
15. Split genes
16. Concept of Introns and Exons
17. Removal of Introns
18. Spliceosomes
19. Splicing pathways
20. Alternative splicing
21. Exon shuffling
22. RNA editing
23. mRNA transport
24. Ribosome structure
25. Eukaryotic Ribosomes.

26. Charging of tRNA
27. Amino acyl tRNA synthetases.
28. Fidelity of translation
29. Inhibitors of protein synthesis
30. Protein Stability
31. Transcription factors.
32. Trp operon.
33. Lac operon

Q. No. 3) Answer the following Questions: 4 Marks Each

1. Write a note on eukaryotic RNA polymerases.
2. Add a note on transcriptional factors.
3. Explain Fidelity of translation.
4. Discuss about unit of transcription.
5. Write a detailed note on transcription in Prokaryotes.
6. Discuss in detail about transcription in Eukaryotes.
7. What is transcriptional regulation and explain concept of operon.
8. Write a note on Lac operon.
9. Discuss Trp operon.
10. Add a note on Repression and induction of genes.
11. Explain in detail about Promotors and Enhancers.
12. Discuss about Eukaryotic Activaters and Repressors.
13. Add a note on Regulation of Transcription by Non-Encoding RNA signal integration.
14. Explain in brief about auxin Signal Transduction and its Regulation.
15. Write a note on concept of introns and exons.
16. Add a note on removal of Introns.
17. Discuss spliceosome machinery in detail.
18. Write a note on splicing pathways.
19. Discuss about alternative splicing.
20. Add a note on exon shuffling.

21. Describe about RNA editing.
22. Write a note on mRNA transport.
23. Explain in brief about Ribosome structure and assembly.
24. Describe various steps in protein synthesis.
25. Write a note on Charging of tRNA.
26. Discuss about amino acyl tRNA synthetases.
27. Write a detailed note on Translation in Prokaryotes.
28. Write a detailed note on Translation in Eukaryotes.
29. Discuss Fidelity of translation.
30. Write a note on Inhibitors of protein synthesis.
31. Add a note on Translation dependent regulation of mRNA and Protein Stability.
32. Write a note on Post translational modifications.

Q. No. 3) Answer the following Questions: 8 Marks Each

1. Discuss Post translational modifications.
2. Add a note on Translation in Prokaryotes.
3. Add a note on Translation dependent regulation of mRNA and Protein Stability.
4. Explain in brief about Translation in Eukaryotes.
5. Write a detailed note on f transcription in Prokaryotes.
6. What are split genes and add note on concept of introns and exons.
7. Write a detailed note on Transcription in Prokaryotes.
8. Add a detailed note on Transcription in Eukaryotes.
9. Define spliceosome machinery and explain splicing pathway.
10. Write a note on RNA editing and mRNA transport.
11. Define operon and Write a detailed note on Lac operon.

B. Sc. II ENTREPRENEURSHIP SEMESTER IV

Paper Title: Microbial Biotechnology

Subject: PAPER-VII: MOLECULAR BIOLOGY

Question Bank

Q. No. 2)	**Answer the following Questions: 2 Marks Each**
1.	Central Dogma
2.	Draw structure of DNA
3.	Enlist Salient features of double helix
4.	Properties of Genetic code.
5.	Translation
6.	Rolling Circle Model
7.	Trp Operon
8.	DNA topology
9.	topoisomerases
10.	RNA Structure
11.	bidirectional replication
12.	Semiconservative
13.	Semi discontinuous
14.	RNA priming
15.	Prokaryotic DNA polymerases
16.	DNA polymerases
17.	DNA ligase
18.	Primase
19.	DNA damage
20.	DNA Repair
21.	Replication
22.	Transcription
23.	Okazaki fragments.
24.	Degeneracy of Genetic code.

25.	Termination of replication in prokaryotes.
26.	RNA Polymerases
27.	Repression and Induction of genes
28.	Role of Ribosomes in translation.
Q. No. 3)	**Answer the following Questions: 4 Marks Each**
1.	Explain properties of Genetic code.
2.	Write a note on Structure of DNA.
3.	Add a note on Salient features of double helix.
4.	Discuss in detail about DNA with suitable diagram.
5.	Write a note on Types of DNA.
6.	Write a note on evidences and properties of Genetic code.
7.	Define topoisomerase and write a note on types of topoisomerases.
8.	Explain bidirectional replication of DNA.
9.	Discuss Semiconservative mode of replication.
10.	Describe Semi discontinuous replication.
11.	Enlist Enzyme involved in DNA replication of prokaryotes
12.	Add a note on DNA polymerases in prokaryotes.
13.	Write a detailed note on Replication of DNA in Prokaryotes.
14.	Discuss Rolling Circle Modelof replication.
15.	Add a note on D-loop (mitochondrial) replication model.
16.	Discuss DNA polymerases of eukaryotes.
17.	Write a detailed note on Replication of DNA in Eukaryotes.
18.	Define DNA damage and add a note on Mismatch repair system.
19.	Add a note on Excision repair mechanism.
20.	Discuss in detail about Recombination repair mechanism.
21.	Explain SOS repair mechanisms and its disorders.
22.	Explain the process of transcription in eukaryotes.
23.	Add a note on process of transcription in prokaryotes
24.	Write a detailed note on translation.

25.	Explain in detail about Trp operon.
26.	Discuss Lac operon in detail.
Q. No. 3)	**Answer the following Questions: 8 Marks Each**
1.	Define DNA damage and add a note on Mismatch repair system.
2.	Write a detailed note on Replication of DNA in Eukaryotes.
3.	Write a detailed note on Excision repair mechanism.
4.	Define topoisomerases and explain DNA topology-linking number.
5.	Write a detailed note on Replication of DNA in Prokaryotes.
6.	Discuss in detail about Enzyme involved in DNA replication of prokaryotes.
7.	Discuss in detail about Enzyme involved in DNA replication of Eukaryotes.
8.	What is DNA and discuss Salient features of double helix.
9.	Explain in brief about Types of DNA.
10.	Add a detailed note on process of Translation.
11.	Explain in brief about eukaryotic transcription.
12.	Write a note on process of transcription in prokaryotes.
13.	Add a detailed note on Lac operon.

B. Sc. Part - II (Semester-IV), CBCS Pattern,

CHEMISTRY (Paper-VII)

Physical Chemistry (w. e. f. Nov.2020)

QUESTION BANK

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2) Answer *any four* of the following (08)

1. What do you mean by electrochemistry? What are conductors and insulators?
2. Define the terms specific and equivalent conductance. How are they related to each other?
3. What is ionic product of water?
4. What is the principle used in moving boundary method?
5. Define sparingly soluble salt. Give any two examples of it.
6. State Kohlrausch law.
7. Define transport number of an iron
8. What are the types of conductors?
9. Define entropy. What are its units?
10. How entropy and probability relates with each other?
11. Entropy of liquid is higher than that of solid, why?
12. Entropy of ice is lower than that of liquid water. Give reason.
13. State third law of thermodynamics.
14. How is entropy change determined in fusion of solid?
15. How will you determine entropy changes in chemical reactions?
16. Entropy is a measure of unavailable energy. Explain
17. Explain Miller indices.
18 Mention the law of crystal symmetry.
19. Draw diagrams showing (100), (110) and (111) planes in simple cubic lattice.
20. What is crystallography? Name three fundamental laws of crystallography.
21. What is Bragg's equation? Give significance of terms
22. Explain in brief: (i) Space lattice (ii) Lattice sites
23. Explain the terms: (i) Plane of symmetry (ii) Axis of symmetry
24 Explain in brief: (i) Lattice planes (ii) Unit cell.
25. Define the terms: (i) Solution (ii) Solvent (iii) Solute (iv) Binary solution.
26. State Nernst's distribution law.
27. What are homogeneous and heterogeneous solutions?
28. Explain the phenomenon of association of solute in solvents.
29. Explain in brief miscible and immiscible liquids.
30. Explain the phenomenon of dissociation of solute in solvents.

3) Write short notes on *any two* of the following (08)

1. What do you mean by electrochemistry? Explain conductors and insulators.
2. Explain variation of specific and equivalent conductance with concentration.
3. Explain the various factors that influence the transport number.
4. Give a brief account of the term, Transport number
5. Define entropy. Give the physical significance of entropy.
6. Obtain the entropy change in mixing of gases.
7. State and explain third law of thermodynamics.
8. Describe the entropy change for physical transformations.
9. Give an account of (i) The law of constancy of interfacial angles (ii) The law of rational indices
10. Weiss indices and Miller indicates.
11. Distinction between Crystalline and amorphous solids.
12. What do you mean by diffraction of X- rays? What is Laue pattern?
13. Write a short note on, Theory of extraction.
14. State and explain Nernst distribution law. What are its limitations?

15. Write a short note on Distribution indicators.

4) Answer *any two* of the following (08)

1. Discuss in detail Hittorf's rule. OR Derive Hittorf's rule with the help of Ostwald's schematic diagram.
2. State and explain Kohlrausch law. How it may be applied to determine the solubility of a sparingly soluble salt?
3. Describe moving boundary method.
4. Give different applications of Kohlrausch law. How it may be applied to determine the ionic product of water.
5. Show that, (i) $\Delta S = 0$, in an isothermal reversible process and (ii) $\Delta S > 0$, in an isothermal irreversible process.
6. Discuss entropy changes in reversible and irreversible isothermal processes.
7. Show that for thermodynamically reversible process, the entropy change is always zero at constant temperature.
8. Explain the entropy change in physical transformations in, (i) fusion of solid and (ii) Vaporisation of liquid
9. State and explain law of crystal symmetry?
10. What is Bragg's equation? How is it applied in determination of crystal structure of sodium chloride?
11. Explain the difference between crystal structures of NaCl and KCI.
12. Give a full account of crystal structure of KCI.
13. State partition law. How is it modified when the solute undergoes association and dissociation in one of the solvents?
14. Give a full account or describe fully the process of extraction
15. Explain the application of distribution law for the determination of (i) molecular weight of solute in different solvents and (ii) solubility of solute

5) Answer *any one* of the following (08)

1. Discuss Factors influencing transport number.
2. Discuss in detail Hittorf's rule for migration of ions during electrolysis with schematic diagram.
3. Define transport number of an ion. Describe moving boundary method to determine the transport number of ion.
4. Describe applications of Kohlrausch law.
5. Discuss entropy changes in reversible and irreversible isothermal processes.
6. Define entropy. Give the physical significance of entropy.
7. Derive an expression for entropy change associated with temperature and volume changes of n moles of an ideal gas.
8. Derive Bragg's equation, $n\lambda = 2d\sin\theta$ for diffraction of X - rays by crystals. Give a full account of crystal structure of NaCl.
9. What do you understand by space lattice and unit cell? Draw neat diagrams to represent unit cell for the space lattices of (i) Simple cubic (ii) Body centred cubic and (iii) Face centred cubic lattice. How many atoms are associated with the unit cell of each type?
10. Mathematical show that in the process of extraction, it is economical to use whole of the solvent in a number of portions than to use all at once.

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Punyashlok Ahilyadevi Holkar Solapur University Solapur
B.Sc.-II Zoology (Semester-IV)
Paper Title-Animal Physiology: Controlling and Coordinating Systems
Paper No: VIII

Q.2: Answer the following questions briefly (2 marks questions):

1) Write any four functions of blood.
2) Define neurotransmitter and its function.
3) Define blood plasma and its functions.
4) Discuss location and function of goblet cells.
5) Write the functions of platelet.
6) Define the term 'resting membrane potential'.
7) Write the meaning of 'synaptic vesicles'.
8) Write the functions of sero-mucous acini.
9) Write on juxtaglomerular apparatus.
10) Write functions of islet of Langerhans in pancreas.
11)Types of muscles

12) Androgens

13) Role of FSH

14)Actin

15)Myosin

16)Menarch

17) Menopause

18)Red blood cell

19)Platlets

20) What is application of IVF techniques

21) Write any two ACTH hormone functions

22)What is function of thyroid hormone

Q.3: Write notes on the following (4 marks questions) 08

1) Discuss types of WBCs and their functions.
2) With a neat labeled drawing discuss histology of liver.
3) Write a note on ultrastructure of neuron with a labeled illustration.
4) Discuss histological architecture of cortex and medulla region of kidney.
5) With a neat labeled diagram discuss histology of tooth.
6) Structure of muscle fibre

7) Hormones of Neurohypophysis

8) oral contraceptives

9) oestrous cycle

10) Intrauterine device

11) surgical methods of contraception

12)Types of neurons

2.Granulocytesd

13)Hyaline cartilage

14)Adipose tissue

15)Function of epithelium tissue

16)Structure of stripped muscle

17)Agranulocyte

18)Glandular epithelium

19)Simple columnar epithelium

20)Stratified columnar epithelium

21)Simple cuboidal epithelium

22)Simple squamous epithelium

23) Pancreatic hormones and their functions
24) Disorder of thyroid hormone
25)Disorder of pancreatic gland

Q.4: Attempt the following (4 marks questions) 08

1) Write a detailed account on the ultra structure of skeletal muscle along with molecular and chemical basis of muscle contraction.
2) Discuss the histology of stomach with a labeled diagram.
3) Define action potential and add a note on its origin and propagation with a diagram.
4) Classify epithelial tissue along with their location, structure and function.
5) Give an account on the histology of ovary with a labeled diagram.
6) Ultra structure of skeletal muscle fibre

7) Describe Menstrual cycle

8) Lactation

9)Hormonal control of pregnancy

10)Parturition

11) Chemical basis of muscle contraction

12)Parotid gland

13)Submandibular gland.

14)Sublingual gland.

16)T.S. of Testis.

17)T.S .of Ovary.

18)Filiform papillae.

19)Fungiform papillae

20)Taste buds

21)Circumvallate papillae

22)Glands of stomach

23)L.S. OF Kidney

24)Natural methods of contraceptive.

25)Mechanical methods of contraceptive.

26)Chemical methods of contraceptive'

27)Copper T.

29)Metabolic hormones.

30)Male sex hormones.

31)Female sex hormones.

32)Function of placenta.

33)Physiological changes during pregancy.

Q.5: Answer any 'one' of the following (8 mark questions) 08

1) Give detailed account on structure, location, classification and functions of connective tissues.
2) Explain an outline of histological details of testis with labeled drawing.
3) Discuss the structure, location, classification and functions of muscular tissue
4) Write a detailed account on types of synapse and mechanism of synaptic transmission.
5) Give an account on the histology of ileum with a labeled illustration.
6) Describe contraceptive methods

8) Describe the molecular basis of muscle contraction

9) Describe the various hormones of Adenohypophysis

10) Describe the role of Pituitary gland and its hormones

11)Give an account of nervous tissue

12)Describe the cardiac muscle.

13)Define tissue. Describe the different type of epithelial tissue

14)Explain the different type of connective tissue

15)Describe the structure of bone

16)Describe the structure of striped muscles.

17)Give an account of fluid connective tissue

18)Give an account of skeletal tissue.

19) With neat labelled digram explain the V.S. of Tooth.

20)Give an account of tongue.

21)Describe basic histological organization of alimentary canal.

22)Give an account of salivary gland.

23)Describe the microscopic structure of pancreas as digestive gland.

24)Explain the gross structure of kidney.

25)Describe the histological structure of testis.

26)Describe the histological structure of ovary.

27)Describe the histological structure of liver.

28)Explain testicular hormone and their functions.

29)Give detailed account of oestrous cycle.

30)Give an account of menstrual cycle.

31)Describe physiological changes during pregancy.

32) Describe in detail IVF technique.

33) Explain hormonal secretion disorder of pituitary gland

34) Describe hormonal secretion disorder of Adrenal gland and thyroid gland

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
B.Sc. Entrepreneurship III (Sem–V)
(Syllabus to be implemented from w.e.f. June 2021)
Subject : Human Resource Management

Q.2 Solve any eight the following

1) Definition of HRM?

2) What is Recruitment?

3) What is job?

4) What is Business?

5) Job Specification?

6) Definition of Management?

7) Job Description?

8) What is profession?

9) What is Human Resource?

10) Define selection?

11) Concept of selection?

12) Job satisfaction?

13) Meaning of training?

14) What is development?

15) Explain convenience allowance?

16) Meaning of principle?

17) Meaning of method?

18) Job design?

19) Meaning of procedure?

20) What is mobility?

21) Promotion?

22) What is transfer?

23) Internal Mobility?

24) Demotions?

25) External Mobility

26) What is planning?

27) Meaning of succession planning?

28) What is programme?

29) Career development?

30) Career development system?

31) Meaning of career?

32) Meaning of Provident Fund?

33) What is gratuity?

34) Convenience Allowance?

35) Full From of LIC?

36) What is appraisal?

37) What is performance appraisal?

38) Long Form of P A ?

39) What is safety?

40) Long form of E.S.I.?

Q.3 (A) Attempt any tow of the following

1) Explain Performance appraisal?

2) Explain HRM and its role ?

3) Describe Function and Imp of HRM?

4) Define Selection and its procedure?

5) Explain recruitment and its objective?

6) Explain IMP and need of training?

7) Define internal and external mobility?

8) Describe career planning and elements of career planning?

9) Explain E.S.I. maintenance and convenience allowance?

10) Explain need and purpose of performance appraisal?

Q.3) B) Explain career planning and steps in career planning?

Q.4 (A) Attempt any tow of the following.

1) Define Essential of selection procedure?

2) Explain IMP of training ?

3) Define various training method ?

4) Explain job satisfaction

5) Define internal and external source of recruitment

6) Explain steps in selection procedure

7) Explain need and purpose of internal mobility

8) Define steps in career development

9) Explain employee benefit

10) Define methods of performance appraisal

Q.4 B Define internal and external mobility

Q.5 **Attempt two any following**

1) Explain provident fund and gratuity

2) Define elements of career development programme

3) Explain use and problems of P.A.

4) Describe transfer and its types

5) Define reasons and principle of demotion

6) Explain need and objective of training

7) Define various training method

8) Define principle of development

9) Explain recent trend in selection procedure

10) Describe role of human resource management

2 mark questions

1) Draw the nature of trajectory of particle entering in crossed uniform and constant electric and magnetic fields.
2) Write gauss law in differential form and give meaning of each term.
3) Write down Poissons equation with meaning of each term.
4) State coulomb's law.
5) Write down the Laplace in operator in spherical coordinates.
6) Define self-inductance and state its unit.
7) Define mutual inductance and state its unit.
8) State Faradays law and Lenzs law.
9) State transformer ratio.
10) Define electromotive force.
11) Define surface current density.
12) State BiotSavarts law.
13) State relation between MB and h.
14) State relation between de and p.
15) State ampere's law.
16) Determine the electrostatics force between two charges of magnitude 4C and 3C separated by a distance 1 cm in air. ($k = 9 \times 10^9$ Nm^2/C^2).
17) State Poyntings theorem.
18) What is skin depth?
19) Draw the graphical representation of plane electromagnetic waves.
20) State Poynting vector in terms of electrical magnetic field vectors.
21) Write down relation between momentum density (G) and Poyntings Vector(N).
22) State the relation between transmission coefficient and reflection coefficient.
23) What is transmission coefficient of electromagnetic waves?
24) What is reflection coefficient of electromagnetic waves?
25) Write equation of integral form of Maxwell equations.
26) Write Maxwell's equation for vacuum medium.
27) Define retarded time.
28) What is retarded potential?
29) What is the dipole moment for a dipole having equal charges -5C and 5C separated with a distance of 5 cm?
30) What is electric dipole moment?
31) Define electric displacement current.
32) Find the electric potential at a distance of 25 cm from charge 0.2 micro coulomb (Given)
33) State any two similarities between electric and magnetic fields.
34) What is electromagnetic induction?
35) Define magnetic permeability.
36) Define electric susceptibility.
37) Define magnetic vector potential.
38) Define electric scalar potential.
39) Write the equation of Lorentz force.
40) Define electric intensity give its SI unit.

4 marks questions

1. Derive an expression for potential at a point between plates of spherical capacitor.
2. Calculate the radius of circular orbit of an electron of 5 KeV in a magnetic field of 10^{-4} T (given, m=9.1 x 10^{-31} kg, e= 1.6x10^{-19} C)
3. Define EMF and obtain expression for motional EMF.
4. Obtain an expression for self-inductance of state conductor due to field inside it.
5. Deduce Faradays law of electromagnetic induction in the form.
6. Write note on Biot-Savarts law.
7. Derive equation of continuity.
8. State and prove Ampere's circuital law.
9. State Maxwell's equation for time dependent electric and magnetic fields in vacuum.
10. Prove orthogonality of eh and k vectors of electromagnetic waves.
11. Find the reflection and transmission coefficient for normal incidence at glass air interface.
12. A uniform electric field of 8 x 10^4 V/m along X- axis and uniform magnetic field of 0.06 T along Y- axis are established. What must be speed of electron that can be projected along Z- axis and passed through crossed fields without getting deviated?

5 marks questions

1. State coulomb's law. Derive Poisson's and Laplaces equations.
2. Discuss the nature of trajectory of charged particle entering a uniform electric field ($\vec{E}$) such that its initial velocity is perpendicular to $\vec{E}$.
3. Obtain integral and differential form of Faradays law.
4. Write a note on a) Faraday's law , b)Lenz's law.
5. Explain the physical significance of Maxwell's equation.
6. State and explain Maxwell's corrections to Ampere's theorem.
7. Write note on plane electromagnetic waves in dielectrics.
8. Considering the plane wave solutions for electromagnetic waves in vacuum. Show that electromagnetic waves are transverse.
9. Write a note on total internal reflection.
10. Obtain expression for total power radiated by an electric dipole.

6 marks questions

1. Discuss the nature of trajectory of a charged particle entering with constant speed in a uniform magnetic field ($\vec{B}$).
2. Explain mutual inductance and obtain Newmann formula.

3. Write down Maxwell's equation in vacuum. Derive $\nabla X \vec{B} = \mu_o . \vec{J}$
4. Establish conservation of momentum for electromagnetic fields.
5. Obtain the boundary conditions for electromagnetic field vectors $\vec{D}, \vec{E}, \vec{B}, \vec{H}$, interface of two media.

8 marks questions

1. Show that a charged particle moves along a cycloid when it enters mutually perpendicular electric and magnetic fields.
2. Show that a charged particle moves along a circular path with a constant speed, in a uniform magnetic field ($\vec{B}$)
3. What is transformer? Obtained the relation $\frac{\varepsilon_2}{\varepsilon_1} = \frac{N_2}{N_1}$
4. What is self-inductance? Obtain an expression for self-inductance of a solenoid.
5. State Maxwell equations for vacuum give meaning of each term. Explain the physical significance of Maxwell's equations.
6. Explain electromagnetic induction. Obtain integral and differential form of Faradays law.
7. State Maxwell's equations for material medium and derive equations giving divergence and curl of magnetic field.
8. State Maxwell's equations for material medium and derive equations giving divergence and curl of electric field.
9. For electromagnetic waves through linear dielectrics, show that i), $\vec{E}, \vec{H}$, and $\vec{K}$ are orthogonal ii) $\vec{E}, \vec{H}$ are in phase.
10. State Maxwell equations for conductors and hence set the wave equations.
11. Show that the plane electromagnetic waves propagating through conductors get attenuated exponentially and there by define the skin depth.
12. State the boundary conditions applicable for normal incidence of electromagnetic waves at the interface of two dielectrics and hence obtain expression for relative amplitude of reflected and transmitted waves with respect to that of incident plane wave.
13. Obtain expression for relative intensities of reflected and transmitted waves with respect to that of plane wave incident normally on the interface of two dielectrics.
14. Obtain an expression for total power radiated by an electric dipole.
15. What do you mean by radiation reaction? Get an expression for radiation reaction force for an electric dipole.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Question Bank

Subject- GEOLOGY

Class- B Sc III

Semester- VI

Paper No. XV

Paper Name- Environmental Geology

Q. 2) Answer any eight of the following. (16)

1. Which are any two examples of global scale disasters?
2. What are the any two examples of man made disasters?
3. What will be the effect on the infiltration if green cover is removed with reference to flood?
4. What is the polar climatic condition?
5. If green cover is removed; how will it affect weathered material on the slope, when a landslide is considered?
6. Write any two main purposes of dam construction?
7. Considering Basaltic, Sedimentary or Granitic terrains, which terrain will have the most surface runoff?
8. What is the main reason for the subsidence in Shanghai ?
9. Which layer of the atmosphere has the lowest & highest temperatures?
10. What percentage of the energy enters in the atmosphere & what percentage of it is reflected by clouds of low altitude?
11. Which condition of beds dip and the slope direction of the hill; landslide will be less possible?
12. What approximate temperature difference in the energy budget of the earth causes Global Warming presently?
13. What are two useful impacts of the GreenHouse Effect ?

14. Which two preparedness measures for COVID 19 pandemic have you identified through your personal experiences?
15. What percentage of sun energy is reflected back from earth's upper atmosphere & the ice sheets?
16. What is the name of the uppermost & lowermost layers of the atmosphere ?
17. What is the percentage of water trapped in the form of ice on the earth surface?
18. What are two common causes of the sinkhole collapse subsidence in karst areas ?
19. How much is the total energy that is not absorbed by the earth initially & is reflected back in the space ?
20. What are two hazardous products of volcanic eruptions?
21. Who are the heads of the district & state level disaster management teams?
22. When does the Latent Heat reside & leave the water cycle?
23. What are the main two symptoms that are associated with the volcanic hazard?
24. How much is the total energy absorbed & reflected by the earth's surface?
25. Mention two precaution measures for building structures related to flood hazard.
26. Which two reasons related with the dams, that will cause the hazard of flood ?
27. What will be the two phases of energy absorption response of the earth if the large scale plantation of trees is done on the earth?
28. On the earth, what is the distribution pattern of the potable water?
29. What are two common hazards associated with the volcano?
30. Which two structures are built along the bank of the river to control flooding?
31. In which disaster situations the masks are used as a part of mitigation?

32. What are the reasons for flooding in urban areas?
33. Give any two examples of conventional energy resources.
34. Give any two examples of non-conventional energy resources
35. Give any two examples of alternative energy resources.
36. Which two rock terrains are the least responsive to the weathering processes as in reference to the flood problems?
37. What are two Polar climate characteristics?
38. What are two sandy desert climate characteristics?
39. What are two coastal climate characteristics?
40. What are two riverine climate characteristics?
41. Which are the two ways that can relate Global warming with the flood?
42. Which are two major concerns of preparedness for flood?
43. What are two causes of subsidence?
44. What are the conditions of causes of avalanches?
45. How to monitor the possibility of volcanic hazard?
46. Ideally what is the total incoming and outgoing energy in the earth's energy budget?
47. Give any two drawbacks of non-conventional energy resources.
48. What are two environmental impacts of solar power harvesting?
49. What are two causes of failure of use of biogas in Indian urban regions?
50. What are the two main effects of conventional energy resources?

Q. 3) A) Attempt any Two of the following. (10)

1. What is Volcanic Hazard? Describe the preparedness related to it.
2. What is Flood Hazard? Describe the preparedness related to it.
3. What is Landslide Hazard? Describe the preparedness related to it.
4. What is Avalanche Hazard? Describe the preparedness related to it.
5. Describe the nature of the energy in an earth's energy budget.

6. Describe the role of Ozone in the earth's energy budget. Add note on present climatic scenarios related to it and the impact that may cause on the life of the earth.
7. What are the impacts of climate change related to drought?
8. How can the weathering processes be responsible for sea level changes?
9. How are mining activities related to landslides and the subsidence?
10. Wind as the agents of destructive activities in the lithosphere?
11. Wind as the agents of constructive activities in the atmosphere?
12. What causes wind? What are its relations to earth's energy distribution?
13. What is the lithosphere and the processes involved in.
14. Describe the water cycle of Hydrosphere
15. Describe the Biosphere of the earth.

Q. 3) B) Short note/Solve (06)

1. Describe the process of energy distribution of the sun along the latitude regions of the earth. Describe its relation with the wind currents on the earth.
2. How much is the total energy that never reaches the earth surface? Explain the causes for that.
3. Explain different stages of reflected energy from the earth in its proper sequence.
4. What is albedo? What is the Earth's albedo? What are the controlling factors of earth's albedo?
5. What is El Nino & La Nina ? What is its significance?

Q. 4 A) Attempt any Two of the following. (08)

1. Draw and describe the rock cycle of the lithosphere.
2. What is the difference between climate and the weather? Give examples of each.

3. What is the Coriolis Effect? Describe its nature in both the hemispheres. What is its significance?
4. Explain the anthropogenic reasons for climate changes and the atmosphere.
5. What is the meaning of preparedness for disaster? Explain the preparedness for a volcanic disaster.
6. Draw and describe the Carbon Cycle of the atmosphere.
6. Draw and describe the Nitrogen Cycle of the atmosphere.
7. Draw and describe the hydrological cycle of the hydrosphere.
8. What is mitigation in a disaster? Give one example in detail.
9. Define hazard and disaster. Explain the difference between them giving the example.
10. What is the importance of GIS in disaster management?
11. What are the long term effects of disaster? Explain with examples.
12. What is the role of technology in disaster management? Explain with examples.
13. What is the preparedness plan for the flood disaster?
14. What is the preparedness plan for the volcanic disaster?

Q. 4) B) **(8)**

1. Explain the interaction process between Lithosphere and atmosphere.
2. Explain the processes that cause drought.
3. What is the greenhouse effect? What are the reasons for it? Add note on the anthropogenic reasons for the greenhouse effect and its significance.
4. Explain the anthropogenic impact on the interaction process between Lithosphere & Biosphere.
5. Explain the anthropogenic impact on the interaction between Hydrosphere and the biosphere.

Q. 5) Attempt any Two of the following. **(16)**

1. Define the environment. Define environmental geology. Describe the fundamental concept, 'Earth is a closed system'. Give examples.

2. What is the atmosphere? Draw a sketch of the earth's atmosphere. Explain the details of the atmosphere.
3. What are the fundamental concepts of environmental geology? Add note on the fundamental concept, 'Earth has limited resources' with examples.
4. With appropriate examples, explain the nature of interactions of Biosphere and Lithosphere.
5. Explain the fundamental concept of 'Population' Give the examples based on the current facts related with this concept as an example.
6. Explain the appropriate examples to explain the nature of interactions of Biosphere and Hydrosphere.
7. What is the meaning of the energy budget of the earth? What are the objectives to study it? What is the role play for the individual after knowing the current facts about the energy budget of the earth?
8. Define disaster? Explain the structure and the nature of work flow of the National Disaster Management Team?
9. Define drought? What are the anthropogenic activities that cause droughts?
10. Explain in detail coastal environments. Add note on recent challenges in coastal environments and its impact on humans.
11. Explain in detail riverine environments. Add note on recent challenges in riverine environments and its impact on humans.
12. Explain in detail polar environments. Add note on recent challenges in polar environments and its impact on humans.
13. What is the lithosphere? Explain in detail the processes of the lithosphere that affects the environment.
14. What is the biosphere? Explain the environments of the biosphere.
15. What is hydrosphere? Explain the controlling factors of the hydrosphere. Add note on dependability of biosphere on it and impact on its population distribution.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY ,SOLAPUR

B.Sc-III Semester-VI

(New w.e.f. Nov 2021) ZOOLOGY

Paper-XVI –DSE-4B; APPLIED ZOOLOGY

QUESTION BANK

Q.1) Write one sentence answer

i) What is fish culture
ii) Breeding pond
iii) Hatching pond
iv) Fish seed
v) Any two names of fish diseases
vi) Any two methods of fish preservation (name of method)
vii) Define inland fishery
viii) Define marine fishery
ix) Define Apiculture
x) Species of honey bees
xi) Products of honey bees
xii) Scientific name of fresh water Prawn
xiii) Name of the rock bee
xiv) Name of the Indian bee
xv) What is monoculture
xvi) Example of Gear
xvii) Example of Craft
xviii) Fish morphometry
xix) Casts of Honey bee
xx) Food of B.mori
xxi) Scientific name of the lac insect
xxii) Host plant of Lac insect
xxiii) Any one use of lac

xxiv) Dairy farming

xxv) Viral disease of fowl

Q.2) Solve following questions

a) Salting of fish

b) Smoking of fish

c) Freezing of fish

d) Significance of preservation of fish

e) Preparation of fish seed

f) How Issinglass is prepared

g) Use of fish manure

h) Milk products

i) Figure of silk worm

j) Queen of honey bee

k) Drones of honey bee

l) Workers of honey bee

m) Common dairy animals

n) Define poultry management

o) Nutritive value of egg

p) Define brooding

q) What is transgenic animals

r) Define applied Zology

s) Zebra fish

t) Equipment used in poultry

u) What is special in Zebra fish

v) Figure of Lac insect

w) What is deep litter

x) What is the first procedure of Lac culture

y) Types of poultry

z) Significance of poultry

a) What is the purpose of induced breeding in fishes

b) Which major carps are used in induced breeding
c) Difference between Breeding pond and Stocking pond
d) Difference between breeding fish and hatching fish
e) Difference between fish gear and fish craft
f) Life cycle stages in lac insect

Q.3A) Write answer in brief

a) Define fish culture? Explain factors affecting the fish culture
b) Give an account on hatching pond
c) Describe procedure of culture of fresh water prawn
d) Give an account on transport of fish seed
e) Note on fish industry
f) Describe laws of fisheries
g) Types of gears used in fisheries
h) Types of Craft used in fisheries
i) Applications of biostatistics in fishery
j) Applications of remote sensing in fishery
k) Describe the life cycle of B.mori
l) Morphological features of B.mori
m) Role of bee in crop pollination
n) Composition of honey
o) Morphological feature of lac insect
p) Classification of lac insect
q) Give an account on processing of lac
r) Significance of sericulture
s) Cultivation of lac insect
t) Control measures of natural enemies of silkworm
u) Control measures of natural enemies of lac insect
v) Laying cages

w) Significance of Applied Zoology
x) Housing in poultry
y) What are the problems faced by dairy industry
z) What are the problems faced by poultry industry

Q.3B) Short notes—

a) Give an account on bee product and their uses
b) Describe honey and wax
c) Nuptial flight
d) Role of workers and drones
e) Role of queen
f) Types of cattle breed
g) Classification of common honey bees
h) Bee hive
i) Bee colony
j) Male lac insect and female lac insect
k) Pruning in lac culture
l) Types of lac
m) Explain the steps involved in the commercial cultivation of lac
n) What is the importance of apiculture

Q.4A) Write answer in details

a) Describe the common fish diseases
b) Write in detail the Aquaculture
c) Give an account on fish seed and breeding pond
d) Describe milk and milk products
e) Life history of lac insect
f) What are the uses of milk
g) Procedure of preparation of cheese, ghee and butter

h) What are the poultry products and its uses

i) Incubation and hatching of egg

j) Give an account on feed formulation for chicks.

k) Give an account on zebra fish as a model organism in research.

l) Significance of transgenic animals

m) Describe natural enemies of silkworm and their control measures

Q.4B) Describe /Explain

i) Give an account on Prawn culture

ii) Give an account on fresh water fish culture

iii) Nutritive value of egg and meat

iv) Common dairy animals

v) Lac culture industry

vi) Sericulture industry

vii) Describe the types of poultry

viii) Gibe an account on cattle breed

ix) Why Zebra fish is used in research

x) Describe benefits and limitations of dairy management

Q.5) Describe/Explain

i) What is aquaculture? Describe the culture of Indian major carps

ii) Describe the lac culture and diseases of lac insects

iii) Describe the sericulture and diseases of silkworm

iv) Give an account on Dairy industry and diseases of dairy animals

v) Describe applications of biostatistics in fisheries

vi) Give an account on common dairy animals and their significance

vii) Describe fisheries laws and regulation

viii) Morphology of four silkworm

ix) Give an account on techniques in dairy management

x) Describe methods of bee keeping

xi) Give an account on depletion of fisheries resources

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
B.Sc. Entrepreneurship III (Sem–VI)
(Syllabus to be implemented from w.e.f. June 2021)
Subject : Organizational Behavior

Q.2 Solve any eight the following

1) Define behavior?

2) What is emotion?

3) Define ability?

4) What is Group?

5) What is intelligence?

6) Long from of OB?

7) Definition of personality?

8) Definition Perceptions?

9) What is Ethics?

10) What is Power?

11) Meaning of Dynamic?

12) Define Motivation?

13) What is Politics?

14) Meaning of influencing?

15) Definition of management?

16) Meaning of individual behavior?

17) Meaning of organizational behavior?

18) Define group development?

19) What is thinking?

20) What is planning?

21) What is co-ordination?

22) What is control?

23) What is organizing?

24) What is stress?

25) What is work stress?

26) Define Experience?

27) What is motive?

28) Meaning of coping?

29) What is environment?

30) Meaning of Commerce?

31) Definition of E-Commerce?

32) What is opportunities?

33) Define Market?

34) Define electronic market?

35) Define conclusion?

36) Long form of EDI?

37) Long Form of WWW?

38) Meaning of web commerce?

39) Meaning of monetary payment?

40) What is electronic cash?

Q.3 (A) Attempt any tow of the following

1) Explain Introduction to Organization Behavior?

2) Define Individual & Organization Behavior?

3) Define Group Dynamics?

4) Define Types of Personality?

5) Explain Factors influencing perceptions?

6) Define perceptual process?

7) Explain Importance of motivation?

8) Define coping the stress?

9) Explain Electronic commerce environment?

10) Define Electronic data interchange?

Q.3) B) Hereberg theory

Q.4 (A) Attempt any tow of the following

1) Explain payment and purchase order process?

2) Describe Electronic data interchange?

3) Describe sources of stress?

4) Explain individual level of stressors?

5) Explain Maslews theory?

6) Describe Factors influencing perceptions?

7) Explain personality-trait theory?

8) Describe two of personality?

9) Explain Nature of groups?

10) Types of Learning Organization?

Q.4 **What is a perception? Write down perceptions process?**

Q.5 **Attempt two any following**

1) Explain learning theory?

2) Describe Type of group?

3) Why do people join group?

4) Explain time management?

5) Explain Sources of power?

6) Describe perceptual process?

7) Explain work stress model?

8) Describe Modes of Electronic commerce?

9) Explain online electronic cash?

10) Describe Commerce Net Advocacy?

Subject: Applied Mathematics II

Section I

Q.1 Find a root of the following equation $x^3 - x - 11 = 0$ using the regula-falsi method correct to three decimal places.

Q.2 Find a root of the following equation $x^3 - 3x + 1 = 0$ using the regula-falsi method correct to three decimal places.

Q.3. Find a root of the following equation $x^3 + x - 1 = 0$ using the Newton Raphson method correct to three decimal places.

Q.4. Find a root of the following equation $x^3 - 4x - 9 = 0$ using the Newton Raphson method correct to three decimal places.

Q.5. Evaluate $\sqrt{13}$ up to 3 decimal places.

Q.6. Evaluate $\sqrt{7}$ up to 3 decimal places.

Q.7. Find the double root of the eqution $x^3 - x^2 - x + 1 = 0$ given that it is near to 0.8.

Q.8. Find the double root of the eqution $x^3 - 5x^2 + 8x - 4 = 0$ given that it is near to 1.8.

Q.9. Perform two iterations of Newton-Raphson method to find a solution of the system

$x^2 + xy = 6$ & $x^2 - y^2 = 3$ taking $x_0 = y_0 = 1$

Q.10. Solve the system of nonlinear equation $x^2 + y = 11$ & $y^2 + x = 7$ taking $x_0 = 3.5$ & $y_0 = -1.8$ by using Newton-Raphson method.

Q.11. Use Gauss Elimination method to solve x + y + z = 2,x + 2y + 3z = 5,2x + 3y + 4z = 11.

Q.12. Use Gauss Elimination method to solve x + y + z = 9, 2x + 5y + 7z = 52, 2x + y – z = 0.

Q.13. Use Gauss Jordan method to solve x + 3y + 2z = 2 , 2x + 7y + 7z = −1, 2x + 5y + 2z = 7.

Q.14. Use Gauss Jordan method to solve 2x+3y−4z=53, x+4y−5z=−64, x+5y−6z=7

Q.15. Use LU Decomposition method to solve x + y + z = 1,4x + 3y – z = 6,3x + 5y + 3z = 4.

Q.16. Use LU Decomposition method to solve x + 2y + 3z = 9,4x + 5y + 6z = 24,3x + y – 2z = 4.

Q.17. Evaluate $\int_0^1 \frac{dx}{1+x}$ applying Trapezoidal rule.

Q.18. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Trapezoidal rule.

Q.19. Use Simpson's 1/3rd rule to find $\int_0^{0.6} e^{-x^2} dx$ taking seven ordinates.

Q.20. Compute the value of $\int_{0.2}^{1.4} (\sin x - \log x + e^x) dx$ using Simpson's 3/8th rule.

Q.21. Find an approximate value of $\log_e 5$ by calculating to 4 decimal places, by Simpson's 1/3 rule $\int_0^5 \frac{dx}{4x+5}$, dividing the range into 10 equal parts.

Q.22. Evaluate $\int_0^1 \int_0^1 xe^y dxdy$ using Trapezoidal rule wigh h=k=0.5.

Q.23. Evaluate $\int_0^5 \int_0^5 \frac{dxdy}{\sqrt{x^2+y^2}}$ taking two subintervals.

Q.24. Evaluate $\int_0^1 \int_0^1 e^{x+y} dxdy$ using Simpson's rule.

Q.25. Evaluate $\int_1^{2.8} \int_2^{3.2} \frac{dxdy}{x+y}$ using Simpson's rule.

Section II

1. Let A and B be fuzzy sets defined on universal set $X = \{-5,-4,-3,-2,-1,0,1,2,3\}$ as

$$A = \frac{1}{-5} + \frac{0.75}{-4} + \frac{0.20}{-3} + \frac{0.8}{-2} + \frac{0.32}{-1} + \frac{0.28}{0} + \frac{0.9}{1} + \frac{0.65}{2} + \frac{1}{3}$$ and

$$B = \frac{0}{-5} + \frac{0.80}{-4} + \frac{0.20}{-3} + \frac{0.70}{-2} + \frac{0.20}{-1} + \frac{0.15}{0} + \frac{1}{1} + \frac{0.60}{2} + \frac{1}{3}$$

Find $S(A,B)$ and $S(B,A)$

2. Find strong $\alpha-$cuts of the fuzzy set A defined by the membership function

$$A(x)=\begin{cases}\dfrac{x-10}{20}, & 10\le x\le 30\\ \dfrac{40-x}{10} & 30<x\le 40\\ 0, & otherwise\end{cases}\qquad \text{for } \alpha=0,0.3,0.9$$

3. Verify which of the following fuzzy sets are fuzzy numbers

(i) $A=\dfrac{1}{1}+\dfrac{0.5}{2}+\dfrac{0.6}{3}+\dfrac{0.7}{4}+\dfrac{0.8}{5}$

(ii) $B(x)=\log x,\ x\in[1,2.72]$

4. Let A be a fuzzy set defined on universal set $X=\{-3,-2,-1,0,1,2,3\}$ by the membership function $A(\mathrm{x})=\dfrac{x+3}{10},\ \forall x\in X$ and f be a function defined on X as $f(x)=2x^2+10$. Then find $f(A)$

5. Let A,B be the fuzzy numbers defined by the membership functions

$$A(\mathrm{x})=\begin{cases}\dfrac{x+5}{2}, & -5\le x\le -3\\ \dfrac{-x}{3}, & -3<x\le 10\\ 0, & otherwise\end{cases}\quad \text{and } \mathrm{B(x)}=\begin{cases}\dfrac{\mathrm{x}}{2}, & 0\le x\le 2\\ \dfrac{5-x}{3}, & 2<x\le 5\\ 0, & otherwise\end{cases}$$

find a fuzzy number $A.B$

6. Solve the fuzzy equation $A+X=B$ where A,B are fuzzy numbers defined by the membership functions $A(\mathrm{x})=\begin{cases}\dfrac{x-9}{2}, & 9\le x\le 11\\ \dfrac{14-x}{3}, & 11<x\le 14\\ 0, & otherwise\end{cases}$ and $\mathrm{B(x)}=\begin{cases}\mathrm{x}-5, & 5\le x\le 6\\ \dfrac{9-x}{3}, & 6<x\le 9\\ 0, & otherwise\end{cases}$

7. Let A be a fuzzy set defined on universal set $X=\{0,1,2,3,4,5\}$ by the membership function $A(\mathrm{x})=e^{-x},\ \forall x\in X$. Then find fuzzy cardinality of A

8. Let A,B be any two fuzzy sets defined on universal set X and $\alpha,\beta\in[0,1]$. Then prove that

(i) $^{\alpha}(A \cap B) = {}^{\alpha}A \cap {}^{\alpha}B$

(ii) If $\alpha \le \beta$, then ${}^{\beta}A \subseteq {}^{\alpha}B$

9. Let A be a fuzzy set defined on universal set $[-1,1]$ by the membership function

$$A(x) = \begin{cases} x+1, & -1 \le x \le 0 \\ 1-x, & 0 < x \le 1 \end{cases}$$ Find (i) Boundary of A (ii) Core of A

10. Let A, B be the fuzzy numbers defined by the membership functions

$$A(x) = \begin{cases} \frac{x-1}{4}, & 1 \le x \le 15 \\ 6-x, & 5 < x \le 6 \\ 0, & otherwise \end{cases}$$ and $$\mathrm{B}(x) = \begin{cases} \frac{x-6}{4}, & 6 \le x \le 10 \\ 11-x, & 10 < x \le 11, \\ 0, & otherwise \end{cases}$$ find $Max(\mathrm{A}, \mathrm{B})$

11. Let A, B be the fuzzy numbers defined by the membership functions

$$A(x) = \begin{cases} \frac{x+5}{2}, & -5 \le x \le -3 \\ \frac{-x}{3}, & -3 < x \le 0 \\ 0, & otherwise \end{cases}$$ and $$\mathrm{B}(x) = \begin{cases} \frac{x}{2}, & 0 \le x \le 2 \\ \frac{5-x}{3}, & 2 < x \le 5 \\ 0, & otherwise \end{cases}$$, find a fuzzy number A, B

12. Solve using the Simplex method the following problem: Maximize Z= *3x + 2y*

Subject to *2x + y ≤ 18, 2x + 3y ≤ 42, 3x + y ≤ 24,* $x \ge 0, y \ge 0$.

13. Solve using the Simplex method the following problem: Maximize = 40x+30y

Subject to $x + y \le 12,\ 2x + y \le 16,\ x \ge 0,\ y \ge 0$

14. The Funny Toys Company has four men available for work on four separate jobs. Only one man can work on any one job. The cost of assigning each man to each job is given in the following table. The objective is to assign men to jobs in such a way that the total cost of assignment is minimum.

	Job			
Person	1	2	3	4
A	20	25	22	28
B	15	18	23	17
C	19	17	21	24

D	25	23	24	24

QUESTION BANK FOR METALLURGY

1) Draw Fe-Fe_3C equilibrium diagram . Label all the temperatures & constituents.(06)

2) With the help of above diagram, explain the slow cooling of 0.2% carbon steel & draw the microstructure of this steel.(06)

3) Explain (i) A1 temperature (ii) A3 temperature.

4) Give typical composition, properties & applications of Any 5 of the following. (10)

(i) Hadfield Mn steel (ii) Ferritic Stainless steel (iii) HSS (iv) Naval Brass

(v) Free cutting steel (vi) Muntz metal (vii) Spring steel

5) Explain modification treatment given to Al-Si system.(04)

6) Answer the following (Any 4) (14)

(a) Compare between Gray Cast Iron & White Cast Iron.

(b) Explain why Copper is an essential constituent of Babbitts.

(c) Draw neat sketch of Interstitial solid solution & Substitutional solid solution.

(d) What are composites ? What are their applications ?

(e) Explain the application of Lever arm principle.

7) Draw TTT diagram for eutectoid steel.(04)

8) Compare Annealing & Normalizing.(04)

9) Explain the purposes of Tempering.(03)

10) Enlist various quenching media & their characteristics.(03)

11) Explain the significance of Hardenability? Which factors improve hardenability?(03)

12) Compare between Brinell & Rockwell hardness Tests.(04)

13) Explain why OHNS steels are subjected to subzero treatment.(03)

14) Draw the typical flow chart for manufacturing of self lubricated bearing by Powder metallurgy.(04)

15) Discuss various methods of Powder manufacturing.(03)

16) Explain X-ray radiography test with neat sketch.(04)

17) Explain Eddy current test with neat sketch.(04)

18) Write a note on Tensile testing (03)

19) Draw Fe-Fe_3 diagram. Label all the phases, constituents & temperatures correctly.(06)

20) Explain the meaning & significance of following terms. (08)

(i) Pearlite (ii) Cementite (iii) Ledeburite (iv) Acm line.

21) Explain classification of metallic materials.(04)

22) Give typical composition, properties & applications of following.(Any 5) (10)

(i) Invar (ii) HSLA steel (iii) Maraging steel (iv) Hot working tool steel.

(v) Gun metal (vi) Babbitts.

23) Compare between Brasses & Bronzes.(04)

24) Write a note on Any 4 of the following.(14)

(i) SG Iron

(ii) Classification of metallic materials.

(iii) Effect of Chromium & Nickel on properties of steel.

(iv) Austenitic stainless steel

(v) Stages in precipitation hardening of Al-4% Cu alloy.

25) Draw TTT diagram for eutectoid steel & show following heat treatments on it.(08)

(i) Austempering (ii) Normalizing (iii) Martempering (iv) Critical cooling rate

26) What is Annealing? Enlist different types with purpose of each.(06)

27) Explain the different stages in quenching.(03)

28) What are the advantages of Carbo nitriding over Gas Carburizing? (03)

29) What are the advantages & limitations of Powder Metallurgy? (04)

30) Explain set up for Ultrasonic test with its advantages.(04)

31) Compare between Dye penetrant test & magnetic particle test.(04)

32) Draw a neat flow chart for Cemented Carbide Cutting tools by powder metallurgy.(03)

33) What is Creep? Explain the factors affecting creep phenomenon. (04)

34) Write a note on Impact test & its significance.(03)

35) Draw Fe-Fe_3 equilibrium diagram, Label all the temperatures & constituents correctly.(06)

36) Explain Eutectic & Eutectoid transformations with respect to above diagram.(04)

37) Draw microstructures of 0.3% C steel & 1.0% C steel.(04)

38) Give typical composition, properties & applications of following.(Any 5) (10)

(i) HCHC steel (ii) Bell metal (iii) Tinman's solder (iv) Spring steel.

(v) OHNS Steel (vi) Free cutting steel.

39) Compare between Alpha brass & Alpha beta brass.(04)

40) Answer the following (Any four) (14)

(i) Why W is an essential element of HSS?

(ii) Explain the applications of nano materials.

(iii) Compare between SG Iron & Malleable Iron.

(iv) Explain why Cu is an essential constituent of Babbitts?

(v) Explain modification treatment given to Al-Si System.

41) Draw TTT diagram for eutectoid steel & superimpose following heat treatments on it. (07)

(i) Annealing (ii) Normalizing (iii) Hardening

42) Explain structural changes during different stages of tempering.(04)

43) Differentiate between hardening & martempering.(03)

44) Compare between Carburising & nitriding.(04)

45) Explain advantages of Induction hardening(03)

46) Draw flow chart for Manufacturing of sintered friction material by powder metallurgy (04)

47) What are advantages of Rockwell hardness test over other hardness test?(03)

48) Write short notes on (Any four)

(a) Applications of Powder metallurgy

(b) Magnetic particle test

(c) Fatigue testing

(d) Charpy Impact test & Izod Impact test

(e) Stress Strain curve for Mild steel & Cast Iron.

B.Sc. I Semester I
English (Compulsory)
Literary Voyage
Question Bank

Q. I. Write Short answers to the following questions.
1. What is the context of Gandhi's talk on religion?
2. What is the importance of Khadi in the context of the freedom struggle?
3. What is the most deep-seated disease in India? How can we eradicate it?
4. What are the various steps taken by Jadav to ensure the safety of forests??
5. How Mahatma Gandhi explain that his every speech is religious?
6. Enumerate the various awards and recognitions received by Jadav Payeng.
7. Describe the effects of floods on the river islands.
8. Why did the poet focus on the lotus flower in the poem?
9. What were the some of the problems faced by Jadav?
10. How was Jadav inspired to start planting trees?
11. Write a note on relationship between author and his grandmother?
12. How did the grandmother spend her time at the new house?
13. Describe the character sketch of grandmother.
14. What is the significance of sparrows?
15. What is the theme of the poem *Let Me Not Pray to be Sheltered from Dangers.*
16. Discuss the theme of the poem The Lotus
17. Discuss the theme of guilt in the poem *The Toys*
18. Explain the significance of toys in the poem *The Toys.*

Q 2. Broad answer questions
1 Explain the process of communication. What are the probable barriers to communication breakdown?
2. Discuss the components of communication.
3. Explain the richest channels and leanest channels of communication.
4. What are communication channels? Explain formal and informal communication channels.
5. What are the thirteen principles of effective communication.

B. Sc. I Semester II

English (Compulsory)

Literary Voyage

Question Bank

Q. Write short answers to the following questions.

1. Explain the relationship between education and virtue.
2. What was the writer reading? What did he find about great men in 19^{th} century?
3. Explain writer's opinion about education system of his time.
4. What is the meaning of discretion of speech?
5. Explain various kinds of discourse.
6. Explain the importance of humour and jest in discourse.
7. What are the desires in discourse?
8. What kind of people can achieve the true essence of freedom ?
9. What are the outcomes of a psychology that deals with terror?
10 . What plays an important part in the present age? How?
11. Comment on the theme of the *Ode on Solitude*.
12. What kind of life the poet wants to lead? Explain
13. What are the various images used by the poet to deliver his message?
14. Discuss the tone of compassion used by the poet.

Q. 2. Broad answer questions

1. Make presentation on your favourite musician.
2. Make a presentation on your favourite movie.
3. Write a letter of application for the post of clerk in a bank.
4. Write a letter of application for the post of Assistant teacher in English.
5. Write process of bread making using appropriate linkers.
6. Write process of making chapatti using appropriate linkers.

Question Bank
Punyashlok Ahilyadevi Holkar Solapur University,Solapur
Class:- B.Sc.I (Sem-I) Subject: Geology
Paper Name –Physical Geology Paper No. I

Unit -I

1. What is the Shape of earth

2. Write Thickness of crust, mantle and core

3. what is focus and epicenter of the earthquake

4. Define weathering

5. Define Earthquake

6. Define Volcano

7.How size of the Earth calculated

8. Products of volcano

9. Intensity of Earthquake

10. Explain the nebular hypothesis.

11. Describe central type of volcanoes.

12.Difference between nebular and planetisimal hypothesis

13. What is Shape and size of earth

14.Name the discontinuities of earths layer

15.Define focus and epicenter

16. Define weathering

17. Define Volcano

18. Define Earthquake

19.Explain the nebular hypothesis.

20. Describe central type of volcanoes.

21.write Intensity and magnitude of Earthquake with their disaster

22.Earthquake waves

23. Write Products of volcano with occurrence

24. Draw and explain Seismograph instrument

25. What is Shape and size of earth

26.Name the discontinuities of earths layer

27.Define focus and epicenter

28.Define weathering

29.Define Volcano

30.Define Earthquake

31.Earthquake waves

32.Products of volcano with their distribution.

33.Seismograph. **8**

34.Explain the nebular hypothesis.

35.Describe central type of volcanoes.

36. Write Rotation and revolution of earth

37. Write Asthenosphere

38. Define focus and epicenter

39.Define weathering

40. What is sima.

41.Intensity and magnitude of Earthquake

42.S Nature of seismic waves

43. write Products of volcano

44. Explain Seismograph Instrument

45.Explain the planetismal theory of earth origin.

46.Describe fissure type of volcanoes.

47.Describe causes of earthquake

Unit- II

1. Describe types of weathering
2. Describe the earth interior
3. Describe physical, chemical and Biological weathering
4. Describe the earth interior
5. Explain layers of earth with discontinuities.
6. write any two hypothesis on origin of earth
7. Describe Chemical and physical weathering with suitable example
8. Describe physical data of Earth
9. Describe physical types of weathering with example
10. Describe Internal Structure of Earth

Punyashlok Ahilyadei Holkar Solapur University, Solapur

B.Sc. I Sem I (CBCS pattern W.E.F. June 2019)
Subject - Geology
Paper II – Structural Geology

Q. 2 Answer any four of the following **8**

1. What is strike
2. What is true dip and apparent dip?
3. What is fault
4. Write the difference between fault and joint.
5. What is topographic map?
6. What is geologic map?
7. what is an outcrop
8. What is anticline fold
9. what is syncline fold
10. Define Dip
11. Define contour.
12. What is true dip and apparent dip?
13. Define bed and bedding plane
14. Define fold
15. Define fault
16. What is limb of fold?
17. What is Net slip in fault?
18. Define joint
19. Define unconformity
20. what is bedding joints

Q 3. Write short notes on any two of the following **8**

1. columnar joints
2. fault terminology.
3. Brunton compass
4. use of contours in geological maps
5. Horst and graben
6. significance of joints.
7. Terminology of fold
8. Chevron and fan fold
9. Non-conformity
10. Disconformity

Q 4. Answer any two of the following **8**

1. Describe horst and graben.
2. Describe genetic classification of joints
3. Describe use of contour in geologic and topographic maps.
4. Describe different terminology related to bed as bedding plane and outcrop
5. Explain overturned and recumbent fold
6. Explain normal and reverse fault.
7. Describe significance of unconformity
8. Draw neat labeled diagrams showing strike, dip, true dip direction and Apparent dip direction
9. Explain different types of contour representing any two types of topographic features.
10. Describe use of Brunton compass to determine the attitude of the beds.

Q 5. Answer any one of the following **8**

1. What is fold? Describe any three types of fold.
2. Define unconformity? Describe various types of unconformities.
3. Define fault? Describe any three types of faults.
4. What is an outcrop? Describe how to determine attitude of outcrop in field.
5. Describe the classification of joints.

Question Bank

B.Sc.-I Semester –II

Analytical Chemistry (paper IV)

Q No.2 - Short answer type ques.

1. Define the term ‘Parachor.’ Give its unit.

2. Define Viscosity. How is it related to fluidity of liquid?

3. What are the advantages of Ostwald’s Viscometer?

4. What is Macleod’s equation? Give it’s modifications by Sugden.

5. Explain the terms: (a) Dissolved oxygen

(b) Biological oxygen demand

6. Explain the term Nuclear pollution and Soil pollution.

7. What is air pollution? Give its classification.

8. What do you understand by optical exaltation. Describe giving suitable example.

9. Define the term water pollution and water pollutants.

10. Explain the term industrial effluent and sewage.

11. What is automobile pollution? What are the main sources of automobile emission?

12. What is soil pollution? Give its sources.

13. What is the principle of Carbon and hydrogen detection?

14. What is the name of assembly units used in Liebig method?

15. Write the reaction occurs while testing sulphur.

16. What is the relation between empirical and molecular formula.

17. Give the reaction for the detection of carbon and hydrogen.

18. What are the reactants used in Kjeldahl’s flask?

19. Write the formula used to find the percentage of nitrogen in an organic compound and explain the terms involved in it.

20. Give the reaction occurs in Kjeldahl's flask.

21. Define the term Knocking and Cracking.

22. Give the constituents of petroleum.

23. Define the term hydroforming and octane number.

24. Explain the terms petroleum and petrochemicals.

25. Write the synthesis of paracetamol.

26. Write the synthesis of styrene.

27. What are the fractions collected in petroleum refining?

28. Define the term molar refractivity. Give its equation.

29. Draw the structure of p-dichlorobenzene and p-nitrochlorobenzene. Which one is polar?

30. Explain the term surface tension of liquid. Give its unit.

Q.No.3 - Write short notes on any two of the following.

1. Electrical polarization of molecules.

2. polar and non-polar molecules in detail. Give its example.

3. Induced polarization of molecule.

4. The Snell's law. How is it related to refractive index?

5. Air pollutants. How are they classified?

6. The source and health hazards of NO2.

7. physical method for sterilization of water.

8. Noise pollution. Discuss its classification.

9. The reactions of Lassaigne's nitrogen test.

10. The principle of estimation of nitrogen by Kjeldahl's method.

11. Draw neat labelled diagram of estimation of hydrogen and carbon.

12. Preparation of paracetamol and 2-phenyl ethanol. Give its two industrial applications.

13. The Chemical methods used to remove germs and bacteria from water.

14. Municipal sewage. Give its main objectives of treatment.

15. Refining of petroleum.

Q. No.4 – Answer any Two of the following.

1. Explain in detail 'orientation polarization of molecules.'

2. Explain with suitable examples, the use of dipole moment in the study of molecular structures of triatomic and tetra atomic molecules.

3.Explain in detail the term 'Surface tension.'

4. What is green house effect?

5. Discuss the source and health hazards of CO.

6.Write a short note on Carius method for the estimation of sulphur.

7. Discuss the estimation of halogen by Carius method.

8. What are the reaction occurs when an organic compound fused with sodium metal?

9. Discuss in detail 'induced polarization of molecule.'

10. Give the use of using K_2SO_4, $CuSO_4$ and H_2SO_4 in Kjeldahl's method.

11. Discuss in detail catalytic reforming and knocking of petroleum.

12. Write a short note on 1) Constituent of petroleum

2) Refining of petroleum

13. Write the synthesis of adipic acid and 2-phenyl ethanol.

14. How the germs and bacteria from water are removed by the physical method? Discuss these in brief.

15. Draw the neat labelled diagram of Ostwald's viscometer. Write Poiseuille equation and explain the terms involved in it.

Q. No.5 – Answer any one of the following.

1. Describe in detail demineralization of water.

2. Discuss in detail sources of water pollution.

3. What is Snell's law? Describe experimental method for determination of refractive index.

4. Describe the titration method to determine molecular weight of acid.

5. Discuss the Liebig combustion method to estimate carbon and hydrogen.

6. What do you mean by petroleum? How it is refined into different fractions?

7. Describe synthesis and industrial applications of any two petrochemicals.

8. Describe the experimental method for determination of viscosity 0f liquid.

9. What are the types of pollution? Explain any four of these.

10. How suspended matter of water are removed? Explain in brief.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc. Part-I(Semester- II) CBCS Examination

BOTANY

PaperIII- Plant Ecology

Question Bank

Q.2) Answer the following.

1. Define Ecology.
2. Defineautecology.
3. Definesynecology.
4. What are heliophytes?
5. What are sciophytes?
6. Enlist different soil separates
7. What is soil humus?
8. What is photoperiodism?
9. Define hydrophytes.
10. Write any two morphological adaptations of hydrophytes.
11. Write any two physiological adaptations in xerophytes.
12. What is plant density?
13. Give the formula for calculating density.
14. What is phenology?
15. Define cryptophytes.
16. Give two examples of geophytes.
17. Enlist biotic components of an ecosystem.
18. What is food chain?
19. What is ecological pyramid?
20. What is food chain?
21. What is food web?
22. Define ecosystem.
23. Enlist biotic components of an ecosystem.

24. Enlist abiotic components of an ecosystem.
25. What is plant succession?
26. Define Primary succession.
27. Define Secondary succession.
28. Enlist sequential steps that occur in the process of succession.
29. What is xerosere?
30. What is hydrosere?
31. Enlist various stages of hydrosere?
32. Enlist various stages of xerosere?
33. Enlist sequential steps that occur in the process of succession.
34. Define conservation ecology.
35. Define resource ecology.
36. Write useful effect of wind
37. What is ecesis
38. What is stratification
39. What is IVI
40. Define density & give its formula
41. Define frequency & give its formula

Q.3) Write short notes on the following.

1. Discuss 'Light' as a climatic factor
2. Comment up on the soil profile
3. Discuss about soil humus and soil organisms.
4. Morphological and two physiological adaptations in hydrophytes.
5. Morphological and anatomical adaptations in xerophytes.
6. Morphological and anatomical adaptations in hydrophytes.
7. Role of decomposers in an ecosystem.
8. Stratification in forest community.
9. Classification of plant community based on the habitat.
10. Biotic components of an ecosystem.
11. Abiotic components of an ecosystem.
12. Productivity of an ecosystem.
13. Pyramid of number in forest ecosystem.
14. Comment on primary succession.

15. Comment on secondary succession.
16. Write chemical properties of soil
17. What is capillary water
18. Describe soil profile
19. Explain water holding & field capacity of soil
20. Explain wind as ecological factor

Q.4) Answerthe following.

1. Explain in brief soil reaction and cation exchange capacity of soil
2. What is soil texture? Comment up on the 'Textural classes' of soil
3. Discuss in detail any three physical and any two chemical properties of soil.
4. What is the difference between weather and climate? Discuss any two climatic factors you have studied.
5. Describe any three important anatomical adaptations of hydrophytes.
6. Write any four morphological adaptations in hydrophytes.
7. What are xerophytes? Write any three anatomical adaptations in xerophytes.
8. Draw phenogram of any one plant species you have studied.
9. Comment on the association between Rhizobium and root nodule cells.
10. What is plant succession? Give an outline of possible trend of succession in aquatic environment.
11. What is plant succession? Give an outline of possible trend of succession in xeric environment.
12. What is plant succession? Comment on Primary succession.
13. What is plant succession? Comment on Secondary succession.
14. What is plant succession? Enlist sequential steps that occur in the process of succession.
15. Discuss the first two stages of xerosere.

Q. 5) Answerof the following.

1. Discuss the impact of light and wind on plant life.
2. Explain in detail formation of soil (Pedogenesis).
3. What are xerophytes? Explainmorphological andanatomical adaptations in xerophytes.

4. What are hydrophytes? Explain morphological andphysiological adaptations in hydrophytes.
5. What are synthetic characters of the community? Explain any two synthetic characters you have studied.
6. What are analytical characters of the plant community? Explain any two qualitative and any two quantitative characters of the plant community.
7. What is ecosystem? Enlist biotic and abiotic components of an ecosystem and comment on any two biotic and any one abiotic components of ecosystem.
8. What is plant succession? Describe various stages of hydrosere?
9. What is plant succession? Describe various stages of xerosere?
10. Write an account of process of plant succession.

Punyashlok Ahilyadei Holkar Solapur University, Solapur

B.Sc. I Sem II (CBCS pattern W.E.F. June 2019)
Subject - Geology
Paper IV – Mineralogy

Question Bank

Unit I

1. Define streak of mineral? How can it determine.
2. Name the parts of lower nicol prism?
3. Define fracture of minerals
4. Colour of minerals
5. What is pleochroism of minerals.
6. specific gravity
7. Twinkling of minerals
8. Relief of minerals.
9. Describe the form of mineral in physical properties of minerals.
10. Describe the isotropic and anisotropic minerals.
11. Describe the different chemical bonding in minerals.
12. Define Isotropism
13. Define Streak of Minerals
14. Describe Bladed and Columnar form of minerals with examples
15. Give the names of any two minerals showing Pleochroism
16. Give Chemical composition and physical properties of Olivine?
17. Define Fracture in Minerals.
18. Cleavage of minerals with example
19. Relief and their types

20. Hardness of Mineral and Scale

21. Describe Pleochroism with example

22 Describe Biotite Mineral

23. Explain Lower assembly of Polarized Microscope

24) Define Anisotropism

25) Describe any two names of minerals from Quartz/Silica Group

26) Draw diagram of Crystallized and Fibrous forms of Mineral

27) Give the names of any two minerals showing Pleochroism

28) What is Chemical composition of Olivine?

29) Define Cleavage in Minerals.

30) Lower assembly of Polarized microscope

31) Twinning and their types

32) Hardness of Mineral and Scale

33) Describe Isotropism with example

34) Describe Calcite Mineral

35) Explain any two types of Lusters in Minerals with example

36) Define Streak of mineral.

37) Describe Pearly lustre with example.

38) Describe Even form of mineral.

39) What is meant by Metallic lustre of mineral?

40) Write about Colour of mineral.

41) What is Hardness property of mineral?

42) Define cleavage?What is the cleavage of biotite?

43) What is Twinning of a mineral?

44) Explain Anisotropism.

45) What is upper polariser called as ?

46) How to distinguish between isotropic and anisotropic minerals using a petrographic microscope?

47) What is plane polarized light ?

48) Define mineral.

49) Give the names of minerals of pyroxene group.

50) What is polarized light?

51) Give the optical properties of Microcline.

52) Describe isotropism under microscope

53) What is Refractive index of the Canada Balsam?

54)What are covalent bonds?Give examples?

55) Name types of chemical bonds.

56) Physical properties of felspar group

57) Lustre and its types.

58) Physical properties of garnet.

59) Describe in brief pleochroism.

60) Explain different types of twinnings.

61) What is extinction?Name the types of extinction.

62) What is specific gravity of mineral?How it is calculated?

63) Describe Physical properties and chemical composition Biotite.

64) Describe Physical properties and chemical composition Microcline.

65) What is form of a mineral? Describe any two forms of minerals with neat sketches.

66) Describe and Draw a figure of ionic bonds in minerals.

67) Describe Physical properties and chemical composition of orthoclase

68) Give the scale of Hardness of minerals.

69) What are interference colours when minerals are observed under microscope?

Unit II

1) Describe luster, cleavage and Hardness of minerals

2) Describe optical properties form, twinning and extension of minerals.

3) Define Mineral. Describe Physical properties, chemical composition, Optical properties of Orthoclase and Microcline

4) Define Mineral. Describe Physical properties, chemical composition, Optical properties of Garnet and Calcite

5) Define Mineral. Describe Physical properties, chemical composition, Optical properties of Muscovite and Biotite

6) Define Mineral. Describe Physical properties, chemical composition, Optical properties of Orthoclase and Microcline

7) Define mineral and write note on hardness of mineral.

8) Describe feldspar group of minerals with physical properties,chemical composition,uses and occurrence

9) Describe upper assembly of petrological microscope.

10) Describe lower assembly of petrological microscope.

11) Define Pleochroism in brief with examples and sketches

12) What is relief in minerals? Explain their types with suitable diagrams

13) Describe types of luster.

14) Describe members, chemical composition and physical properties of Pyroxene group minerals

15) Describe mineral Calcite with physical properties,chemical composition,uses, occurrence with optical properties.

16)Describe silica group/family of minerals with physical properties,chemical composition,uses and occurrence.

17) Distinguish between ordinary and petrological microscope

18) Draw neat-labeled diagram of petrological microscope.

19) Decsribe Olivine group of minerals with physical properties,chemical composition,uses and occurrence.

20) Pyroxene group of minerals with physical properties,chemical composition,uses and occurrence.

21) Write a note on chemical bonding in minerals

22) Define fracture. Describe any two types of fractures of minerals with examples.

23) Describe physical and chemical properties of muscovite and biotite.

24) Describe amphibole group minerals with physical properties,chemical composition,uses and occurrence.

25) What is twinkling phenomenon?Explain with sketches and examples.

26) Describe Epidote with physical properties,chemical composition,uses and occurrence.

27) Write optical properties of olivine.

28) Describe Garnet under microscope.

29) Describe fracture, cleavage and their types with example.

30) Describe physical properties, varities and occurrence of mica group of minerals.

31) Describe optical properties under PPL (Plane Polarised Light)

32) What are carbonates ? Describe their physical,chemical properties and optical properties of Calcite.

Punyashlok Ahilyadei Holkar Solapur University, Solapur

B.Sc. II Sem III (CBCS pattern)
Subject - Geology
Paper V – Igneous Petrology
Question Bank

Unit I

1. Define concordant forms?
2. What is magma and lava?
3. What is eutectic point?
4. What is isotherm? explain with suitable diagram
5. Define holocrystalline texture
6. Describe Batholith with suitable diagram
7. Describe Volcanic igneous rocks with their formation
8. Describe the glass and crystals with suitable diagram
9. Describe the plutonic igneous rock.
10. Describe any two discordant forms of igneous rock.
11. Describe the crystallization of unicomponant magma.
12. Difference between magma and lava
13 Difference between concordant and Discordant Intrusion
14. Difference between minerals and rock
15. Spreading of Acidic and Basic lava
16. Minerals in Granite
17. Minerals in Basalt
18. Ophitic and Poikilitic Texture

19. What is Vesicular and amygdaloidal Structure ,Describe briefly.
20. Pillow and Columnar Structure
21. Define concordant forms?
22. What is magma and lava?
23. What is eutectic point?
24. What is isotherm?
25. Define holocrystalline texture
26. Describe the batholith
27. Describe Volcanic igneous rock
28. Name the Volcanic rocks

Unit II

1. Describe structures of igneous rock
2. Describe the differentiation process and their results
3. Explain Differentiation by liquid immiscibility and gaseous transfer
4. Crystallization of Unicomponent and Bicomponent magma
5. Any two concordant igneous intrusions
6. Describe Ropy and flow Structure with suitable diagram
7. Composition of magma
8. Granitic and Glassy Texture
9. Describe Vesicular and amygdaloidal Structure with their formation
10. Pillow and Columnar Structure
11. Any two discordant igneous intrusions
12. Describe Ropy and flow Structure with their formation
13. Describe Composition of magma with procedure
14. Explain Differentiation by liquid immiscibility and filtration
15. Crystallization of Binary and Tertiary magma with suitable diagram

16. Describe the plutonic igneous rock.
17. Describe any two discordant forms of igneous rock.
18. Describe the crystallization of unicomponant magma.
19. Describe structures of igneous rock
20. Describe the differentiation process

Question Bank

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Class: - B.Sc.-I (Sem-II Paper No – III) June 2022

Subject: Geology

Paper Name – Crystallography

Q. 2 Answer any four of the following

i) What is Crystal?
ii) Describe Planes and Axes of Symmetry of Triclinic System
iii) Draw labeled diagram of crystallographic axes of Orthorhombic system
iv) Define Crystallography
v) What is Form?
vi) Give Definition of Dome
vii) Describe Planes and Axes of Symmetry of Tetragonal System
viii) Draw labeled diagram of crystallographic axes of Cubic system
ix) Define combined forms of Crystal
x) What is interfacial angle?
xi) Define Plane of Symmetry
xii) Define Axes of Symmetry
xiii) What are closed and open forms?
xiv) Define Parameters of crystal.
xv) What are interfacial angle?

Q.3 Write short notes on any two of the following

i) Crystallographic axes of Monoclinic and Triclinic system
ii) Contact Goniometer
iii) Orthorhombic Pinacoid and their types
iv) Crystallographic axes of cubic and Hexagonal system
v) Octahedron and Trapezohedron
vi) Hexa-octahedron and Dodecahedron
vii)Basal Pinacoid
viii) Prism
ix) Elements of Symmetry
x) Cube and Trapezohedron

Q.4 Answer any two of the following

i) Describe Faces, Solid angle and interfacial angle of crystal with labeled diagram
ii) What is Center and Axes of Symmetry?
iii) Draw and Describe Pyramid crystal
iv) Describe Any 2 forms of Cubic system
v) Explain Plane and Axes of Symmetry
vi) Draw and Describe Octahedron crystal
vii) Describe any 2 forms of Orthorhombic system
viii) Describe any 2 forms of Hexagonal system
ix) Explain Goniometer with diagram
x) Explain parameters and Indices

Q.5 Answer any one of the following

i) Define crystal. Describe Crystallographic axes, Elements of Symmetry and any two forms of Cubic System.
ii) Define crystal. Describe Crystallographic axes, Elements of Symmetry and any two forms of Tetragonal System.
iii) Define crystal. Describe Crystallographic axes, Elements of Symmetry and any two forms of Hexagonal System.
iv) Define crystal. Describe Crystallographic axes, Elements of Symmetry and any two forms of Orthorhombic System.
v) Define crystal. Describe Crystallographic axes, Elements of Symmetry and any two forms of Monoclinic System.
vi) Describe Crystallographic axes of all crystal ststems

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY

● QUESTION BANK ●

B.Sc. Part-II (Semester–III), (CBCS)

CHEMISTRY (Paper–VI)

Inorganic Chemistry

Q.2 Answer Any Four of the following **(02 Marks Questions)**

i) Define Coordinate bond. How it is denoted?

ii) Draw the Werners structure of $CoCl_3 \cdot 6NH_3$

iii) Define ligand and give any one example of monodentate ligand

iv) What is effective atomic number? Give its example

v) Give any two limitations of VBT

vi) Discuss in brief the formation of coordinate bond with suitable example.

vii) Give the limitations of Werners coordination theory

viii) Distinguish between primary valency and secondary valency.

ix) Write the formula of Tetramminecopper(II) sulphate

x) Distinguish between inner orbital and outer orbital complex with suitable example.

xi) Define chelation by giving suitable example.

xii) Give any two examples of bidentate chelating agent.

xiii) Draw the structure of EDTA and indicate their point of attachments for metal.

xiv) Draw the structure of DMG. Name the metal ions which are detected by DMG.

xv) Define metal chelate and metal complex.

xvi) Write the general outer electronic configuration of 3d-block elements. Name the elements showing anomalous electronic configuration in it.

xvii) Write the general outer electronic configuration of 4d-block elements. Name the elements showing anomalous electronic configuration in it.

xviii) Write the general outer electronic configuration of 5d-block elements. Name the elements showing anomalous electronic configuration in it.

xix) Write the outer electronic configuration of chromium and copper.

xx) Write the outer electronic configuration of Palladium and Silver.

xxi) Write the outer electronic configuration of Platinum and Gold.

xxii) Give reason, why elements of first transition series are more reactive than second and third transition series.

xxiii) Write the formula for calculation of magnetic moment of first transition series and second and third transition series.

xxiv) Write the spin only formula. Calculate magnetic moment for Fe^{2+} ion by it.

xxv) Write the factors causing colouration in transition metal compounds.

xxvi) Define Lewis acid and Lewis base. Give example of each.

xxvii) What is symbiosis?

xxviii) Explain the relative stability of haloacids on the basis of Pearsons HSAB concept.

xxix) Write the demerits of Lewis theory

xxx) What are bordered line acids and bases? Give example of each.

Q.3 Write short note on <u>Any Two</u> of the following (04 Marks Questions)

i) Postulates of coordination theory

ii) Distinction between double salt and complex salt

iii) Postulates of VBT/ basic concepts of VBT

iv) Structural requirements of chelate formation

v) Difference between metal chelate and metal complex

vi) Classification of chelating agents

vii) Classification of acids and bases as hard and soft

viii) Applications of HSAB principle

ix) Acid-Base strength and hardness-softness

x) General Characteristics of 3 d-block elements w.r.t oxidation state

xi) General Characteristics of 3 d-block elements w.r.t colour

xii) General Characteristics of 3 d-block elements w.r.t magnetic properties

xiii) Comparison of 1st transition series with 2nd & 3rd transition series w.r.t. reactivity, stability of oxidation state, magnetic behavior and stability of complexes

xiv) High spin and low spin complexes w.r.t. CN = 4 / CN = 6

xv) Limitations of Valence bond theory.

Q.4 Answer <u>Any Two</u> of the following (04 Marks Questions)

i) Explain the structure of $CoCl_3 \cdot 3NH_3$ / $CoCl_3 \cdot 4NH_3$ on the basis of Werner's theory.

ii) Discuss in brief geometrical isomerism in coordination compounds having coordination number (CN)= 4 / (CN)= 6

iii) Write the symbol, name and electronic configuration of elements of 4d block elements.

iv) Explain hard and soft, acids and bases with suitable examples

v) Explain the structure of $CoCl_3 \cdot 5NH_3$ / $CoCl_3 \cdot 6NH_3$ on the basis of Werner's theory.

vi) What are transition elements? Discuss various oxidation states of elements of first transition series.

vii) What are d-block elements? Give an account of colour formation property in the elements of 3d series.

viii) What are Lewis acids and Lewis bases? Give the merits and demerits of Lewis acid-base concept.

ix) What is chelation? Explain bidentate chelating agents with specific illustration.

x) Discuss ligands, chelating agent, chelation and metal chelate in brief.

xi) What is Werner's theory? Give the limitations of it.

xii) How will you differentiate metal chelate from metal complex

xiii) Give their position of transition metals elements in periodic table. Discuss magnetic properties of elements of first transition series.

xiv) Discuss acid base strength and hardness-softness

xv) Explain the role of EDTA / DMG as a chelating agent.

Q.5 Answer <u>Any One</u> the following (08 Marks Questions)

i) Discuss in brief optical isomerism in coordination compounds having coordination number (CN)= 4 and 6

ii) Write the symbol, name and electronic configuration of elements of 3d-block elements. Give their position in periodic table.

iii) Write the symbol, name and electronic configuration of elements of 5d-block elements. Give their position in periodic table.

iv) Give the general characteristics of 3d-block elements w.r.t catalytic properties and their tendency to form complexes.

v) On the basis of VBT, explain the formation of $[NiCl_4]^{2-}$ complex ion. Comment on its stability and magnetic property.

vi) Discuss the formation of $[Fe(CN)_6]^{3-}$ complex ion with the help of VBT and explain their stability and magnetic property.

vii) Give the applications of EDTA as a chelating agent. Draw the structure of any one metal chelate formed by it.

viii) Give the applications of DMG as a chelating agent. Draw the structure of Ni-DMG chelate formed by it.

ix) Give the applications of HSAB principle.

x) State Pearsons HSAB concept with suitable example and give the limitations of HSAB principle.

Question Bank

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Class: - B.Sc.-II (Sem-III) Examination: May/June 2022
Subject: Geology
Paper Name – Sedimentary and Metamorphic Petrology (Paper – VI)

Q.2: Answer any four of the following

i) Give any two names of rocks of showing thermal metamorphism
ii) What is Dynamo-thermal metamorphism?
iii) Give two names of rocks showing Granulose structure.
iv) Define Clastic structure
v) What Arenaceous rocks?
vi) Define Metamorphic Facies
vii) Give any two names of minerals of Eclogite facies
viii) What is contact metamorphsm metamorphism?
ix) Define Argillaceous deposits
x) Define Bedding structure
xi) Define Chemical deposits
xii) Define Carbonate deposits
xii) Define cataclastic metamorphism
xiii) Give two names of Residual deposits
xiv) Define sedimentary rocks
xv) Give the composition of Bauxite

Q.3: Write short notes on any two of the following

i) Stratification structure
ii) Greenschist Facies
iii) Marble
iv) Cross bedding structure
vi) Granulite Facies
vii) Stress and Anti-stress minerals
viii) Eclogite facies
ix) Limestone
x) Rudaceous rocks

Q.4: Answer any two of the following

i) Describe Slaty structure
ii) Explain Residual deposits with examples
iii) Describe Size of sediments
iv) Describe Schistose structure
v) Explain Conglomerate and Breccia
vi) Describe Shape of sediments
vii) Describe Arenaceous sedimentary deposits
viii) Explain Zeolite facies
ix) Draw labelled diagrams of cross and Graded bedding structures
x) Explain Augen structure

Q.5: Answer any one of the following

i) Define Sedimentary rocks. Describe Conglomerate and Breccia
ii) Define Metamorphic rocks. Describe Agents of Metamorphism
iii) Define Sedimentary rocks. Describe Laterite and Bauxite
iv) Define Metamorphic rocks. Describe Marble and Slate
v) Define Metamorphic rocks. Describe any three structures of metamorphic rocks
vi) Define Sedimentary rocks. Describe different processes involved in formation of sedimentary rocks

Punyashlok Ahilyadevi Holkar Solapur University,solapur

B.Sc.II (Semester - IV) (CBCS) 2022

CHEMISTRY (Paper-VII)

Physical Chemistry

Questions bank

2. Answer of the following (each 2 marks)

i) Define conductors and non conductors.

ii) Define conductivity and give its unit

iii) Define equivalent conductivity and give its unit

iv) Define molecular conductivity and give its unit

v) Explain the terms specific resistance

vi) Define specific conductivity and give its unit

vii) Define transport number of ions.

viii) State Kohlrausch law

ix) State third law of thermodynamics.

x) Define entropy give its units

xi) Define standard entropy.

xii) Entropy of a liquid is higher than that of solid, why?

xiii) Mention any two thermodynamic state functions.

xiv) Mention any two physical significance of entropy.

xv) Explain entropy change in fusion of solid.

xvi) Give only equation of entropy change in vaporization and transition.

xvii) Define unit cell.

xviii) Define space lattice and lattice sites.

xix) Define lattice plane.

xx) State law of constancy of interfacial angles.

xxi) State law of axial ratio.

xxii) Define plane of symmetry.

xxii) Define axis of symmetry.

xiv) Define center of symmetry

xv) Define Weiss and miller indices

xvi) State Nernst's distribution law

xvii) Give meaning of $k= c_1/c_2$

xviii) Give modified distribution law for association and dissociation of solute.

xxix) Give application of park process.

xxx) What is distribution coefficient?

3. Write short note of the following (each 4 marks)

1) Write a short on variation of specific and equivalent conductivity with dilution.

2) Write a short on term specific and equivalent conductivity and how are they related to each other.

3) Write a note on factors affecting on transport numbers

4) Write a short on application of Kohlrausch law

5) Write a short on equivalent conductivity at infinite dilution

6) Write a short on Hittorf's number of ions.

7) Write a note on entropy changes in physical transformations

8) Write a note on entropy changes in mixing of gases

9) Write a note on physical significance of entropy

10) write a note on third law of thermodynamics,

11) Write a note on entropy changes in an isolated system.

12) Write short on Law of crystallography

13) Write short on types of cubic lattice

14) Write short on limitation of distribution law

15) Write short on modification distribution law.

4. Answer of the following (each 4 marks)

1) Distinguish at least four points between metallic and electrolytic conductors

2) What do you mean by strong and weak electrolytes? How equivalent conductivity at infinite dilution determine?

3) Explain the phenomenon of association and dissociation of solute in solvents

4) Calculate the change in entropy when 4 moles of CO_2 expands isothermally from 3 liter to 6 liter. ($R = 8.314\ Jk^{-1}mole^{-1}$)

5) Acetic acid has its normal molecular weight in water in the distribution of the acid between water and CCl_4 , The Concentration layer as follows.

$CH_2O(mol/dm^3)$:	10.8	7.96	5.01
$CCCl_4$ (mol/dm^3) :	1.325	0.729	0.29

Calculate the molecular weight of acetic acid in carbon tetrachloride

6) Explain the phenomenon of association and dissociation of solute in solvents.

7) Iodine has the same molecular weight in water and CCl_4, when varying amounts of iodine were shaken with water and CCl_4 mixture, the following

results were obtained.

$CH_2O(mol/dm^3)$:	0.000321	0.000502	0.000762
$CCCl_4$ (mol/dm^3) :	0.02736	0.04282	0.06533

Calculate the partition coefficient of iodine between water and iodine.

8) Derive Bragg's equation for inter planer distance of crystals.

9) At 298 k an aqueous solution containing 0.0413 kg/dm^3 of Iodine is in equilibrium with CCl_4 solution containing 3.531 kg of Iodine per dm^3. If solubility of Iodine in water is 0.34kg/dm^3 at 298k.what will be its solubility in CCl_4 ?

10) How will you determine entropy changes in chemical reaction?

11) Explain in detail planes of a simple cubic system

12) Give a full account of crystal structure of KCl.

13) Numerical problems on specific, equivalent molecular conductivity, transport number, degree of dissociation, ionic product of water, solubility and ionic mobility

14) Numerical problems on change in entropy, change in molar entropy, entropy of fusion, vaporization and transition

15) Numerical problems on Weiss and miller indices and Bragg's equation

5. Answer of the following (each 8 marks)

1) Explain the term spacing of lattice planes.NaCl and KCl belong to same group, NaCl has face centered cubic structure while KCl has simple cubic structure. Give reason. The X-ray pattern of KCl shows the first order maximum reflection at an angle 14.38^0. Using X-ray wavelength of 1.54×10^{-8}

cm. Calculate the spacing between the planes.

2) Define transport number of an ions. Describe the moving boundary method. What are it advantages?

3) Define isolated system. Calculate the entropy change during melting of ice at 0^0C at one atmosphere? The latent heat of fusion of ice = 422.25 Jk^{-1}/gm.

4) Derive the expression for entropy change for an ideal gas as a function of P, T.

5) Give a full account of crystal structure of NaCl and give difference between NaCl and KCL crystals.

6) Discuss process of extraction and give applications of extraction process.

7) Discuss the moving boundary method used for measurement of transport number of ions .

8) With the help of Hittorf's rule, explain migration of ions.

9) Write use of absolute entropy and derive the expression for entropy change for an ideal gas as a function of V and T

10) Derive an expression for entropy change in an isothermal reversible and irreversible process in an isolated system

Punyashlok Ahilyadei Holkar Solapur University, Solapur

B.Sc. II Sem IV (CBCS pattern. WE.F. Nov 2020)
Subject - Geology
Paper VIII – Paleontology

Question Bank

Q. 2 Answer any four of the following **8**

1. Define paleontology

2. Name the fossils of trilobites?

3. What is suture line in fossil?

4. Write conditions of fossilization

5. Describe physa.

6. What is sinistral cell

7. Describe echinus

8. what is medarporic plate

9. what is dextral cell

10. Define fossil

11. Gives the names of fossils of gastropods

12. Explain Peristome in echinoderms

13. Explain periproct in echinoderms.

14. Gives the names of fossils of brachiopods

15. what is aperture in gastropods

Q 3. Write short notes on any two of the following **8**

1. Petrification
2. Thorax of trilobite

3. Goniatite and natilus
4. Carbonation
5. Impression
6. Head of trilobite
7. Cardium
8. Appical system in echinoderms
9. Glassopteries
10. Gangamopteries
11. Write Morphology of Voluta
12. Write Significance of Gondwana fossil .
13. Write preservation of fossil in cold climate
14. Write Difference between caste and mold

Q 4. Answer any two of the following **8**

1. Describe the Glossopteris and gangamopeteris.
2. Describe the echinodrems.
3. Describe the gastropods.
4. Explain condition of fossilization
5. Describe any two mode of preservation of fossils.
6. Describe the significance of fossils.
7. Describe Gondwana flora of glossopteris and gamgamopteris
8. Describe Ogygia and paradoxide
9. Describe Natilus and Goniatite

10. Explain mould and cast

Q 5. Answer any one of the following **8**

1. Describe uses of fossils
2. Describe mode of preservation of fossil.
3. Describe the morphology of hard parts of lamllibranchiea
4. Describe the morphology of hard parts of trilobites
5. Describe the morphology of hard parts of echinoderms
6. Describe the morphology of hard parts of gastropods
7. Describe the evolutionary history of horse
8. Explain Classification and morphology of Cardita and Goniatite
9. Explain Classification and morphology of Ogygia and Paradoxide
10. Classification and morphology of Echinus and Micraster
11. Classification and morphology of Spirifer and Productus.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Question Paper for choice based credit system (CBCS) Semester Pattern

Event: March/April 2022

Class:- B. Sc. II

Subject: - Physics

Paper:- V (General Physics and Sound)

Time: - 2 hrs. Total Marks-40

Q E S T I O N B A N K

Q.1) Short answer type questions (Each Question for 2 marks)

1) What is precession?
2)What is a scalar field? Give one example.
3)Define bending moment.
4)Draw neat labeled diagram of Searle's viscometer.
5)Define vector triple product.
6)State Lanchester's rule.
7) Define neutral surface and neutral axis
8) Define transducers and give its examples
9) Define critical velocity of a rolling disc.
10)Draw neat labeled diagram of Ostwald's viscometer
11)What is a vector field? Give one example.
12)Define scalar triple product.
13)What is a flat spiral spring?
14)What are the different types of torques?
15) Define reverberation time.
16) What is viscosity?
17) Define gyroscope
18) What is nutation?
19) Define coefficient of viscosity.
20) State Newton's law of viscosity.
21) Give types of transducers.
22) What is passive transducer?
23) Give examples of active transducers.
24) Define elastic limit.
25) State Hook's law.
26) Define Stoke's law of viscosity.
27) Define terminal velocity.
28) Define viscous drag.
29) Define curl of vector field.
30) Define gradient of scalar field.
31) Define acoustics.
32) Define echelon effect.
33) Define optimum reverberation time.

34) State the applications of gyroscopic motion.
35) Give the relation between precessional, gravitational and gyrostatic torque.
36) Define gyrostatic torque.
37) Define gravitational torque.
38) Define precessional torque.
39) Define elasticity.
40) What is resonance effect?

Q.2) Short notes (Each Question for 4 marks)

1)Derive Sabine's formula for reverberation time.

2)Calculate the radius of curvature of path described by a disc of radius 5cm, rolling over a horizontal surface with its face inclined at an angle of 30^0 to the vertical

3) Define divergence of a vector field and give its physical significance

4)Explain gyroscopic motion and obtain an expression for its period. (4)

5) Ostwald's viscometer

6) Gyroscope

7)Carbon microphone

8)Obtain an expression for depression produced at the end of a bar forming a cantilever.

9)Describe the construction and working of Searle's viscometer.

10)Explain the physical significance of gradient of scalar field. (4)

11)Derive an expression for bending moment of an uniformly bent beam.

12)Derive an expression for precessional torque. What is nutation?

13)An auditorium of volume 1982 m^3 has a reverberation time of 0.9 secs when empty. Find the area of empty hall.

14) Explain various factors affecting acoustics of buildings.

15) Explain the construction and working of Rankin's viscometer.

Q. 3) Long answer type questions (Each Question for 8 marks)

1)Define vector triple product and obtain an expression for it.

2)Derive Sabine's formula for reverberation time.

3)Obtain an expression for depression produced at the end of a bar forming a cantilever.

4)Describe the construction and working of Ostwald' viscometer.

5) What is microphone? Describe the construction and working of carbon microphone

6)What is curl of a vector? Explain the physical significance of the curl of a vector field.

7)Derive an equation for the periodic time of a gyrostatic pendulum.

8)Explain the various factors affecting the acoustics of building.

9)Calculate the radius of curvature of path described by a disc of radius 5cm, rolling over a

horizontal surface with its face inclined at an angle of 30^0 to the vertical

10)Define divergence of a vector field and give its physical significance.

Q.4) Long answer type questions (Each Question for 8 marks)

1)Give the construction of Searle's viscometer. Explain how it can be used to determine

Viscosity of viscous liquids. Obtain an expression for coefficient of viscosity.

2)Discuss in detail the motion of a rolling disc. Obtain an expression for its critical velocity and radius of curvature of its path on the surface.

3)Define gyrostatic pendulum and obtain an expression for its period..

Calculate the rate of precession of a gyrostat of moment of inertia 40000 gm cm^2 about its axis of symmetry and the precessional torque acting on it is 200 dyne.cm and it rotates at the rate of 2 per second.

4)What is viscosity? Define coefficient of viscosity with unit.

5)What is microphone? Describe the construction and working of carbon microphone.

6)Explain gyroscopic motion and obtain an expression for its period.

7)What is flat spiral spring? Obtain an expression for modulus of rigidity of material of wire

of flat spiral spring

8)Discuss in detail the motion of a rolling disc. Obtain an expression for its critical velocity and radius of curvature of its path on the surface.

9)What is acoustics of buildings? Explain various factors affecting the acoustics of buildings.

10) Give the construction and working of loudspeaker.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Question Bank for B. Sc.-II (Sem.–IV) Examination 2022
PHYSICS (Paper - VII)
OPTICS
(w. e. f. Nov 2020 CBCS Semester Pattern)

Q. No.1) Select the correct alternative. (08)

Q. No.2) Answer any four of the following (08)

1) Define nodal points and nodal planes for a lens system.
2) Define focal points and focal planes for a lens system.
3) Define principal points and principal planes for a lens system.
4) Write expression of equivalent focal length in terms of power.
5) Prove that $\alpha f_1 + \beta f_2 = 0$.
6) State the Helmholtz's law of magnification.
7) Draw a neat ray diagram to represent a pair of principal Foci for converging system.
8) What is lateral magnification?
9) State different types of fringes obtained by using Michelson Interferometer.
10) Define visibility of fringes?
11) Obtain equation of P.D. between reflected ray and transmitted ray in Michelson's interferometer.
12) What is zone plate?
13) How zone plate is prepared?
14) Distinguish between magnification and resolution.
15) State Rayleigh's criterion for limit of resolution.
16) Distinguish between geometrical resolution and spectral resolution.
17) Define resolving power of a grating.
18) What is meant by resolving power of optical instrument?
19) Explain dextrorotatory and laevorotatory optical m active substances.
20) What is a quarter wave plate?
21) What is double refraction?
22) State laws of rotation of plane of polarization.
23) Define the term specific rotation, state its unit.
24) What is optical fiber?
25) What are the types of optical fiber?
26) State any four advantages of optical fiber.
27) Define 'numerical aperture'. State its unit.
28) What is pulse dispersion?
29) Calculate the thickness of half wave plate for sodium light of wavelength 5890 A^0 and refractive index $\mu_0 = 1.54$, $\mu_e = 1.55$
30) How Fabry Perot interferometer is superior over Michelson's interferometer?

Q. No.3) Write short notes on any two of the following (08)

1) Derive Lagrange's equation.
2) Obtain Newton's formula for a lens system.
3) Write short note on formation and working of fiber optic communication system?
4) Write short note on cardinal point of lens system.
5) Explain different types of fringes obtained by using Michelson Interferometer.
6) Explain application of Michelson interferometer for measurement of wavelength.
7) Write short note on rectilinear propagation of light on the basis of Fresnel's half period zone.
8) Explain construction and working of polarimeter.
9) Describe an experiment to demonstrate the rotation of plane of polarization.
10) Write short note on Nicol prism.
11) Write short note on optical rotation.
12) Explain the structure and principle of optical fiber.
13) What are the types of optical fiber? How are the optical fiber classified?
14) Write note on step index fiber.
15) Write short note on pulse dispersion in optical fiber?

Q. No.4) Answer any Two of the following (08)

1) Two thin convex lenses having focal length 6cm and 2cm are coaxial and are 4 cm apart. Calculate the focal length of combination and the position of principal planes. Indicate the positions in the diagram.
2) Derive the relation between f and f' for an optical system.
3) Derive the relation between lateral, axial and angular magnifications.
4) Define lateral, axial and angular magnification and derive the relation between them.
5) Describe the construction and working of Michelson's interferometer with schematic diagram.
6) Describe the construction and working of Fabry – Perot interferometer.
7) Derive the expression $\frac{1}{a} + \frac{1}{b} = \frac{n\lambda}{r^2}$ in case of Fresnel's type of Diffraction.
8) Two lines in the second order spectrum of a plane transmission grating are just resolved in a plane transmission grating. If the lines are formed due to the light of wavelengths 5890 A^0 and 5896 A^0. Find the number of lines in the grating.
9) Derive an expression for resolving power of a grating.
10) Describe how you will distinguish circularly polarized light from unpolarized light.
11) How does Nicol prism produce polarized light?
12) Calculate the thickness of quarter- wave plate for sodium light of a wavelength of 5893A^0, given μ_E = 1.553 and μ_o = 1.544
13) What are step index fibers? Explain in brief how pulse dispersion arises in step index fibers.
14) What are Graded index fibers? Explain in brief how pulse dispersion reduced in graded index fibers.
15) Two thin convex lenses of focal length 10 cm each are placed coaxially and are separated by a distance of 5 cm. find the equivalent focal length of the combination.

Q.No.5) Answer any one of the following (08)

1) Obtain an expression for equivalent focal length lens of a coaxial lens system.
2) Explain how a zone plate acts like a lens having multiple foci. Derive an expression for its focal length.
3) What is Fresnel's type of diffraction at straight edge? State the features of the diffraction pattern obtained.
4) Define resolving power of an optical instrument. Derive an expression for resolving power of prism.
5) State the laws of rotation of plane of polarization. Describe polarimeter experiment to determine the specific rotation of an optically active solution.
6) Describe the construction and working of Nicol prism. Discuss how you obtain a plane polarized beam of light with it.
7) What is a fiber optic communication system in detail?
8) Explain construction and working of Michelson interferometer and how it is for measurement of wavelength.
9) Explain construction, working of Fabry-Perot interferometer and how it is for measurement of wavelength.
10) Define resolving power of an optical instrument. Distinguish between magnification and resolution. Derive an expression for resolving power of grating.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc. Part-I (Semester- II) CBCS Examination

BOTANY

Paper IV- Taxonomy of Angiosperms

Question Bank

Q. 2) Answer the following.

1. Define taxonomy.
2. What is classification?
3. What is mean by Empirical approach?
4. What is mean by Interpretative approach?
5. Define nomenclature.
6. Define natural classification.
7. Define artificial classification.
8. Define phylogenetic classification.
9. Enlist the series of sub-class Polypetalae.
10. Enlist the series of sub-class Gamopetalae.
11. Define identification.
12. What is binomial nomenclature?
13. What is Expert Determination?
14. What is Recognition?
15. What is Comparison?
16. Define Herbarium.
17. Draw format of Herbaria label.
18. What is Collection trip?
19. What is mean by Exploration?
20. Define poisoning of plants.
21. Enlist the characters of sub-division Angiospermae.
22. Enlist the characters of class Dicotyledonae.
23. Enlist the characters of class Monocotyledonae.

24. Enlist the characters of sub-class: Polypetalae & Gamopetalae.
25. Enlist the characters of orders: Polemoniales & Rosales.
26. Write habit and habitat of Liliaceae.
27. Enlist the plants of economic importance in Liliaceae.
28. Enlist the the plants of economic importance in Caesalpiiaceae.
29. Enlist the the plants of economic importance in Solanaceae.
30. Enlist the the plants of economic importance in Liliaceae.
31. Enlist the the plants of economic importance in Nyctaginaceae.
32. Enlist the the instruments required for collection of plant in the field.
33. Enlist steps of Herbarium method.
34. Write down correct botanical name of any plant species in ICBN format.
35. What is the full-form of ICBN?

Q. 3) Write short notes on the following.

1. Write short note on Empirical approach and Interpretative approach.
2. Explain in brief principles of Taxonomy.
3. Write in brief about 'Taxonomy and Systematics' in hands of different taxonomists.
4. Write a note on artifical cassification.
5. Write a note on natual cassification.
6. Write a note on phylogenetic cassification.
7. Write short note on Binomial nomenclature of plants.
8. Why scientific names are treated as Latin?
9. Write short note Need for Scientific Names.
10. Write a short note on significance of herbarium.
11. Functions of Lead Botanical Garden.
12. Write the systematic position of Solanaceae.
13. Write the systematic position of Caesalpiniaceae.
14. Write the systematic position of Nyctaginaceae.
15. Write the systematic position of Liliaceae.

Q. 4) Answer the following.

1. What are the principles of taxonomy?
2. What are the aims of taxonomy?

3. Write short note on Identification.
4. Write down the salient features of Bentham and Hooker's system of classification.
5. Write down the merits of Bentham and Hooker's System of classification.
6. Write down the demerits of Bentham and Hooker's System of classification.
7. Comment upon merits and demerits of Bentham and Hooker's system of classification.
8. Explain in brief need for 'scientific names' to plant species.
9. Which are the methods used for plant identification.
10. Enlist the correct steps in preparation of herbarium specimens.
11. Write a short note on collection of plant specimens for herbarium.
12. Write a short note on labeling and storage of plant specimen for herbarium.
13. Enlist the distinguishing characters of Solanaceae.
14. Enlist the distinguishing characters of Caesalpiniaceae.
15. Enlist the distinguishing characters of Nyctaginaceae.

Q. 5) Answer of the following.

1. Comment upon Identification, Nomenclature, and Classification in taxonomy.
2. Write an essay on introduction of taxnomy.
3. Comment upon aims of taxonomy.
4. Comment upon outline of the system of classification presented by Bentham and Hooker.
5. Comment up on characters considered before plant identification.
6. Write an essay on introduction and principles of ICBN.
7. Write an essay on Identification of plants.
8. What is Herbarium? Explain in detail method of preparation for herbarium specimens.
9. Write an essay on Lead Botanical Garden of Shivaji University Kolhapur.
10. Write systematic position, morphological characters & distinguishing characters and economic importance of Caesalpiniaceae.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Question Paper for choice based credit system (CBCS) Semester Pattern

Event: March/April 2022

Class:- B. Sc. III

Subject: - Physics

Paper:- IX (Mathematical and Statistical Physics)

Time: - 3 hrs. Total Marks-80

Q U E S T I O N B A N K

Q. 1) B) Fill in the blank/Definition/One sentence answer/ one word answer/ Give the name/Predict the product etc. (Each question for 1 mark06)

1) Define priori probability.

2) Stokes theorem gives the relation between line integral with----------

3)Write Laplacian operator ∇^2 in orthogonal curvilinear co-ordinates.

4) What do you mean by an ensemble?

5) Give three coordinates of spherical coordinate system are

6) Give the momentum of a photon

7) What is the effect of temperature on black body?

8) What is the charge on photon?

9) Define Fermi energy.

10) Rest mass of photon is----------

11) What are accessible microstates?

12) Electrons are the particles which belongs to which statistics

13) When the distribution is most probable

14) Give an equation for the total energy U of N molecules of an ideal gas

at the absolute temperature T

Q. 2) Solve any Eight of the following. (Each question for 2 marks) .

1)Define microstates and macrostates

2)What is phase space?

3)Define most probable distribution.

4)What is Cartesian co-ordinates system?

5)What is Fermi energy?

6)Define Boson and Fermions

7)Define orthogonal curvilinear coordinate.

8)Define canonical and micro canonical ensemble.

9)Define R.M.S Velocity

10)Write basic postulates of Bose-Einstein statistics

Q. 3) A) Attempt any Two of the following. (Each question for 5 marks)

1) State and prove Stoke's theorem.
2) State and prove Green' theorem
3) Explain electronic specific heat of solids.
4) Obtain an expression for divergence of vector field in orthogonal curvilinear coordinates System
5) Explain electronic specific heat of metals.
6) Derive Rayleigh- Jean's law from Planck's law.
7) Derive Wein's law from Planck's law
9) Obtain an expression for curl of vector field in orthogonal curvilinear coordinates System
10) Obtain Stefan's law from Planck's law.

Q. 3) B) Short note/Solve(Each question for 6 marks)

1)Obtain an expression for average speed of gas molecules.
2) Obtain an expression for R.M.S Velocity of gas molecules
3) Explain postulates of priori probability.
4) Explain microstates and macrostates
5) Explain black body radiation.

Q. 4 A) Attempt any Two of the following. (Each question for 4 marks)

1) Derive Rayleigh-Jean's formula from Planck's radiation formula.
2) Explain Green's first theorem
3) Deduce Wien's displacement law from Planck's radiation formula
4) Explain ensemble.
5) Explain canonical and micro canonical ensembles.
6) Explain basic concepts of Maxwell- Boltzmann's statistics.
7) Explain basic concepts of Fermi - Dirac statistics.
8) Explain basic concepts of Bose - Einstein's statistics.
9) Obtain most probable speed of gas molecules
10) Obtain spherical polar coordinates.

Q. 4) B) Describe/Explain/Solve (Each question for 8 marks)

1) Derive Maxwell-Boltzmann distribution law.
2) Derive Fermi Dirac distribution law.
3) State and prove Gauss theorem.
4) Obtain cylindrical coordinates.
5) Explain Green's symmetrical theorem.

Q. 5) Attempt any Two of the following. (Each question for 8 marks)

1) Derive Planck's radiation formula in terms of wavelength of black body radiation.
2) Obtain an expression for curl of a vector field in orthogonal curvilinear co-ordinates.
3) Derive Planck's radiation formula in terms of frequency of black body radiation.
4) Explain Maxwell Boltzmann statistics and derive its distribution law
5) Explain the basic concepts of Bose Einstein statistics and obtain distribution law.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Science

Examination: B.Sc. III, Semester VI w.e.f. 2021

MARCH/APRIL 2022

Subject: **GEOLOGY**

Title of the Paper: **GEOCHEMISTRY** PAPER – XVI

QUESTION BANK

Questions for 2 marks:

1. Name the four most abundant elements in the continental crust.
2. Give the examples of Ionic bonding
3. Give the any two examples of polymorphs.
4. List the major planets with low densities in solar system.
5. Name any four types of colloids.
6. Define Widmanstatten structure in siderites.
7. List the types of adsorption with examples
8. Define carbonaceous chondrites
9. List the two types of siderolites
10. Define secular changes in geochemical cycle.
11. Give four examples of the chalcophile elements of geochemical classification.
12. State the Goldschmidt classification of the elements.
13. Name the high field strength elements.
14. Name the trace elements that replaces potassium in crystal lattice.
15. Give the examples of hydrophobic sol.
16. Give the average composition of Chondrites
17. List any four stable isotopes
18. Define Isomorphism.
19. Name any four major oxides of average composition of igneous rocks.
20. Name the four most abundant elements in average composition of igneous rocks.
21. List the evaporites form by evaporation of sea water.
22. Name some of the hydrolysates products of sedimentation.
23. Give the any two examples of isomorphism.
24. State the average composition of sedimentary rocks.
25. Name the types of radioactivity.

26. Define geochronology
27. List the types of colloidal system
28. Name the clay mineral with CEC properties.
29. Define trace elements, List the trace elements in igneous rocks.
30. State the position in periodic table of geochemical elements.
31. Write any four types of chemical bonding.
32. Define radiogenic isotopes
33. Name the first series transition metals in geochemical periodic table.
34. State the isotopes tracer to indicate the origin of magma.
35. Give the examples of hydrophilic sol.
36. Write the characteristics of isotopes.
37. Name kinds of solid solution based on the mechanism that causes variation in chemical composition
38. Give the examples of isotones.
39. Give the example of covalent bonding
40. Name the isotopes of hydrogen atoms.

Questions for 4 marks:

1. Define Solid solution substitution. Dis cuss the different types of solid solution substitution with diagram.
2. Explain in short Half life of radioactive isotopes.
3. Discuss in detail the applications of radiogenic isotopes.
4. Describe the composition of planets.
5. What is trace elements? State any four minor elements in magmatic crystallization.
6. Explain in short U-Th-Pb method of radiogenic dating the geologic event.
7. Write note on evolution of mantle by radiogenic isotope.
8. Describe the Rubidium-Strontium method of dating the geological events.
9. Write short note on Polymorphism with suitable example.
10. Define Widmanstatten structure. Add a note on iron meteorites.
11. Explain in brief cosmic abundance of elements with suitable diagram
12. Discuss in detail the isomorphism process.
13. Define colloids. Discuss the applications of colloids.
14. Write a note on coordination number.
15. Write in brief geochronology and its types

Questions for 5 marks:

1. Discuss briefly an Aerolite type of meteorite.
2. Explain colloidal in geological system.
3. State the characteristic feature of cosmic abundance of elements with suitable diagram.

4. Discuss the trace elements in magmatic crystallization.
5. Explain in brief geochemical cycle with suitable diagram.
6. Describe with suitable examples the products of sedimentation.
7. Give the brief account on Stony iron meteorites.
8. Write note on Vander waals bonding with suitable examples.
9. Describe in detail the geological applications of Isotopes.
10. Discuss the radioactive method of dating the basic igneous rocks.
11. Explain the average chemical composition of Igneous rocks.
12. Write short note on the geochemical periodic table.
13. Discuss the solid solution substitution in minerals with suitable examples.
14. Give an account on elements of geochemical thermodynamics.
15. Explain the radiocarbon method for dating the fossils.

Questions for 6 marks:

1. Define radioactivity. State different types of radioactivity with suitable examples.
2. Define colloids. Explain the types and application of colloids.
3. Describe briefly with examples about different types of chemical bond observed in natural minerals.
4. Explain the radioactive method used for tracing silicate differentiation and mantle-crust evolution
5. Give a brief account on evolution of earth.

Questions for 8 marks:

1. Describe in brief the Goldsmith's classification of geochemical elements.
2. Discuss the geochemical periodic table. Add a note on cosmic abundance of elements.
3. Explain in details the composition of Meteorites.
4. Describe the isotopic geochemistry of Earth's Mantle.
5. Describe the types of chemical bonding with coordination number.
6. Discuss any four radiogenic methods used for dating geologic events.
7. Discuss in short the average chemical composition of igneous rocks. Add a note on trace elements.
8. Explain in brief geochemical thermodynamics.
9. Define stable isotopes. Explain in brief the types of stable isotopes.
10. Describe colloids in geological systems. Give an account on adsorption and its types.
11. Discuss in brief the different types of radioactivity. Add note on radioactive decay system.
12. Explain the geochemical evolution of earth. Add note on geochemical cycle.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

QUESTION BANK FOR B.Sc. Part III (Semester VI) MICROBIOLOGY COURSE
SUBJECT – Microbial Biochemistry

PAPER NO = 16

Class-B.Sc. III (WEF June 2021) Sem.-VI

QUESTIONS TO BE ASKED FOR 1 MARK

1. Define Enzyme

2. Define Allosteric Enzyme

3. What is Isozyme
4. Use of EDTA
5. What is assimilation
6. What is dessimilation
7. Define biolumminescence
8. Enzyme are made up of what
9.
10. Define catalyst
11. Who coined the word enzyme
12. Name an enzyme which is not protein in nature
13. What is apoenzyme
14. What is cofactor
15. What is coenzyme
16. What is prothetic group
17. Bond joining NAG & NAM
18. What is murein
19. Example of antibiotic which inhibits cell wall synthesis
20. Who discovered induced fit hypothesis
21. Who discovered Lock & Key hypothesis
22. Which is the start codon
23. Who explained wobble hypothesis
24. What is anitcodon
25. Name the heterocyclic nucleotide
26. Enzyme involved in nitrogen fixation
27. Define Ammonification
28. Coenzyme
29. Active site
30. Define enzyme unit
31. Specific activity
32. Define nitrogen fixation
33. Enlist the names of purines.

34. Enlist the names of pyrimidines.
35. What is Km?
36. What is Vmax?
37. Allosteric enzyme.
38. Stereo specificity.
39. Homogenization
40. Enlist the detergent used for the extraction of enzymes.
41. Enlist physico-mechanical methods of cell disruption.
42. Enlist the chemical methods of cell disruption.
43. What is osmotic shock?

Q.3 A) Attempt any two of the following. (10)

1. Function of peptidoglycan
2. Ribozyme
3. What is catabolic repression
4. Cell disruption & homogenization
5. Mechanism of bioluminescene
6. Aminoacid sidechain in peptodoglycan structure
7. Role of TRNA in protein synthesis
8. Enzymes in Nucleotide synthesis
9. What is enzyme assay
10. Acid base catalyst
11. What is efficiency of enzymes
12. Active site of an enzyme
13. Ligand
14. How many phases are present in PPP
15. Products of PPP
16. Function of PPP
17. Enzymes involved in PPP
18. Significance of glycoxylate pathway
19. Glyoxysomes
20. Regeneration of Carbon acceptor
21. Significance of Km
22. Significance of Vmax
23. Holoenzyme
24. Lock and key hypothesis.
25. Define activation energy
26. What is isozyme.
27. Define immobilization
28. Induced fit hypothesis
29. Explain the principle of affinity chromatography.
30. What is GOGAT?
31. What is catabolite repression?
32. What is freezing and thawing?
33. What is significance of binding energy?
34. Explain the principle of ion- exchange chromatography

35. What is the significance of NADPH and ribose generated in pentose phosphate pathway.
36. What is role of transaldolase enzyme in non-oxidative phases of metabolic pathway?
37. What is role of transketolase enzyme in non-oxidative phases of metabolic pathway?
38. What is gel encapsulation?
39. What is principle of physical adsorption of enzyme immobilization?
40. What is microencapsulation?
41. Enlist the applications of immobilized enzyme.
42. Explain the role of initiation factor (IF-I) involved in the initiation of protein synthesis.
43. Explain the role of initiation factor (IF-2) involved in the initiation of protein synthesis.
44. Explain the role of initiation factor (IF-3) involved in the initiation of protein synthesis
45. What is the role of elongation factor (ef-Tu and ef-Ts and ef-G) involved in the elongation of protein synthesis?
46. What is the role of translocation factor (ef-G) involved in the elongation of protein
47. synthesis?
48. What is nonsense codon? Enlist the termination codon of protein synthesis.
49. What are the components required for bioluminescence?
50. What is HGPRT?
51. What is covalent catalysis?
52. What is the role of RUBISCO enzyme in carbon assimilation pathway?
53. Mention the components involved in the formation of back bone of Peptidoglycan.
54. What is the role of aminoacyl transferase enzyme in the activation of amino acid?
55. What is the fate of pyruvate under anaerobic condition?
56. What is proximity?
57. Enlist the method of purification of enzymes on the basis of solubility.
58. Mention the method of purification of enzymes on the basis of charge.
59. Which is the starting amino involved in the biosynthesis of purine?
60. Which is the starting amino involved in the biosynthesis of pyrimidine?
61. What is PRPP?
62. What is the end product of pentose phosphate pathway?
63. Enlist the two essential enzyme involved in glyoxylate bypass

QUESTION TO BE ASKED FOR 5 MARKS

1. Explain Lock & Key model with the diagram & mechanism
2. Explain Induced Fit model with the diagram & mechanism
3. Purification of enzyme based on molecular size
4. Purification of enzyme based on solubility
5. Purification of enzyme based on electric charge
6. Purification of enzyme based on adsorption characteristic
7. Write short note on assimilation on sulphur
8. Explain transcription in protein synthesis
9. Explain in detail Glyoxylate bypass.

10.What is inducible operon? Explain in brief arabinose operon

11. Explain in brief assimilation of carbon by Calvin cycle.
12. Explain in brief assimilation of nitrogen by GOGAT.
13. Explain in brief assimilation of sulfur by assimilatory pathway.
14. Discuss in brief Entner-duedroff pathway.
15. Explain in derivation of Michaelis- Menten equation of enzyme kinetics.
16. Discuss in brief oxidative phases of hexose monophosphate pathway.
17. Explain in detail KNF model of allosteric enzyme.
18. What is general acid- base catalysis?
19. What is specific acid- base catalysis?

QUESTION TO BE ASKED FOR 6 MARKS

1. Biolumminescence
2. Assimilation of nitrogen
3. Enzyme assay
4. Explain in detail the methods of enzyme immobilization.
5. Give the mechanism of conversion of inosinate to adenine and guanine biosynthesis.
6. Discuss in brief mechanism of enzyme action.
7. Disscuss in brief heterolactic acid fermentation by phosphoketolase pathway.
8. Explain in detail MWC model of allosteric enzyme.

QUESTION TO BE ASKED FOR 4 MARKS

1. Allosteric enzyme
2. Catabolite repression with example
3. Sulphur assimilation
4. Carbon assimilation
5. Translation process in protein synthesis
6. Explain any two methods of enzyme purification
7. Enzyme specificity
8. Glyoxylate bypass
9. Significance of Km & Vmax
10. Structure of enzyme
11. Explain in detail end product repression of tryptophan operon.
12. Give a brief account on peptidoglycan biosynthesis
13. Describe in brief mechanism of bioluminescence.
14. What is catabolite repression? Explain briefly positive regulation of Lac operon.
15. Discuss in detail arabinose operon by positive control.

16. Explain in detail isozymes. Explain it with example.

G17. Give the significance of Vmax and Km.

18. Explain in detail ribozymes. Explain it with example.

19. What is the principle of gel permeation chromatography?

20. Discuss in brief acid- base catalysis.

QUESTION TO BE ASKED FOR 8 MARKS

1. Explain bioluminescence with its significance
2. Describe the biosynthesis of nucleotides
3. Describe the biosynthesis of protein
4. Describe the biosynthesis of peptidoglycan
5. Explain pyruvate as the key metabolite in carbonhydrate metabolism
6. Explain pentose phosphate pathway with its significance
7. Explain various steps in nitrogen assimilation
8. Explain various steps in carbon assimilation
9. What is purification on enzymes? Give any four methods
10. What is end product repression? Explain tryptophan operon
11. What do you understand by positive control ? Explain Arabinose operon
12. Explain in detail allostric enzyme with the mechanism & its significance
13. What is immobilization of enzymes ? Explain methods & application
14. Explain the Michaleis Menten equation
15. Explain Isozyme & its significance
16. What is protein synthesis? Discuss in detail protein synthesis.

Question Bank B.Sc.-III Chemistry

Organic Chemistry Paper-XV

Q.2. (two marks each)

1) What are heterocylic compounds? Give its example.
2) Explain pyrrole is more reactive than benzene.
3) Explain basic nature of pyrrole.
4) Explain acidic character of pyrrole.
5) Give two methods of preparation of pyridine.
6) Why electrophilic substituhon takes place at position two in pyrrole.
7) Explain basic character of pyridine.
8) What is action of following on pyrrole.
   a) reduction b) nitration
9) What is action of following on pyrrole.
   a) nitration b) reaction with sodaminde
10) What is the action of following on quinoline.
   a) nitration b) sulphonation
11) What are carbohydrates? Give its general formula.
12) What is photo synthies ?
13) Define monsaccharide, disaccharide.
14) Define homploysaccharide & heteroploysaccharide.
15) Define mutarotation
16) Draw structure of sucrose, give its uses.
17) Draw structure of lactose, give its uses.
18) Draw structure of amylase & amylopectin.
19) Give commertial method of preparation of glucose.
20) How will you prove glucose is a straight chain hydrocarbon.
21) What are vitamins? Give its examples.
22) Give classification of vitamins.
23) What are sources & deficiency of vitamin- A
24) What are hormones? Give its example.

25) Give the classification of hormones.

26) How will you prove presence of OH group in vitamin- A.

27) How will you prove presence of primary alcoholic group in vitamin A

28) How will you prove adrenalinehas three –OH groups.

29) How will you prove methylamino group in adrenaline.

30) How will you prove NH_2 group in theyroxine

31) Define drug. Give any one example.

32) What are qualities of ideal drug.

33) What are bacteriostatic agents.

34) Def ine with example CNS drug.

35) Define with example antibiotics.

36) Draw structure of paludrin. Give its one use.

37) Draw structure of isoniazide. Give its one use.

38) Define pharmacodynamic agcnts.

39) What are sedatives? Give its example.

40) Define antipyretics & antimalenals.

41) Define dye. Give its example.

42) Define auxochrome & chromophore.

43) Give any two qualities of good dye.

44) Give structure & uses of phenolphthalein.

45) Give the synthesis of phenolphthalein.

46) Define agrochemical & peshcides.

47) Give any two uses of pyrethroirds.

48) How pryethroids are isolated.

49) Draw struchere of methoxychlor & give its uses.

50) Give the synthesis of carbaryl.

Q. 3 (5 marks each) (Any Two)

1) Give the classification of heterocyclic compounds.
2) Give the 3 methods of preparation of pyrrole.
3) Give the methods of preparation of pyridine.

4) What are heterocyclic complounds ? How will you synthesis quinoline by Skrup syuthes.
5) Explain acidic & basic character of pyrrole.
6) Give the classification of carbohydrates.
7) How will you prove open chain structure of D. glucose.
8) Explain Killiaini's synthesis.
9) Which are the objections against open chain structure.
10) What do you understand the term mutarotation.
11) Give general idea about vitamins.
12) Give general idea about Homones.
13) Give the synthesis of vitamin A.
14) How will you prove vitamin A contains.
    a) Primary hydroxyl groups b) five conjugated double bonds
    c) B-iononering
15) Give the syutheis of adrenaline .
16) Qualities of ideal drug.
17) Give synthesis & uses of paludrine.
18) Give synthesis & uses of ethambutol.
19) Qualities of good dye.
20) Explain Witts theary of colour & chemrcal constitution.
21) Give the synthesis of orange IV & phenolphthalein.
22) Give the synthesis of idole – 3 acetic acid.
23) Give synthes of moncrotphos & ethophon.

Q.3. B)

1) What are heterocyclic complounds. Give any two methods for preparation of pyrrole & pyridine.
2) What are carbohydrates ? How will you prove open chain structure of D-glucose.
3) How will you prove the structure of adrenaline.
4) Give general idea about chemotherapeutic agent.
5) Give syuthesis & uses of Paludrin.

Q.4 A (Any Two)

1) Give two methods of preparation of pyrrole.
2) Give reduction,oxidation, sulphonation & halogenations of pyrrole.
3) Explain Weermans reaction.
4) Explain periodic acid method to determine size of ring.
5) How will you prove that vitamin A has primary hydroxyl group & it has side chain.
6) What is the molecular formual of adrenaline. & prove that adrenaline is catechol derivative.
7) Give the synthesis of adrenaline.
8) Give any four qualties of ideal drug.
9) Give synthesis & uses of isonazide.
10) Give synthesis of tolubutamide.
11) Uses of sedative, hypnotics. Analgesics, antidaibaetic.
12) What are dyes? Give the syuthesis of malachite green.
13) Give synthesis & uses of carbaryl.
14) Give synthesis & uses of methoxychlor
15) Give synthesis & uses of monocrotophos.

Q.4B)

1) Give two methods of preparation of pyridine, what is the action of HNO_3 H_2SO_4 on it.
   b) Give two methods of preparation of pyrrole. How will you prepare 2-nitorpyrrole & pyrrole -2 sulphoinic acid from pyrrole.
2) Explain Killani's & Weerman's reaction.
3) With the help of analytrcal eridence how will you prove the structure of vitamin- A.
4) Explain classification of dyes based on constitution.

Q.5. (Any Two) 8 Marks.

1) Explain classification of drugs based on application.
2) Give general idea about agrochemicals.
3) Give synthesis of indole- 3 acetic and, carbaryl & methoxychlor.

4) Explain classification of drug based on structure.
5) Give brief idea about penicillin. Give its properties.
6) Give synthesis of Phenobarbital & tolbutamide.
7) How will you prove structure of thyroxine on analytical base.
8) Prove structure of adrenaline on the basic of analycal & synthetical base.
9) Write short note on polysaccharide. Give structure & uses of sucrose & maltose.
10) How will you arrive the configuration of D-glucose from d-arabinose.
11) What are carbohydrates. Give its classification. Explain Weerman's reaction.
12) What are heterocyclic complounds Explain reactivitiy of pyrrole.
13) Explain chemical reactions of pyridine or Explain basic character, electro philic substitution & nucleophilc substituton. reactin of pyridine.
14) Give Skrup synthesis, what is the action of HNO_3, $NaNH_2$, CH_3Li on quinoline.
15) What are hormones? Give the synthesis of thyroxine.

PAHSUS

QUESTION BANK OF PHYSICS FOR B. Sc. III Paper XV (Materials Science)

SHORT ANSWER TYPE QUESTIONS:

1) Discuss the classification of materials
2) Explain in brief: a) Organic materials, b) Inorganic materials, c) Biological materials
3) Explain the term: Ductility.
4) Difference between hardness and toughness
5) What is creep?
6) Discuss modulus of elasticity of materials with the help of stress strain diagram.
7) Explain the terms: a) malleability b) Ductility
8) Discuss the thermal properties of materials
9) What are optical properties of materials
10) Explain in brief any two optical properties of materials.
11) Discuss magnetic properties of materials
12) Differentiate between brittleness and ductility
13) What is resilience?
14) How the mechanical energy is stored in the materials?
15) What are polymers?
16) What are the different types of polymerization?
17) What is meant by addition polymerization? Give an example.
18) Explain condensation polymerization. Give example.
19) Explain the classification of polymerization.
20) What is meant by thermoplastic polymers?
21) What is meant by thermosetting polymers?
22) Explain Elastomers. Give examples.
23) What is the difference between rubber and elastomer.
24) Mention any two properties of polymers.
25) Explain the degree of polymerization.
26) What is crystallinity of polymers?
27) Mention any four applications of polymers.
28) Explain why the mechanical properties depend on the crystallinity of polymers.
29) What are copolymers?
30) Explain defect in polymers.
31) What are ceramic materials?
32) Write a note on ceramic processing.

33) Discuss any type of ceramic crystal structures.
34) What to do mean by traditional ceramics.
35) Explain electrical properties of ceramics.
36) What are different applications of polymers?
37) What is composite?
38) Why are composites important in nature?
39) What are the special features of structural composites?
40) What are the properties of composites?
41) Write a note on fibre – reinforce composites.
42) Write a note on concrete?
43) How concrete is prepared. Explain in brief about concrete.
44) What are cermets?
45) How the length of the fibre influences strength of composites materials.
46) What are biomaterials?
47) What is meant by biomechanism.
48) Define bioactivity or biocompatibility.
49) Explain how metals and alloys used for biomedical implantation.
50) What is meant by biopolymers?
51) Explain biocomposite materials.
52) Explain some of the applications of metals and alloys in the medical field.
53) Mention some of the applications of biocomposites in the medical field.
54) Explain how the magnetic properties of the nanomaterials changes with size.
55) Explain how the electronic properties of the nanomaterials changes with size.
56) Explain how the optical properties of the nanomaterials changes with size.
57) Write a note on classification of nanomaterials.
58) Explain the growth of nanoparticles.
59) Write some advantages of chemical methods.
60) Write a note on physical vapour deposition.
61) Why nanomaterials are called as super plastics?
62) Why does nanoparticels find applications in magnetic and electric field?
63) Mention different methods used for the characterization of nanomaterials.
64) Explain specific heat of ceramics with definition.
65) Write a note on electrodeposition method.
66) Write a note on sputter deposition.
67) Write any four applications of ceramics.
68) What is porosity? Why ceramics possess porosity?
69) Write a note on defects in polymers.

70) Write a note on: a) Fatigue b) Stifness.
71) Explain the relation between specific heat and atomic weight of materials.
72) Explain how Bakelite is prepared.
73) Write a note on classification of polymers.
74) Write a note on visco – elastic behaviour on polymers.
75) What is Teflon?
76) Explain the perovaskite crystal structure of ceramics with example.
77) Explain the zinc blende crystal structure of ceramics with example.
78) Write a note on mechanical properties of composites.
79) What is rule of mixture? Where it is used?
80) What top down approach of nanopaticles synthesis?
81) What bottom up approach of nanopaticles synthesis?
82) Write a note on mechanicano synthesis of nanoparticels.
83) Write a note on co – precipitation method.
84) Write a note on sol – gel method.
85) Write a note on chemical vapour deposition.

LONG ANSWER TYPE QUESTIONS:

1) Explain mechanical properties of materials in details.
2) Explain the polymerization mechanism with suitable examples.
3) Explain how polymers are classified. Mention the difference between the types of polymers.
4) Explain how the crystallinity of polymer varies with temperature. What is the role of crystallinity on the mechanical properties of polymers?
5) What is meant by degree of polymerization of polymers? Give examples for linear polymers.
6) Explain the role of mechanical properties in polymers.
7) Explain different fabrication processes in polymers.
8) Why composites are favoured in engineering applications? Write a brief note on their use in various engineering disciplines?
9) Explain particle reinforced composites.
10) What are biomaterials? Explain the different types of biomaterials and their applications in the medical field.
11) Write notes on the following:
    a) Bioactive glass, b) biocermaic c) biocomposites d) biometal and alloys
12) Write an essay about the biomaterials and their application in the medical field.
13) Explain different physical methods for synthesis of nanomaterials.
14) Explain different chemical methods for synthesis of nanomaterials.

15) Explain different hybrid methods for synthesis of nanomaterials.
16) Write a note on deformation in polymers.

PunyashlokAhilyadevi Holkar SolapurUniversity, Solapur

B.Sc. Part III Semester -VI (New w.e.f. Nov 2021) Examination, 2022)

Zoology

Paper –XIV Evolutionary Biology

Unit 1.Life beginning

Short notes.

1.Chemogeny

2.RNA world.

3.Organic evolution

4.Evolution of eukaryotes.

Long questions

1.Explain the term chemogeny.

2. Describe primitive atmosphere on earth.
3.Explain energy source at the time of origin of life .
4.Describe formation of organic molecule of life.

5. Explain the endosymbiotic theory for the origin of eukaryotes.
6. Explain the general steps of a sexual life cycle.
7. Explain evidence for the endosymbiotic theory.

Unit 2.

Short notes

1.Criticism of lamarckism.

2.Theory of Lamarckism.

3.Darwinism.

4.Neo-Darwinism

5. Theory of evolution.

6.Natural selection theory.

Long questions

1.Explain use and disuse theory of evolution.

2.Explain natural selection.

3.Explain Darwinism.

4.Explain Lamarckism.

5 Explain Neo-darwinism.

6. **What are the facts that support Darwin's theory of Natural selection?**

Unit 3.

Short notes

1 . Types of fossils.

2.The geological time scale.

3.Carbonisation.

4.Mineralization.

5.Molecular evolution.

6.Globin gene family.

7.Universality of genetic code.

Long questions.

1). Define the terms fossils

2). Outline the requirements for fossilization to take place

3). Describe the preservation of original soft, hard and altered parts of organisms

4). Give examples of trace fossils

5). Explain what is the Geological Time Scale and how fossils have been used in its construction.

6). Outline the importance and uses of fossile.

7) Explain evolution of horse.

8) Explain molecular evolution.

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Unit no.4, 5 6 ,7&8

2 Marks questions

1. What are the sources of variation?
2. Explain the role of heritable variation on evolution.
3. What is genetic drift
4. Define microevolution
5. Macroevolution
6. Define Natural selection
7. Define Adaptive radiation
8. Write examples of heritable variation.
9. Define mutation

10.What is mean by natural selection
11.Define allopatric speciation

12.Define extinction

13.Australopithecus

4 Marks questions

1. Explain the Hardy-Weinberg law?
2. What is Macroevolution? Explain it with suitable example.
3. What forces can drive speciation?
4. What is theory of natural selection
5. Explain the factors affecting the Hardy-weinberg equilibrium

5 Define species. Describe the types of speciation

6-Write a note on k-t extinctions

6

8 marks questions

1 What is adaptive radiation? Explain with suitable example

2. Explain the statement of Hardy-Weinberg law and derivation of equation and the application of law to human population.
3. What is isolation ? Describe briefly various types of isolating mechanism

Q4. Explain mutation theory of organic evolution

5. explain Darwin's theory regarding the origin of new species
6. Describe the evolution of horse with suitable diagram

7. Explain macroevolution taking info consideration Darwin finches
8. What are fossils how are they dated
9. Define and describe adaptive radiation
10 . Write a note on Lamarckism
11.state Hardy Weinberg law and discuss the five condition necessary to Prevent changes in gene frequency

12 . Discuss the various pre mating isolating mechanism
13. Difference between a positive and negative type of natural selection
14. Write short note on synthetic theory of evolution (Neo-Darwinism)
15. Write a note on phylogenetic tree of modern horse equus

16. Explain genetic drift and it's significance with an example ? Why is drift. More likely in small population
17 . Explain causes and effect of extinction
18 . Write a note on molecular evolution,Give example of globin family.
19.Discuss molecular analysis of human origin.
20.What is variation.Add a note on sources of variations

PunyashlokAhilyadevi Holkar SolapurUniversity, Solapur

B.Sc. Part III Semester -VI (New w.e.f. Nov 2021) Examination, 2022)

Zoology Paper –XIII (Animal Physiology-Life Sustaining System)

Q: 1: Write one sentence answer

i) Emulsification of fat

ii) Hemerythrin

iii) Acidic Chyme

iv) Tidal volume

v) Erythroblastosisfetalis

vi) Diagram of ECG

vii) Composition of blood

viii) Bowman's capsule

ix) Role of ADH hormone during urine formation.

x) Cardiac cycle.

xi) pacemaker

xii) AV Node

xiii) S A Node

xiv) Purkinje's fibre system

xv) coronary circulation

xvi)Blood pressure

xvii) Acid -base balance

xviii) Heart beat

xix) Rh-Factor

xx) components of blood

xxi)blood antigen

xxii)MN type Blood

xxiii)Néphron

xxiv) patelettes function

xxv) types of leukocytes

Q: 2 : Solve following questions

a) Ultrastrure of kidney and its functional unit

b) write brief account on blood clotting process

c) Describe structure and functions of platelets

d)Describe regulation of acid -base balance

e)Describe cardiac cycle

f) Describe complement and fibrinolytic systems

g)Describe physiology of urine formation

h) Describe cardiac output and its regulation

i) Describe ABO -Blood group system

j)) Describe MN type-Blood group system

k) Describe Rh-factor and its consequences

l)What is tidal volume

m)Give examples of respiratory pigments

n) write enzymes of pancreas

o) what is Tachy cardia

p) Draw structure of haemoglobin

q)Bohr's effect

Q: 3A:Write answer in brief

a)Describein brief haemopoietic process

b)Describe mechanism of urine formation and add a note on composition of urine

c)Describeorigin and conduction of heart beat

d)Describe ultrafiltration and add a note on water and acid base balance

e) Describe ultrastructure of uriniferous tubules

f)Describe functions of RBCS

g)Describe Erythroblastosis fetalis

h)Explain oxygen dissociation curve

i)Describe t,s.stomach of mammal

Q: 3B:Write short note on

a) Describe ultra structure of nephron and add a note on glomerular filtration

b) Component involved in the blood clotting phenomenon

c) Internal structure of heart

d) Describe cardiac out put and its nervous control

e) Describe electrocardiogram and add a note on blood pressure

Q: 4. A)-Attempt any **Two** of the following.

a) Describe the chemical and nervous control of respiration.

b) Describe the phenomenon of blood clotting

c) Describe with neat labeled diagram, the origin and conduction of heart beat

d) Describe Modern theory of mechanism of urine formation

e) Describe tubular reabsorption

Q: 4.B) Write short note on-

a) Describe the mechanism Hair pin counter current multiple theory

b) Describe urine and hormonal regulation of kidney

c) Describe different cell types in leukocytes and their functions

d) Describe different components of platelets those which are playing role in blood clotting

Q: 5. Attempt any Two of the following

a) Describe the physiology of digestion in small intestine.

b) What are blood groups? Describe types of blood groups in human.

c) Describe the process of transport of Co2 and o2 in blood.

d) Describe nervous and chemical control of respiration

e) Describe characteristics of pace maker

f)Explain the process of renal filteration and excretion.

g) Describe process of respiration in mammals.

h)Explain the respiratory pigments with examples.

Physics B.Sc.-III
Paper No- XVII
Electronics
Question Bank

Que. Give the answers in one sentence / one word of the following. (1 marks)

1) What is an Op-Amp?
2) What is meant by SVRR?
3) What is the bandwidth of an ideal operational amplifier?
4) What is the feedback component in an Op-Amp differentiator?
5) Which component is used in feedback path of an Op-Amp integrator?
6) How many pins are there in IC 555 timer?
7) Define duty cycle in astable multivibrator.
8) When IC 555 is operated as an oscillator then trigger input is connected to which pin number?
9) What is the name of pin 7 in the IC 555 timer?
10) What operations Op-Amp can perform?
11) When SCR is turned off the current is?
12) What do you mean by breakover voltage of SCR?
13) What do you mean by Holding current of SCR?
14) What is the effect of gate when SCR starts conducting?
15) What is SCR also called?
16) Which semiconductor device is not a current triggered device?
17) Why DIAC is a bidirectional device?
18) How many semiconductor layers DIAC has?
19) What is TRIAC?
20) State the important application of TRIAC.
21) How many thyristor are required to make TRIAC?
22) Which material is used for doping to yellow colour in LED?
23) Give one example of passive display.
24) Which fluids are used in LCDs?
25) Which are commonly used displays in digital electronics field?
26) What is the input impedance of MOSFET.
27) Write transconductance of the MOSFET.
28) What are the types of MOSFET?
29) Draw the symbol of n-channel D-MOSFET.
30) Which material is used for doping to give green colour in LED?

Solve the following **(2 marks)**

1) Define an Op-amplifier?
2) Draw the block diagram of Op-Amp.
3) Explain the term SVRR.
4) Write any two applications of Op-Amp.
5) Draw the block diagram of Op-Amp.
6) Draw the function block diagram of IC555.
7) Draw the circuit diagram of square wave generator using IC-555.
8) Draw the pin connection diagram of IC-555 i.e. 8- pin DIP package.
9) Draw I-V characteristics of SCR.
10) How an SCR can be turned off?
11) Define Break over voltage and Holding current.
12) What are the reverse characteristics of SCR.?
13) What are the applications of SCR.?
14) Write any two applications of DIAC.
15) What any two applications of TRIAC?
16) Explain the operating principle of LED.
17) What are the advantages of LEDs?
18) Explain gas discharge plasma display.
19) State the principle of LCD.
20) Write down the features of LCD display.
21) Which materials used for doping to give out different colors.
22) Draw the circuit diagram of n-channel JFET and p-channel JFET.
23) Explain n-channel D-MOSFET.
24) Differentiate between D-MOSFET and E-MOSFET.
25) For the inverting amplifier using IC741, if $R_2 = 100K\Omega$, $R_1 = 10K\Omega$, $V_{cc} = \pm 10V$ then find the gain of Op-Amp.
26) State any two applications of SCR.
27) Mention most commonly used displays in the digital electronic field.
28) Draw the D-MOSFET transfer characteristics i.e. I_D vs V_{GS} curve.
29) Draw the circuit diagram of ramp generator using IC-555.
30) A 5mV, 1000Hz sinusoidal signal is applied to the input of an OP-AMP integrator. Find the output voltage.

Solve the following **(4 marks)**

1. Draw the neat circuit diagram & explain voltage divider bias of n-channel E-MOSFET.
2. State different types of liquid crystals used for LCD display.
3. Give four important features of LCD's.
4. What is the advantages LCD?
5. Give two advantages & two disadvantages of TRIAC.
6. Discuss the application of DIAC.
7. Discuss application of an SCR for speed control of d.c. motor.
8. Explain square wave generator.
9. Explain application of timer IC555 as a linear ramp generator.
10. Explain Op-Amp as a differentiator.
11. State four characteristics of Op-Amp.
12. Explain any four parameters of Op-Amp.
13. Explain Op-Amp as an adder.
14. Explain Op-Amp as a subtractor.
15. Explain transfer characteristics of n-channel E-MOSFET.

Attempt the following **(5 marks)**

1. Explain Op-Amp as an integrator
2. Explain Op-Amp as an adder.
3. Explain application IC 555 as a square wave generator.
4. Draw the pin connections of IC555 timer & explain function of each pin.
5. Explain the construction of SCR.
6. Explain application of an SCR for speed control of D.C. Motor.
7. What are the I-V characteristics of a TRIAC
8. What are the features of LCD?
9. What are the important characteristics of Nixie tubes?
10. Explain circuit operation of D-MOSFET.
11. Explain circuit operation of E-MOSFET.
12. Explain transfer characteristics of D-MOSFET.
13. Astable mode of IC555 consists of $R_A = 10\ K\Omega,\ R_B = 22\ K\Omega$ and $C = 1\mu F$ Find frequency of astable multivibrator?
14. Explain Op-Amp as Schmitt trigger.

Short Note **(6marks)**

1) Astable multivibrator using IC555
2) Functional block diagram of Op-Amp
3) Construction and working of an SCR
4) Construction and working of TRAIC
5) Operation of seven segment display using gaseous discharge with neat diagram.

Solve the following **(8 marks)**

1. With a neat circuit diagram, prove that for an inverting amplifier $A_{vf} = -\frac{R_2}{R_1}$
2. Derive an expression for voltage gain of a closed loop non inverting amplifier using Op-Amp.
3. Explain the block diagram and working of IC555.
4. Explain monostable operation of IC555 timer.
5. Explain how timer is used as voltage to frequency converter.
6. Explain construction and working of an SCR.
7. Draw the equivalent circuit of SCR and explain its working from equivalent circuit.
8. Explain construction and working of DIAC.
9. Draw the structure of LED and explain its operation.
10. Give comparison between JFET and D-MOSFET
11. Give comparison between E-MOSFET and D-MOSFET
12. If monostable mode of IC555 consist of $R = 33K\Omega$ & $C = 0.047\mu F$ Then find the time period of monostable multivibrator.
13. If astable mode of IC555 consist of $R_A = 47K\Omega$ & $R_B = 10K\Omega$ & $C = 10\mu F$ Then find the frequency of astable multivibrator.
14. An Op-Amp is used in non- inverting mode with $R_1 = 3K\Omega$, $R_2 = 12K\Omega, V_{CC} = \pm 12$. Calculate the output voltage for the following inputs
    i) $V_i = 100\ mV$ ii) $V_i = 3\ V$
15. In a D-MOSFET determine $I_{DSS}\ given\ I_D = 2mA,\ V_{GS} = -4v$ & $V_{GS(off)} = -10v$.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

QUESTION BANK

B.Sc. I, Zoology, Semester: II, 2022

Paper III: COMPARATIVE ANATOMY OF VERTEBRATES

Answer the following (Questions of 2 Marks)

1. Define the term integument in vertebrates.
2. Functions of Integuments.
3. Poison glands in vertebrates.
4. Describe sweat gland,
5. Which are femoral glands.
6. Functions of sebaceous gland.
7. Define mammary glands.
8. Scent glands of vertebrates.
9. In which class claws are strong.
10. Functions of horns in mammals.
11. Describe hoops in angulates.
12. Describe amphicoelous vertebra.
13. Which type of tongue is present in reptiles.
14. Air bladder
15. Larval gill
16. Pseudobranch
17. Swim bladder
18. Functions of skin
19. External gills
20. Operculum
21. Venous (branchial) heart
22. Ductus caroticus
23. Wolffian duct
24. Mullerian duct
25. Functions of cerebral hemisphere
26. Diencephaon of Scoliodon
27. Optic lobes of vertebrates
28. Cerebellum of Birds
29. Cerebellum of Mammals
30. Pons varolli

Answer the following (Questions of 4 Marks)

1. Describe types of teeth in chordates.
2. Explain types of feathers in birds.
3. Describe functions of pancreas.
4. Describe functions of liver.
5. Structure of skin of amphibians.

6. Describe pectoral girdle of frog.
7. Give structure and functions of stomach.
8. Describe role of oral glands invertebrates.
9. Describe structure of pelvic girdle of rabbit.
10. Describe of vertebrae in frog.
11. Skin of Pisces.
12. Cutaneous respiration
13. Describe structure of gill in fishes
14. Air sac in birds
15. Lungs of Mammals
16. Explain 2 chambered heart
17. Explain 2 chambered heart
18. Explain structure of heart in birds
19. Explain structure heart in mammals
20. Aortic arches in amphibia
21. Aortic arches in reptiles
22. Aortic arches in birds and mammals
23. Explain structure of archinephros
24. Write a note on Pronephros kidney
25. Describe the Mesonephros kidney
26. Explain the Metanephros kidney
27. Describe the ventricles of brain
28. Explain the structure of brain of scoliodon

Answer the following (Questions of 8 Marks)

1. Describe epidermal scutes and scales in vertebrates.
2. Explain in detail structure digestive system of reptiles and compare with amphibians.
3. Describe integuments and its derivatives in vertebrates.
4. Give an account of axial skeleton in vertebrates.
5. Describe various types vertebrae based on shape and centrum.
6. Explain skull of lizard with birds.
7. Give an account of digestive glands in vertebrates.
8. Explain stomach of mammals with reptiles.
9. Describe in detail appendicular skeleton in vertebrates.
10. Explain accessory respiratory organs of vertebrates
11. Give a comparative account of respiratory organs in the vertebrates.
12. Describe the structure of lungs of frog and compare it with reptilian.
13. Describe the evolution of heart in vertebrates.
14. Give a comparative account of heart in vertebrates.
15. Give a comparative account of aortic arches in reptiles, birds and mammals.
16. Describe the evolution of kidney in vertebrates.
17. Describe the comparative account of brain of vertebrates
18. Describe the brain of reptiles and compare it with mammals.

19. Compare the brain of frog and rabbit.
20. Describe the brain of scoliodon and compare it with mammals.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Nature of Question Paper for choice based credit system (CBCS) Semester Pattern

QUESTION BANK

• Faculty of Science •
(w. e. f. June 2019)

Total Marks-40

Subject – Applied Microbiology

Class – B.Sc. I (Semester - II) **Paper Number - IV**

Q.No.2) Answer any four of the following **(08)**

1) Define primary infection

2) Define secondary infection

3) Define acute infections

4) Define chronic infections

5) What is cross infection?

6) What is mixed infection?

7) What is congenital infection?

8) What is endemic disease?

9) What is pandemic disease?

10) What is sporadic disease?

11) Define Mortality rate

12) Define morbidity rate

13) Define virulence

14) Define pathogenicity

15) Define etiology

16) Define prophylaxis

17) Define incubation period

18) Write a short note on MPN test

19) Write a note on Disinfection of water

20) Definition of sewage & treated sewage

21) Write a note on composition of milk

22) Define DMC test

23) Define phosphatase test

24) Definition of pasteurization

25) Definition of Etiology

26) Indicator of fecal pollution

27) Write in short principle of MBRT test

28) Define Opportunistic Pathogen

29) Define Carrier

30) Define Epidemic Disease

31) Define Endemic Disease

32) Define Pandemic Disease

33) Define Sporadic Disease

34) Give the examples air borne disease

35) Give the example of water borne disease

36) Give the example of water borne disease

37) Give the example of food borne disease

38) Give the example of arthropod borne infection

Q.No.3 Write short notes on any two of the following **(08)**

1) Write a note on sources of Microorganisms in water

2) Explain fecal pollution of water and its indicator

3) Explain presumptive test

4) Explain confirmed test

5) Explain completed test

6) What is Eijkman Test?

7) Explain MBRT test

8) What is Pasteurization and add note on types of pasteurization?

9) Write a note on phosphatase test.

10) Qualitative test for coliforms (presumptive, confirmed, completed)

11) Write a note on Microbial flora of sewage

12) Write a note on Types of pasteurization

13) Define Mortality rate and morbidity rate

14) Write a short note on oxidation pond

15) Write in short about general principles of prevention and control

16) Define milk and write note flora of milk

17) Define milk and add note on composition of milk

18) Write note on microbiological examination of milk through SPC

Q. No.4) Answer any Two of the following (08)

1) Explain MPN test

2) Write a note on BOD

3) Write a note on types of disease?

4) Write a note on preventive and control measures of water and food borne diseases

5) Write a note on preventive and control measures of Air borne diseases

6) Write a note on preventive and control measures of Vector borne diseases

7) Write a note on preventive and control measures of Diseases transmitted through physical contact

8) Write a note on sources of Microorganisms in milk.

9) Describe in detail Sources of microorganism in water

10) Discuss in detail IMViC test

11) Write a note on BOD and COD

12) Definition and composition of milk

13) Describe in detail types of disease

14) Describe in detail Ingestion (mode of transmission of disease)

15) Write a note on Trickling Filter

Q.No.5) Answer any one of the following (08)

1) Write an essay on municipal water purification

2) Write an essay on qualitative tests for coliform

3) Write an essay on types of infections

4) write an essay on Microbiological examination of Milk

5) Write an essay on definition and composition of Milk

6) Describe in detail Municipal water purification process (sedimentation, filtration, disinfection)

7) Describe in detail Treatment of sewage

8) Discuss in detail Mode of transmission of disease (inhalation and contact)

9) Describe in detail Prevention & control measure for water & food borne disease, Air borne disease

10) Describe in detail Types of infection (chronic, reinfection, congenital , acute , generalized)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Faculty of science
Subject- Microbiology
Class-B.Sc. I (WEF June 2019)
Sem.-II
Title of the paper- Microbial Physiology
(Paper- III)
Question bank

Q. 2) Answer any four of the following (08)

i) Define carbohydrate

ii) Define Monosaccharide

iii) Define polysaccharide

iv) Define amino acid.

v) Define protein

vi) Define lipid

vii) What is lipid.

viii) enlist the types of lipid

ix) What is simple lipid?

x) What is compound lipid?

xi) What is derived lipid?

xii) Define phospholopid.

xii) What is saponification?

xiii) Define sphinolipid.

xiv) Define fatty acid.

xv) What are the types of fatty acid?

xvi) Enlist the names of storage homopolysacchrade.

xvi) Enlist the names of heteropolysaccharide.

xvii) what is the biological function of carbohydrate?

xviii) What are the properties of monoscchride?

xix) What is the biological function of protein?

xx) What is the biological function of lipid?

xxi) Draw neat labeled diagram of clover leaf model of t-RNA.

xxii) Define nucleoside

xxiii) Define nucleotide.

xiv) Define enzyme

xxv) Define coenzyme

xxvi) Define prosthetic group.

xxvii) Define cofactor

xxviii) Define Anabolism. State the significance of Anabolism

xxix)Define Catabolism. State the significance of Catabolism

xxx) What is Metabolism?

xxxi) What is the energy content of single ATP molecule?

xxxii) State the significance of EMP pathway

xxxiii) What is the Net gain of ATP in EMP pathway?

xxxiv) State the significance of TCA cycle

xxxv)What is the Net gain of ATP in TCA cycle?

xxxvi) Define Autotroph with example

xxxvii) Define Heterotroph with example

xxxvii) What is Auxotroph?

xxxviii) Define macronutrients with example

xxxix) Define micronutrients with example

xxxx) State the role of Agar-agar in microbial media preparation

xxxxi) What is saline? Mention its significance.

xxxxii) State the use and significance of 'Blood' in Blood agar

xxxxii)What is serum?

xxxxiii) State the use of Andrade's indicator in sugar fermentation test

xxxxiv) Mention the pH range of Andrade's indicator?

xxxxvi) What is the significance of Neutral red as pH indicator?

xxxxvii) In which test Bromothymol blue is used as indicator?

xxxxviii) What is the significance of Phenol red as pH indicator?

xxxxix) State the significance of Brilliant green as indicator.

xxxxx) In which test Methylene blue is used as indicator?

xxxxxi) What is selective media? Give one example.

xxxxxii) State the biological functions of carbohydrate.

xxxxxiii) State the biological functions of protein.

xxxxxiii) State the use and function of Andred's indicator.

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Q.3) Write short notes on any two of the following (08)

i) What is oligoscchride? Give any two examples.

ii) What is the globular and fibrous protein? Enlist any two examples

iii) What are the different forms of DNA?

iv) What are the different types of RNA?

v) What is inducible and constitutive enzyme?

vii) What is an extracellular and intracellular enzyme?

viii) Write short notes on the following

1) α- helix 2) β- pleated sheet.

ix) What are high energy compounds? Enlist different high energy compounds

x) What is Metabolism? State the significance of metabolism

xi) Why ATP considered as energy currency of the cell?

xii) What is high energy content compound? Give structure of ATP. Explain in brief energy content of ATP.

xiii) Write a note on fate of pyruvate.

xix) Differentiate between Autotroph and Heterotroph.

xx) What are Photolithotrophs? Explain with example

Q.4) Answer any two of the following. (08)

i) Discuss in brief Z form of DNA.

ii) Define active site. Briefly explain the structure of active site.

iii) Discuss in brief structural level of classification of protein.

iv) Discuss in brief secondary structural level of protein.

v) Discuss in detail classification of monosaccharide.

vi) Discuss in brief chemical composition of deoxyribonucleic acid.

vii) Discuss in brief chemical composition of ribonucleic acid.

viii) Draw structure of cholesterol. Add a note on properties and functions of cholesterol.

ix) What is saturated and unsaturated fatty acid? Give examples of each.

x) What are heteropolysaccharide? Give their classification.

xi) What are Photoorganotrophs? Explain with example

xii) Differentiate between Photolithotrophs and Photoorganotrophs

xiii) What are Growth factors? State their importance

xiv) What are Chemolithotrophs? Explain with example

xv)What are Chemoorganotrophs? Explain with example

xvi) Write a note on Peptone. State its significance as microbial media component

xvii) State significance of Meat extract as microbial media component

xviii) State the significance of sodium taurocholate in MacConkey's media

xix) What are the vitamins? Enlist their different types.

xx) Define active site. Explain in detail lock and key hypothesis.

xxi) Define active site. Explain in detail induced fit hypothesis.

Q.5) Attempt any one of the following (08)

i) Define polysaccharide. Discuss in details homo and heteropolysaccharide

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iii) Describe in detail classification of lipid.

iv) Describe in detail structure and function of m-RNA, r- RNA and t-RNA.

v) Define enzyme. Describe in detail classification of enzyme on the basis of location and presence of substrate.

vii) Define carbohydrate. Describe in detail classification of carbohydrate.

viii) Explain EMP pathway. Add a note on its significance

ix) Write in detail on TCA cycle

x) Differentiate between Chemolithotrophs and Chemoorganotrophs

xi) Explain with example differential components of microbial media

xii) Explain the role of different pH indicators in microbiological media

xiii) Describe in detail classification of microorganism on the basis of energy and nutrition.

xiv) Give a detailed account on nutritional requirement og microorganisms.

xv) Explain in detail the role of peptone, blood, serum, bile salt and lactose as nutitional components in microbial culture media.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
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xv) Explain in detail the role of peptone, blood, serum, bile salt and lactose as nutitional components in microbial culture media.

Question Bank

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B. Sc. II Semester IV Biotechnology Examination, 2022

Subject: DSC 2D Immunology - Paper-I: Immunology-I (wef June, 2020)

Time: Hours Max. Marks: 40

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat labeled diagrams wherever necessary.

Q. 2] Explain **any four** of the following. 8

1. Native immunity
2. Innate immunity
3. Portal of entry
4. Inflammation
5. Phagocytosis
6. Apoptosis
7. BCR
8. TCR
9. Lymph
10. Homeostasis
11. Mucosa
12. Afferent lymphatic
13. Efferent lymphatic
14. Trabecula
15. Immunogen
16. Antigen
17. Epitope
18. Antigenicity
19. Immunological specificity
20. Fc
21. Fab
22. Paratope
23. Instructive theory
24. Selective theory
25. Antigenic determinant
26. Peptide binding cleft
27. Presentation of antigen
28. Synergy
29. Cascade
30. properdine

Q. 3] Write short notes on **any two** of the following. 8

1. Haematopoisis

2. Programmed cell death
3. Phagocytosis
4. Natural killer cell
5. Dendritic cell
6. Spleen
7. Properties of immunogen
8. Immunogen dose
9. Route of administration
10. Antibody diversity
11. IgD
12. IgA
13. MHC
14. Complement
15. Cytokines

Q. 4] Answer **any two** of the following. 8

1. Explain in brief first line of defense
2. Describe in brief second line of defense
3. Write in brief programmed cell death and homeostasis
4. Explain in brief B lymphocytes
5. Describe in brief structure and functions of thymus
6. Write in brief mononuclear phagocytes
7. Explain in brief adjuvant with examples
8. Describe in brief T cell dependent antigen
9. Write in brief difference between T and B cell epitopes
10. Explain structure and functions of IgG
11. Describe in brief antigenic determinants of antibody
12. Write in brief structure and function of IgE
13. Explain in brief structure and functions of MHC I
14. Describe in brief properties of cytokines
15. Write in brief general account of complement activation

Q. 5] Answer **any one** of the following. 8

1. Explain in detail innate immunity
2. Describe in detail process of haematopoisis
3. Write in detail primary lymphoid organs
4. Explain in detail secondary lymphoid organs
5. Describe in detail various types of antigens with example
6. Explain in detail structure and functions of IgM
7. Write in detail structures of cytokine receptors
8. Explain in detail alternative complement activation pathway
9. Describe in detail structure and functions of MHC molecules
10. Write an essay on properties, functions and receptors of cytokines

Question Bank

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B. Sc. II Semester IV Biotechnology Examination, 2022

Subject: DSC 2D Immunology - Paper-II: Immunology - II (wef June, 2020)

Time: Hours Max. Marks: 40

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat labeled diagrams wherever necessary.

Q. 2] Explain **any four** of the following. 8

1. Humoral immunity
2. Primary immune response
3. Secondary immune response
4. B cell differentiation
5. Exogenous antigen
6. Endogenous antigen
7. T cell maturation
8. T cell differentiation
9. Cytosolic pathway
10. Autoantigen
11. Cross reactivity
12. Inflammation
13. Hypersensitivity
14. Immunodeficiency
15. Active immunization
16. Passive immunization
17. Adjuvant
18. Vaccination
19. Attenuation
20. Affinity
21. Avidity
22. Non-covalent interactions
23. Precipitation
24. Agglutination
25. Immune complex
26. Assay
27. Bacteria
28. Fungi
29. Virus
30. Protozoa

Q. 3] Write short notes on **any two** of the following. 8

1. Endocytic pathway

2. Primary immune response
3. Antibody production against TI antigen
4. Cytosolic pathway
5. Cell mediated immunity
6. T cell activation
7. Haemolytic autoimmune diseases
8. Hashimoto's disease
9. AIDS
10. Complement fixation
11. Immunodiffusion
12. Radioimmuno assay
13. Specific immunity to bacteria
14. Specific immunity to viruses
15. Non specific immunity to protozoa

Q. 4] Answer **any two** of the following. 8

1. Explain in brief difference between primary and secondary immune response
2. Describe in brief humoral immunity against TD antigen
3. Write in brief maturation, activation and differentiation of B cells
4. Explain in brief maturation, activation and differentiation of T cells
5. Describe in brief cell mediated immunity
6. Write in brief cytosolic pathway
7. Explain in brief organ specific autoimmune diseases with examples
8. Describe in brief types of hypersensitivity
9. Write in brief rocket immunoelctrophoresis
10. Explain in brief agglutination test
11. Describe in brief ELISA
12. Write in brief immune fluorescence test
13. Explain in brief immunity against viruses
14. Describe in brief immunity against protozoa
15. Write in brief immunity against bacteris

Q. 5] Answer **any one** of the following. 8

1. Explain in detail humoral immunity
2. Describe in detail antibody production against TI and TD antigen
3. Write in detail cell mediated immunity
4. Explain in detail autoimmunity
5. Describe in detail traditional vaccines
6. Explain in detail DNA and rDNA vaccines
7. Write in detail various ELISA techniques
8. Explain in detail precipitation and immune diffusion techniques
9. Describe in detail complement fixation test
10. Explain in detail immunity to infections by microbes

B.Sc. (Part-II) (Semester-IV) Examination

CHEMISTRY (Paper-VII) (CBCS Pattern)

Physical Chemistry

Question Bank

Q. 1. Answer of the following (2 Marks for each question)

1. Give a brief account of the term transport number.

2. State and explain the law of rational indices.

3. State Kohlrausch's law.

4. Define the term 1) conductance 2) equivalent conductance

5. Distinguish between metallic and eletrolytic conductors.

6. Explain, entropy is a measure of unavailable energy.

7. Define Weiss and Miller indices.

8. Define the terms : 1) Solution 2) Solute

9. What is distribution coefficient?

10. Give reason - Entropy of solid increase on fusion

11. Explain the term plane of symmetry

12. Define the following term 1) space lattice 2) lattice site

13. State and explain the partition law.

14. What are the limitations of partition law ?

15. Discuss any two factors affecting transport number of ions..

16. What is Hittorf's rule ?

17. Define the term molecular conductance . Mention its unit.

18. How specific and equivalent conductance's are related to each other?

19. Explain the term absolute entropy.

20. Under what condition, $\Delta S = \Delta H/T$?

Q. 2.Write short notes on the following (4 Marks for each question)

1. Write precise notes on physical significance of entropy.

2. Write a short note on , application of partition law.

3. Discuss the application of Kohlrausch's law.

4. Write precise notes on types of conductor.

5. Draw diagrams showing (100),(110) and (111) planes in simple cubic system .

6. Mention various factors affecting transport numbers.

7. What is principle used in moving boundary method?

8. Write a note on equivalent conductance at infinite dilution.

9. Mention laws of crystallography, and explain the law of constancy of interfacial angles.

10. How is third law applied to determine absolute entropies?

Q. 3. Answer of the following(4 Marks for each question)

1. Explain any two application of distribution law in details.

2. What is crystallography? Name the three fundamental laws of crystallography.

3. Prove that entropy is a state function.

4. Give the relationship between ionic mobility and ionic conductance .

5. Discuss entropy changes in reversible process.

6. State Kohlrausch's law . How it is used to determine the degree of dissociation of weak electrolyte.

7. Explain the phenomenon of association and dissociation of solute in solvent.

8. Derive an expression for entropy change of an ideal gas at constant volume and pressure.

9. Write a full note on Bragg's equation.

10. What is mean by (100),(110),(111) planes of cubic lattice. How do the spacing of these planes differ?

Q. 4 Answer of the following (8 Marks for each question)

1. Give a full account of crystal structure of NaCl

2. Obtain the entropy change in mixing of Gases.

3. Derive Hittorfs rule with the help of Ostwald's schematic diagram.

4. State the distribution law. What are its limitations? Mention its application.

5. Give different application of Kohlrausch's law. Explain in details. How it may be applied to determine the ionic product of water?

Punyashlok Ahilyadevi Holkar Solapur University Solapur

B.Sc.II Sem. III Chemistry Paper V (Organic Chemistry)

Question Bank

Q 2. Answer the following (2 Marks)

i) Explain why Formaldehyd shows Cannizzaro's reaction but acetaldehyde does not ?

ii) Define a) Chromophore b) Auxochrome.

iii) What is Bathochromic and Hypsochromic shifts?

iv) Define Geometrical isomerism. Give it's one example.

v) Explain geometrical isomerism in ketoxime.

vi) Explain geometrical isomerism in Aldoxime.

vii) Draw the structure of 18 crown-6 ether.

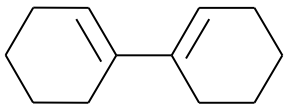
viii) What is the action of following on phthalic acid.

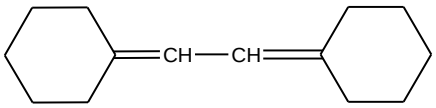
a) Ammonia b) soda lime

ix) Explain any one method of formation of succinic acid.

x) Write the synthesis of phenyl hydrazine from benzene diazonium chioride.

xi) Calculate the λ_{max} for following compounds.

a) 

b) 

xii) Explain effect of conjugation on position of UV and Visible band.

xiii) Write the synthesis of ethylene glycol from ethylene dibromide.

xiv) Explain commercial method of preparation of ethylene oxide.

xv) What is the action of following on malic acid.

a) Action of heat B) HI

xvi) Explain Oxidation and Bromination reaction of cinnamic acid.

xvii) Explain methods of formation of acrylic acid.

xviii) Explain reactivity of carbonyl group.

xix) Explain acid catalyzed ring opening reaction of ethylene oxide.

xx) What is the action of Grignard reagent and organolithium reagent on ethylene oxide?

Que.3. Answer the following (4 marks)

i) Explain Acid and Base catalyzed ring opening reaction of ethylene oxide.

ii) Write a short note on Claisen rearrangement reaction.

iii) Perkin reaction with mechanism.

iv) Write a short note on Benzoin condensation reaction.

v) Reimer – Tiemann reaction with mechanism.

vi) Explain preparation and chemical properties of benzene diazonium chloride.

vii) Write a short note on reactions of Grignard and organolithium reagent on ethylene oxide.

viii) Explain methods of formation of anisole by Williamson's synthesis and from Diazomethane.

ix) Write a short note on application of UV spectroscopy.

x) Explain methods of formation of Halo acids,Di and Tri chioroacetic acid by HVZ reaction.

Que.4. Answer the following (4 marks)

i) Define Diazotisation reaction. Write synthesis of Congo Red.

ii) Write any two methods of formation of ethylene glycol with reaction.

iii) What is the action offollowing on citric acid,

a) Acetic anhydride b) HI

iv) Explain with mechanism Base catalysed Aldol condensation reaction.

v) Write short note on mechanism of nucleophilic addition to carbonyl group.

vi) Write short note on Kolbe's reaction.

vii) Explain method of prepration of citric acid from glycerol.

viii) Explain Pinacol-Pinacolon rearrangement with mechanism.

ix) Define azo coupling reaction. Explain synthesis of Methyl orange.

x) Write short note on Sandmeyer's reaction.

Que.5. Answer the following (8 marks)

I) Describe conformational analysis of ethane with the help of energy profile diagram.

ii) Explain various types of electronic transitions with suitable example.

iii) Explain Gravimetric estimation of $-OCH_3$ group by Ziesel's method.

iv) Describe conformational analysis of n-butane with the help of energy profile diagram.

v) What are Hydroxy acids. Explain methods of formation and chemical properties of

a) Malic Acid b) Citric acid

P.A.H. SOLAPUR UNIVERSITY SOLAPUR
B.Sc. (CS) III SEM V CBCS (w.e.f. JUNE 2021) EXAMINATION
PAPER XI SUBJECT-OPERATING SYSTEM MARKS 80

QUESTION BANK

Questions for 02 MARKS

1) Define O.S.
2) List out services provided of O.S.
3) Define Multiprogramming O.S.
4) Define Uni-programming O.S.
5) Define Time Sharing O.S.
6) Define Real Time O.S.
7) Define Soft Real Time O.S.
8) Define Hard Real Time O.S.
9) Define Time Sharing O.S.
10) Define Time Slice.
11) What is System Call?
12) List out types of system calls.
13) State drawback of uni-programming O.S.
14) Define Virtual Machine
15) Define Process and Program
16) List out differences between program and process.
17) What do you mean by process state?
18) What is purpose of PCB.
19) Define Context Switching with its Drawback.
20) Define Process Creation.
21) Define Process Termination.
22) Define Parent Process.
23) Define Child Process.
24) What is Co-Operating Process?
25) Define Concurrent Process.
26) Define Thread.
27) What is advantage of thread as compare with process?
28) Define User Thread.
29) Define Kernel Thread.
30) List out Advantages of Threads.
31) Define Process Scheduling.

32) Define Scheduler and list its types.
33) State function of Long Term Scheduler.
34) State function of Short Term Scheduler.
35) State function of Medium Term Scheduler.
36) Define CPU Utilization.
37) Define Throughput.
38) Define Waiting Time.
39) Define Response Time.
40) Define Turnaround Time.
41) What is mean by preemption?
42) Define Scheduling Algorithm.
43) State the types of Scheduling Algorithm.
44) Define Pre-Emptive-Scheduling
45) Define Non-Pre-Emptive-Scheduling
46) Define Priority.
47) Define Interactive Process.
48) Define Non-Interactive Process.
49) Define Foreground Process.
50) Define Background Process.
51) Define CPU Bound Process.
52) Define I/O Bound Process.
53) Define Process Synchronization.
54) What do you mean by race condition?
55) Define Critical Section.
56) Define semaphore and its operations.
57) Define Deadlock.
58) Define RAG.
59) Define Request Edge.
60) Define Assignment Edge.
61) How we can represent resource node having Single and Multiple instances?
62) Define Wait-For Graph
63) Define Address Binding.
64) Define Logical Address.
65) Define Logical Address Space.
66) Define Physical Address.
67) Define Physical Address Space.
68) Define Dynamic Loading.
69) Define Overlays.

70) Define Swapping.
71) Define Fragmentation.
72) State Two Types of Fragmentation.
73) Define Compaction with Advantage.
74) Define Demand Paging.
75) Define Page Fault.
76) State When Page replacement is necessary?
77) Define Page Replacement algorithm.
78) Define Thrashing.
79) Define File.
80) List out File types.
81) List out File Access Methods.
82) Define Directory.
83) What is Single Level Directory Structure?
84) State drawback of Single level Directory Structure.
85) What do you mean by File Allocation?
86) Define File System Structure.
87) State drawback of contiguous file Allocation method.
88) State advantage of linked file allocation method.
89) What is dis- advantage of linked file allocation method?
90) State advantage of indexed file allocation method.
91) What is drawback of indexed file allocation method?
92) List Free Space Mgt. Techniques.
93) Define Seek Time.
94) Define Rotational Latency.
95) Define Transfer Time.
96) Define Disk Access Time.
97) Define Disk Reliability.
98) What is mean by Disk Formatting?
99) Define Boot Block.
100) Define Bad Block.

Questions for 05 MARKS

1) Explain OS Structure with Diagram.
2) Explain Multiprogramming O.S. with advantages.
3) Explain Real Time O.S. With its types.
4) Explain Layered Approach.
5) Explain Monolithic O.S.
6) Write note on Thread and its types.
7) State Scheduling Criteria's for Scheduling algorithms.
8) Explain Multilevel Queue Scheduling.
9) Explain Multilevel Feedback Queue Scheduling.
10) Explain Critical Section Problem.
11) Explain Producer-consumer Problem.
12) Explain Deadlock Prevention mechanism.
13) Write Bankers Safety Algorithm for Deadlock Avoidance.
14) Explain Contiguous File Allocation Method.
15) Explain Disk Structure with Dig.

Questions for 06 MARKS

1) Example to prepare Gantt chart and calculate average waiting time and turnaround time using either one or more following scheduling algorithm,
   -FCFS Scheduling Algorithm.
   -SJF Scheduling Algorithm.
   -Pre-Emptive-SJF Scheduling Algorithm.
   -RR Scheduling Algorithm with specified Time slice.
   -Priority Scheduling Algorithm.
2) Explain Contiguous memory allocation with fixed sized partitions.
3) Explain Contiguous memory allocation with dynamic/variable sized partitions.
4) Explain Paging with advantages and dis-advantages.
5) Explain free space mgt. techniques.

Questions for 04 MARKS

1) Write note on Batch O.S.
2) Write note on Context Switching.
3) Explain in brief Process Creation

4) Explain RAG.
5) Example to draw RAG using given system scenario.
6) Write Note on Semaphore.
7) Write note on Overlays.
8) Explain Compaction with advantages and dis-advantages.
9) Explain in brief segmentation.
10) State four necessary conditions to occur Deadlock.
11) Write note on Sequential File Access method.
12) Write note FCFS scheduling algorithms.
13) Explain Process scheduling with its types.
14) Example to calculate head movements using any Disk Scheduling algorithm such as,
-- FCFS Disk Scheduling Algorithm.
-- SSTF Disk Scheduling Algorithm.
-- SCAN Disk Scheduling Algorithm.
-- CSCAN Disk Scheduling Algorithm.
15) Define File and state its attributes.

Questions for 08 MARKS

1) Define O.S. and Explain Components of O.S.
2) Explain PCB with neat diagram.
3) Define Scheduler and explain its all types.
4) Explain Reader Writers Problem with EX.
5) Explain Dining Philosophers Problem.
6) Explain Virtual Memory with Demand Paging.
7) Example on Bankers Safety algorithm and resource request algorithm.
8) Explain Deadlock Detection and recovery mechanism.
9) Example to calculate PFR for given reference string using any Page Replacement algorithm such as
a) FIFO b) Optimal c) LRU
10) Define File and explain various operations on file.
11) Define Process state and explain Process Life cycle with diagram.
12) Explain various file access methods with advantages and disadvantages.
13) Define Directory and Explain Types of directory structure.
14) Explain Various File allocation methods with advantages and disadvantages.
15) Define System call and Explain types of system calls.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc.-I Sem-I

Question Bank

Statistics Paper-I: Descriptive Statistics-I

Short Answers

1) Define Variable and Constant
2) Define discrete variable and give one example of discrete variable
3) Define frequency and cumulative frequency
4) Define Class limits and midpoint
5) Define continuous variable and give one example of continuous variable
6) Define frequency and relative frequency
7) Define Primary Data and give example of primary data
8) Define Secondary Data and give example of secondary data
9) Define upper class limit and lower class limit
10) Calculate class width of the following classes.

    Class : 0-10 10-20 20-40 40-50 50-80 80-120
11) Calculate midpoints of the following classes

    Class: 0-20 20-40 40-60 60-80 80-100
12) Find the relative frequency for the following frequency distribution

    Class : 0-10 10-20 20-30 30-40 40-50 50-60

    Frequency: 5 25 27 32 6 5
13) Define raw moment and central moment
14) Prove that first central moment is zero
15) Prove that second central moment is variance
16) Define positive skewness and negative skewness
17) Define Karl Pearson's coefficient of skewness and state its limits
18) Define Bowley's coefficient of skewness and state its limits
19) In a moderately asymmetrical distribution the mode and mean are 32 and 35 respectively. Find median
20) In a slightly skew distribution the arithmetic mean is 45 and median is 48. Find mode
21) Ina frequency distribution Karl Pearsons coefficient of skewness revealed that the distribution was skewed to the left to an extent of 0.6. Its mean value was less than its modal value by 4.8. What is the standard deviation?
22) Karl Pearson's coefficient of skewness of a distribution is 0.40. Its standard deviation is 8 and mean

is 30. Find mode.

23) For a symmetrical distribution, if the first quartile is 142 and third quartile is 178. Find median

24) In a distribution the difference of the two quartile is 15 and their sum is 35 and median is 20. Find coefficient of skewness.

25) Define Range and coefficient of range.

26) Define quartile deviation and coefficient of quartile deviation

27) Define mean deviation about mean

28) Define standard deviation.

29) Define mean square deviation.

30) Define coefficient of variation.

31) State the minimal property of mean deviation.

32) If mean and variance of data are 40 and 25 respectively. Find coefficient of variation.

33) Calculate the standard deviation for the following data

5, 10, 15, 20, 25

34) If the coefficient of variation and mean of a data are 12% and 3. Find standard deviation.

35) Define A.M.

36) Define G.M.

37) Define H.M.

38) Define median

39) Define mode.

40) Find mode of the following data 2, 4, 6, 3, 2, 4, 5, 7, 4, 6, 6, 4, 5

41) Find median of the following data 20, 18, 10, 12, 11, 22, 21, 14, 13, 15

42) Calculate G.M. of the numbers 27, 243, 125

43) Calculate H. M. of the numbers, 1, 2, 4, 8

44) Define weighted A. M.

45) Distinguish between Qualitative and Quantitative data

46) Distinguish between inclusive and exclusive methods

47) Explain discrete frequency distribution

48) Explain continuous frequency distribution

49) Explain cumulative frequency distribution

50) Define ordinal scale and nominal scale

51) Define interval scale and ratio scale

52) Explain Classification

53) Calculate Less than and Greater than cumulative frequency.

X:	0	1	2	3	4	5	6
F:	5	9	13	10	7	4	2

54) Calculate Less than and Greater than cumulative frequency.

Class:	0-10	10-20	20-30	30-40	40-50	50-60	60-70
F :	5	9	13	10	7	4	2

55) What is effect of change of origin and scale on raw moments?

56) What is effect of change of origin and scale on central moments?

57) State and prove the relation between first raw moment and mean.

58) Write a note on Sheppard's correction.

59) Write a note on skewness

60) Write a note on kurtosis

61) Prove that Bowley's coefficient of skewness is lies between -1 and +1

62) The first two moments of a distribution about the value 5 of the variable 2 and 20. Find the mean and S.D

63) Given that $\beta_1=0.19, \beta_2=2.6, \mu_2=1.2. Find\ \mu_3 \wedge \mu_4$

64) The first four central moments are 0,4,8& 144. Calculate coefficient of skewness and kurtosis.

65) A distribution has mean 30, coefficient of variation is 20% and coefficient of skewness is 0.3. Find its mode

66) The sum of 20 observations is 300 and sum of squares is 5000 and median is 15. Find the coefficient ofskewness and coefficient of variation.

67) State and prove minimal property of mean square deviation.

68) State and prove effect of change of origin and scale on standard deviation.

69) If V(X) is the variance of X. prove that $V(aX+b)=a^2V(X)$ where a and b are any constant.

70) Two samples of sizes 40 and 50 have the same mean and standard deviation20 and 10 respectively. Find mean and standard deviation of combined sample.

71) The mean and standard deviation of 100 observations are 40 and 5.1 respectively. During the cross checking, it was found that an observations 40 was misread as 50. Compute correct mean and standard deviation.

72) Given that n¿ $10\sum(X-20)=8\sum(X-20)^2=762$ Find mean, S.D. and C.V.

73) Find mean of first n natural numbers.

74) State and prove effect of change of origin and scale on A.M.

75) For any two observations prove that A.M. ≥ G.M. ≥ H.M.

76) State empirical relation between mean, median and mode. For a distribution if mean is 60 and mode is 45. Find median of the distribution.

77) State empirical relation between mean, median and mode. For a distribution if median is 70 and mode is100. Find median of the distribution.

78) The mean monthly salary of 77 workers in a certain factory is Rs. 1560. The mean salary of 35 of them is1500, that of 22 of the remaining is Rs. 1640. What is the mean salary of remaining 20 workers?

79) State the value of sum of deviations of observations taken from the A. M. and prove it.

80) For two positive observations a and b show that $G.M. = \sqrt{A.M. \times H.M.}$

81) Find quartiles of the following series of observations.

26, 35, 6, 9, 40, 11, 15, 60, 49, 18, 45, 30, 5, 7, 20

Long Answers

1) What is less than ogive curve? Explain how it is used to obtain first and third quartile.

2) Explain the construction of histogram. How it is used to locate mode.

3) Explain the construction of frequency polygon.

4) Explain the construction of cumulative frequency curve. How it is used to locate median.

5) Explain the construction of frequency curve

6) Express the first four central moments in terms of raw moments

7) Explain the term Kurtosis with reference to a frequency curve. For any frequency distribution show that $\beta_2 \geq 1$

8) Define raw moments and central moments. Obtain the first four central moments in terms of central moments.

9) The first three moments of a distribution about 2 are 1,22 and 10. Find its mean, S.D. and the third central moment.

10) Define skewness. State the types of skewness. State the various measures of skewness.

11) Given $\overline{X} = 1, \mu_2 = 3, \mu_3 = 0, \mu_4 = 27$. Find the first four raw moments

12) What do you mean by dispersion? Explain absolute and relative measures of dispersion.

13) The mean and S. D. of 10 observations were 9.5 and 2.5 respectively. If one more observation with value 15 included in a group, obtain mean and standard deviation of these 11 observations.

14) Calculate S. D. and coefficient of variation for the following frequency distribution.

Marks	: 0-20	20-40	40-60	60-80	80-100
No. of Students	: 5	12	32	40	11

15) Calculate Q.D. and coefficient of Q.D. for the following data

100, 24, 14, 105, 21, 35, 106, 16, 100, 61, 90, 20, 103, 68, 72

16) Calculate mean deviation about mean and coefficient of mean deviation about mean for the following data80, 79, 85, 80, 82, 83, 78

17) The following data shows mean and standard deviation of runs scored by cricketers A and B in 10 test matches

Cricketer	Mean	S.D.
A	53.3	40.9293
B	45.3	16.8882

Which Cricketer is more consistent?

18) Define median and derive the formula for median in case of continuous frequency distribution.

19) Define mode and derive the formula for mode in case of continuous frequency distribution.

20) What are the requisites of good average?

21) Find Mean and median of the following frequency distribution.

Marks	: 0-10	10-20	20-30	30-40	40-50
No. of students:	5	12	43	32	8

22) Find G.M. and H.M. of the following frequency distribution.

Marks	: 0-20	20-40	40-60	60-80	80-100
No. of students:	4	8	12	10	6

23) Find 6^{th}Decile and 73^{rd} percentile of the following frequency distribution.

Marks	: 10-30	30-50	50-70	70-90	90-100
No. of students:	10	40	80	35	15

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc.-I Sem-I

Question Bank

Statistics Paper-II: Probability and Probability Distributions-I

Short Answer

1. Explain Random experiment
2. Define i] Sure event ii] impossible event
3. Define finite sample space and countably infinite sample space.
4. Define Union of two events
5. Define mutually exclusive events and exhaustive events
6. Define sample space and power set of a sample space
7. Define compound event.
8. T. V. viewers were asked to give rating to 3 programmes. Write down an appropriate sample space for this experiment.
9. Ten seeds are planted and total number of seeds germinated is recorded after a week. Write down an appropriate sample space for this experiment.
10. Answers to an objective questions which has 4 multiple choices A, B, C, D. Student ticks a single answer. Write down an appropriate sample space for this experiment.
11. A committee of 3 persons is to be formed from 5 persons A, B, C, D, E. Write down an appropriate sample space for this experiment.
12. Number of tossing of a die is recorded when it is tossed until '6' occurs. Write down an appropriate sample space for this experiment.
13. Examination result (P:Pass, F:Fail) are noted for three students. Write down an appropriate sample space for this experiment.
14. Write down the sample space corresponding to the experiment a two digit number is formed from the digits 4,5,6 using each digit only once.
15. Sample Space of a random experiment is S={1,2,3,4,5,6}. Two events A and B are defined as A={1,2,3} B={ 2,3,4}. Then find the elements of set $\overline{A} \cap \overline{B}$
16. An urn contains 25 tickets numbered 1,2,3,…..25. One ticket is drawn at random. Compute the probability that it is multiple of 5 or 7.
17. 3 books are picked up at random from a shelf containing 5 novels, 3 books of poem and a book of dictionary. Find the probability that 2 novels are selected
18. Let P be a probability function on sample space $\Omega = \{e_1, e_2, e_3\}$.

    Find $P(e_1) \text{ if } P(e_3) = 2P(e_2) = 3P(e_1)$
19. Given $P(\overline{A} \cap B) = 0.1, P(A \cap \overline{B}) = 0.4 \; P(\overline{A} \cup \overline{B}) = 0.6 \text{ compute } P(A)$
20. A bag contains 10 balls two of which are blue, three red and five black. Three balls are drawn at random from the bag. What is the probability that the three balls of different colour?

21. Suppose A, B and C are three events defined on Ω such that
$P(A)=P(B)=P(C)=\frac{1}{4}P(A\cap B)=P(B\cap C)=0, P(A\cap C)=\frac{1}{8}$ Find $P(A\cup C)$

22. If $P(A)=0.6, P(B)=0.5 \qquad P(A\cap B)=0.3$ Compute $P(\overline{A}\cap\overline{B})$

23. Let A and B be two events of $P(\Omega)$ Then arrange the following probabilities in a ascending order of magnitude.

$P(A\cup B), P(A\cap B), 0, P(A)+P(B), P(A)$

23. If A and B are two events defined on Ω with $(A)=0.4, P(A\cup B)=0.7\wedge P(B)=K$. Find the value of K if A and B are mutually exclusive.

24. Define a Priori definition of probability

25. If A and B are mutually exclusive and exhaustive events such that $P(A)=2P(B)$, then find the P(A).

26. Two dice are thrown simultaneously. Let X denote the number on first die, Y denote the number on second die. Find the probability that the sum of number is 8.

27. State axioms of probability measure

28. Two cards are drawn from a pack of 52 cards. Find the probability that both the cards are black.

29. Two cards are drawn from a pack of 52 cards. Find the probability that both the cards are diamonds.

30. For any two events A and B. Define conditional probability $P(\frac{A}{B})$

31. For any two events A and B. Define independence of two events.

32. State Baye's Theorem

33. State the multiplication theorem of probability for events A and B.

34. The probabilities of three independent events are 1/3, 1/2 and 2/3. Find the probability that all three events will occur.

35. If A and B are independent events with $P(A)=\frac{1}{4}, P(B)=\frac{1}{3}. Find\, P(A\cup B)$

36. If $P(A)=\frac{9}{10}, P(B)=\frac{3}{4}, P\left(\frac{A}{B}\right)=\frac{4}{15}. Find\, P\left(\frac{B}{A}\right)$

37. If A and B are independent event with $P(A)=\frac{1}{2}, P(B)=\frac{2}{3}. Find\, P(A\cap\overline{B})$

38. If A and B are independent event with $P(A)=0.6, P(B)=0.15. Find\, P(\frac{A}{B})$

39. If $P(A)=\frac{1}{3}, P(B)=\frac{3}{4}, P(A\cup B)=\frac{11}{12}. Find\, P\left(\frac{B}{A}\right)$

40. If $A\subset B\, then\, find\, P\left(\frac{\overline{A}}{B}\right)$

41. If $B\subset A\, then\, find\, P(\overline{A}\cap B)$

42. If $P(A)=0.4, P(B)=0.3 P(A\cap B)=0. Find\, P\left(\frac{\overline{A}}{\overline{B}}\right)$

43. Let A and B are independent events such that $P(A)=0.2, P(A \cup B)=0.5. Then find P(B)$

44. If $P(A)>0, P(B)>0, P(A|B)=P(B|A) then show that P(A)=P(B)$

45. Prove that $P(A|B)\geq 0$

46. Define partition of sample space

47. If $P(A)=\frac{1}{4}, P(B)=\frac{2}{5}, P(A \cup B)=\frac{1}{2}. Find P\left(\frac{A}{B}\right)$

48. Find the probability that a single toss of a die will result in a number less than 4 if it is given that the toss resulted in an odd number

49. Define discrete random variable

50. Define probability mass function (p. m. f.)

51. Define distribution function (c. d. f.)

52. Define median for discrete random variable.

53. Define mode for discrete random variable.

54. If $P(x)=\frac{x}{8}+c; x=1,2,3$ is the p. m. f. of r. v. X, then find the value of c

55. A r. v. X has p. m. f. P(x) is given by

X :	-10	-5	0	5	10
P(x):	$\frac{1}{4}$	$\frac{1}{8}$	k	$\frac{1}{8}$	$-k$ $\frac{1}{2}$

Find the value of k

56. A r. v. X has p. m. f. P(x) is given by

X :	2	4	6	8
P(x):	$\frac{1}{12}$	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$

Find P(4>X)

55. The p. m. f. for the number of insurance policies Mr. X is sell is given by

$$P(X=x)=\frac{(0.5)^x}{k}, x=0,1,2,3,\ldots\ldots$$

Find the value of k

56. If the p.m.f. of a discrete random variable X is

P(X=x) = C x= 0,1,2,3,4

= 0 otherwise

Find the value of C

57. For the following probability distribution

X:	0	1	2
P(x):	k	5k	4k

Find the value of k

58. Consider the following probability distribution

X:	0	1	2
P(x):	k	2k	4k

Find the value of k

59. If $P(x)=\frac{x+1}{k}$ *for* $x=0,1,2,3,4$ *find* k

60. Verify whether following function is pmf of x $P(x)=\frac{x+1}{3}\ x=0,1$

61. If $P(x)=\frac{x^2-2}{8}\ x=1,2,3$ Verify whether it is pmf or not?

62. Let A, B, C be any three events on a sample space Ω. Write expressions of events.

i} Only A occurs ii] A and B occur but not C

iii] Exactly one occurs. Iv] Only one of A and C occurs

63. A committee of 3 persons is to be formed from 5 persons A, B, C, D, E. Write down the events corresponding to the following:

i] E_1 = A is not selected in the committee

ii] E_2 = B and C are both selected in the committee

iii] E_3 = B and C but not D is selected in the committee.

iv] E_4 = at least one of A and B is selected in the committee

64. Write down the sample space for the following events

i] A leap year will have 53 Sundays ii] A non-leap year will have 53 Sundays

65. Write down the sample space and power set for tossing of two coins.

66. If Ω={1,2,3,4,5,6,7,8,9} A={1,3,5,7} B={ 6,7,8,9} C={ 2,4,8}. List the elements of the subset of Ω corresponding to the following events

i] $(\overline{A}\cap B)$ ii] $(\overline{A}\cap B)\cap C$ iii] $(\overline{B}\cup C)$ iv] $A\cup(\overline{B}\cup C)$

67. If A, B, C are three events. Express the following events in appropriate symbols

i] Simultaneous occurrence of events A, B, C

ii] Occurrence of at least one of the events A, B, and C

iii] A, B and C are mutually exclusive

iv] Every point in A is contained in B

68. Suppose we conduct an experiment where ordered pair of integers (X,Y) are observed. The restriction on (X,Y) are as follows $1\le X\le 3, 1\le Y\le 3\ X\ne Y$. Let A be the event that product of X and Y is less 5 and B be the event that sum of X and Y is greater than 2. Write down the appropriate sample space Ω and event A and B

69. Two dice one is red and other is green are thrown. Let A be the event that the sum of the points on the faces shown is even and B be the events that at least one is ace number. Obtain

i] The sample space ii] Events A and B

70. If a fair coin and a fair die are tossed together. Let A be the event that there is a head on a

coin and even number on a die and B be the event that the number on a die is greater than 4. Obtain i] Sample Space ii] Events A and B

71. Write down the sample space for the following experiments. Also state the type of the sample space.

i] Ten radio sets are checked and number of defective sets is noted

ii] Items coming off production lines are marked defective (D) or non-defective (N). This is continued until two consecutive defectives are produced or four items have been checked, whichever occurs first.

72. Write down the sample space for the following experiments. Also state the type of the sample space.

i] A coin is tossed until 'head appears for the first time.

ii] Life of an electric tube produced by a company is measured.

73. Distinguish between deterministic and non-deterministic experiments

74. A class of 100 students appeared for two examinations 60 passed the first examination, 50 passed the second examination and 30 passed both examinations. Find the probability that a student selected at random has failed in both the examination.

75. Let $\Omega=\{e_1,e_2,e_3\}$ be a sample space associated with a certain experiment if $P(e_1)=K$, $P(e_2)=2K^2 \wedge P(e_3)=K^2+K$. Find K.

76. With usual notation prove that

i] $P(\varphi)=0$ ii] $P(\overline{A})=1-P(A)$

77. A and B are two events defined on sample space Ω such that

$P(A)=\frac{1}{4}, P(B)=\frac{1}{5}, P(A\cap B)=\frac{1}{7}$. Find i] $P(\overline{A}\cup\overline{B})$ ii] $P(A\cap\overline{B})$

78. If A and B are two events such that $A \subset B$. Prove that $P(A)\leq P(B)$

79. If a coin and a dice are tossed together, find

I] Sample Space ii] Probability of head on coin and even number on dice

80. If A and B are any two events, then prove that $P(A\cup B)\leq P(A)+P(B)$

81. Define Axiomatic definition of probability.

82. Four persons are chosen at random from a group containing 3 men, 2 women and 4 children. Find the probability that exactly 2 of them will be children.

83. In a group of equal number of men and women 10% men and 45% women are unemployed. What is the probability that a person selected at random will be employed?

84. For any two events A and B. Show that

i] $P(\overline{B})=1-P(B)$ ii] $P(A\cap\overline{B})=P(A)-P(A\cap B)$

85. Two unbiased dice are thrown simultaneously. What is the probability that

i] The sum (X+Y) is greater than 9 ii] The product (XY) is less than 4

where X: Number on first die Y: Number on second die.

86. Let A and B be two events such that $A \subset B$ *then prove that* $P(A)\leq P(B)$

87. Show that classical definition of probability satisfies the axioms of probability measure.

88. If A and B are mutually exclusive events. Then show that

i] $P\left(\frac{A}{B}\right)=0$ ii] $P\left(\frac{A}{\overline{B}}\right)=\frac{P(A)}{1-P(B)}$

89. If $A \subset B$, then prove that

i] $P\left(\frac{B}{A}\right)=1$ ii] $P\left(\frac{A}{B}\right)=\frac{P(A)}{P(B)}$

90. Explain the concept of pairwise independence and mutual independence.

91. A and B are independent events, prove that with usual notation

$P(A \cup B)=1-P(\overline{A}).P(\overline{B})$

92. A, B and C are mutually independent events and $P(A \cap B) \neq 0$. Prove that

$$P\left(\frac{C}{A \cap B}\right)=P(C)$$

93. If A and B are independent events. Then prove that

i) A and B^C are independent

ii) A^C and B are independent

94. If A, B, C forms the partition of the sample space. And 3P(A) = 2P(B) =6P(C) then find P(A).

95. If A and B are two events and $P(A) \neq 1$. Prove that $P\left(\frac{B}{\overline{A}}\right)=\frac{P(B)-P(A \cap B)}{1-P(A)}$

96. For any three events A, B and C. Prove that

$P(A \cap B \cap C)=P(A).P\left(\frac{B}{A}\right).P\left(\frac{C}{A \cap B}\right)$

97. With usual notations, prove that $P\left(\frac{\overline{A}}{B}\right)=1-P\left(\frac{A}{B}\right)$ where $P(B)>0$

98. Show that if A and B are independent events, then $\overline{A} \wedge \overline{B}$ are also independent events.

99. If $P(A)=0.50, P(B)=0.60, P\left(\frac{B}{A}\right)=0.90$. Find the probability that

i] A and B both happens ii] A happens given that B has happened.

100. If P(A) = 0.5, P(B) = 0.6 and P(B|A) = 0.9. Find the probability that

i) Both A and B happen ii) at least one of A and B happen

101. A pair of fair dice is rolled. Find the probability that the sum on the faces is 9 given that the number on the first dice is greater than the number on the second dice.

102. If X takes values $-2,-1,0,1,2$ with probabilities 0.2, 0.1, 0.3, 0.2, 0.2 respectively. Find the probability distribution of |X|. Also find mode of |X|

103. If $P(X=x)=\frac{2x+1}{16}, x=0,1,2,3$ Verify whether this function is p. m. f. If yes find mode of X

104. A r. v. X has following probability distribution

X:	1	2	3	4	5	6	7
P(x):	k	2k	3k	k^2	k^2+k	$2k^2$	$4k^2$

Find i) k ii) P(X≤ 3)

105. Verify whether the following function can be considered as p. m. f. Further find P(X=1 or 3).

$$P(X=x)=\frac{x^2+1}{18}\ x=0,1,2,3$$

106. Verify whether the following functions can be regarded as the p.m f. for the given values of X.

$$P(X=x)=\frac{1}{5}\ x=0,1,2,3,4$$

107. Verify whether the following functions can be regarded as the p.m f. for the given values of X.

$$P(X=x)=\frac{x^2-2}{8}\ x=1,2,3$$

108. A r. v. X has p.m.f.

X:	1	2	3	4
P(x):	k	2k	2k	3k

Find i)k ii) P[X-2 < 0]

109. The r. v. X has p.m.f. of the following form

P(x) = k if x=0

=2k if x=1

=3k if x=2

=0 o.w.

i) Determine the value of k ii) Obtain distribution function

110. For the following probability distribution

X:	1	2	3	4	5	6
P(x):	$\frac{1+2k}{6}$	$\frac{1-k}{6}$	$\frac{1+k}{6}$	$\frac{1-4k}{6}$	$\frac{1-2k}{6}$	$\frac{1+4k}{6}$

Find i) k ii) comment on mode.

111. A discrete r. v. X has the following probability distribution

X:	-2	-1	0	1	2	3
P(x):	0.1	k	0.2	2k	0.3	3k

Find i) k ii) $P(-2<X<2)$

112. Suppose a die throw has the following probability model

Face :	1	2	3	4	5	6
Prob. :	0.3	0.1	0.1	0.1	0.1	0.3

Find i) P(X<5) ii) P(X=2 or 3)

113. For the following probability distribution

X :	-2	-1	0	1	2

P(x) : 1/5 2/5 1/15 2/15 1/5

i) Obtain c.d.f. ii) Find median

114. Let X is a discrete r.v. with following probability distribution.

Find i) $P(X < 2.5)$ ii) $P(X-2 \geq 0)$

X	0	1	2	3
P(x)	1/3	½	1/24	1/8

115. Suppose a r.v. X takes values 0 , 2 , 4 , 6 with respective probabilities 0.1 , 0.2 , 0.3 , 0.4 ; find the distribution of $Y = X^2$ and hence find $P(X^2 - 1 \leq 20)$ and $P(Y > 10)$.

Long Answer

1. Define the term

   i] Sample space ii] Event iii] Elementary event iv] Compound event

2. Explain the following terms with suitable example

   i] Sample space ii] Exhaustive events iii] Complementary Events

   iv] Mutually exclusive event

3. Explain the following terms with suitable example

   i] Event ii] Elementary event iii] Complementary Events iv] Power set

4. Three coins are tossed and whether each shows head or tail is recorded. Write the following events.

   i] A : Exactly two coins show tails ii] B : At least two coins show tails

   Write down also the sets corresponding to the complementary events. Determine whether the events A and B are mutually exclusive. Are A and B exhaustive?

5. Let $\Omega = \{a,b,c,d,e,f,g,h,i\}\ A = \{a,c,e,f\}\ B = \{b,d,e,g,h\}\ C = \{e,h,i\}$

   List the elements of the following events.

   i) $A \cap B'$ ii) $(A \cup B \cup C)'$ iii) $(A \cap B) \cup C$ iv) $[A \cap (B \cup C)]'$

6. A card is drawn from a pack of 52 playing cards. Consider the following events:

   A : An ace is drawn B : A face card is drawn

   (i) List the elements of A and B (ii) List the elements of $A \cap B'$

   (iii) Are A and B mutually exclusive? Justify. [A face card is a king or queen or a jack]

7. Define apriori definition of probability. Prove that the apriori definition leads to a probability measure.

8. Prove that for any two events A and B

   $P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$

9. State and prove addition theorem of probability of two events. Write the expression for $P(A \cup B \cup C)$

10. Prove that for any two events A and B

i] $P(A \cap \overline{B}) = P(A) - P(A \cap B)$ ii] $P(\overline{A} \cap B) = P(B) - P(A \cap B)$

11. Given $P(A) = \frac{1}{3}, P(B) = \frac{1}{4}, P(A \cap B) = \frac{1}{6}$,

$find\, i¿ P(\overline{A})\, ii¿ P(\overline{A} \cup B)\, iii¿ P(A \cup \overline{B})\, iv¿ P(A \cap \overline{B})$

12. With usual notation prove that

i] $0 \le P(A) \le 1$ ii] $P(A \cap B) \le min\,[P(A), P(B)]$

13. A and B are two events defined on sample space Ω such that $P(A) = \frac{1}{4}, P(B) = \frac{1}{5}$ and $P¿$ find

i]$P(A\,B)^c$ ii) $P(A^c B^c)$ iii)$P¿$ iv) $P¿$ v) P(A|B)

14. For any two events A and B prove that i) $P¿$

ii) $P(\overline{A}) = 1 - P(A)$

15. For any two events A and B prove that i) $P¿$

ii)$P¿$

16. i) State and prove addition law of probability for two events and extend the result for three events.

ii) Prove that probability of an impossible event is zero.

17. Define conditional probability of an event. Show that conditional probability satisfies all the axioms of unconditional probability.

18. State and prove Baye's theorem on probability.

19. If A, B, C are any three events defined on sample space Ω with P(A) > 0 then prove that $P¿$

20. A fair coin is tossed twice and the events are defined as follows

A: Head on first toss

B: Head on second toss

C: Same face on both tosses

Discuss pairwise and mutual independence of A, B and C.

21. A box contains 4 tickets marked with numbers 112, 121, 211 and 222. One ticket is taken at randomly. Let A_i (i= 1,2,3) be the event that the i^{th} digit of the number on ticket is 1. Comment on the pairwise and mutual independence of A_1, A_2, and A_3.

22. The chances of X, Y, Z becoming the manager of a certain company is $\frac{4}{9}, \frac{2}{9}, \frac{3}{9}$ respectively. The probabilities of a bonus scheme being introduced. If X, Y, Z becomes manager are 0.3, 0.5, and 0.6 respectively. If bonus scheme is introduced, what is the probability that X is appointed as manager?

23. Define

i) Conditional probability of A given B

ii) Partition of sample space Ω

iii) Power set of a sample space Ω

24. i) State and prove addition low of probability.

ii) A, B and C are mutually independent events and P¿

prove that P¿

25. Define conditional probability of B given A. Show that it is a probability measure.

26. The chances of X, Y, Z becoming the manager of a certain company is $\frac{4}{9}, \frac{2}{9}, \frac{3}{9}$ respectively. The probabilities of a bonus scheme being introduced. If X, Y, Z becomes manager are 0.3, 0.5, and 0.6 respectively. If bonus scheme is introduced, what is the probability that X is appointed as manager?

27. A man is equally likely to choose any one of the three routes A_1. A_2, A_3 from his house to the railway station. The probabilities of his missing the train by the routes A_1. A_2, A_3 are $\frac{2}{5}, \frac{3}{10}, \frac{1}{10}$ respectively. He sets out on a day and misses the train. What is the probability that the route A_3 was selected?

28. Two dice are rolled. Let X denotes the r. v. which counts total number of points upturned. Find probability distribution of r. v. X. Find its c. d. f. hence find median. Also find its mode

29. A r. v. X has the following probability distribution.

X	:	1	2	3	4	5	6	7
P(x)	:	1/8	2/8	3/8	1/64	9/64	2/64	4/64

Find i) P(2<X<6) ii) P(X≥5) iii) distribution function of X iv) Median of X.

31. The r. v. X has p.m.f. of the following form

P(x) = $3C^3$ if x=0

= $4C-10C^2$ if x=1

= $5C-1$ if x=2

= 0 o. w.

i) Determine the value of C ii) Compute P(X<2) and P(1<X≤2) iii] find largest k such that F(k)<1/2

32. Given the following probability function of discrete r. v. X

X:	0	1	2	3	4	5	6	7
P(x):	0	c	2c	2c	3c	c^2	$2c^2$	$7c^2+c$

Find i) c ii) Evaluate P(X≥ 5), P(X<3) & P(X≤ 4) iii) Distribution function of X

33. Let $P(x)=\frac{\binom{3}{x}}{8} x=0,1,2,3$ be the probability function of X

i) Obtain the probability distribution of X. Hence find distribution function of X.

ii) Evaluate P[0<X<3] and P[X≥2]

34. The probability mass function of a r. v. X is given by

$P(x)=\frac{x+1}{10} x=0,1,2,3$

Find i) P(X≤2) ii) P(X>1) iii) distribution function of X iv) Median of X.

35. Let P(x) be the probability mass function of discrete r. v. X which assumes values x_1, x_2, x_3 such that $p(x_1)=2p(x_2)=3p(x_3)$ Obtain the probability mass function of X.

36. From a lot of 10 items containing 3 defectives, a sample of 4 items is drawn at random without replacement. Let the r. v. X denote the number of defective items in the sample

i) Find the probability distribution of X. ii) Find P(X≤1) , P(0<X<2)

37. A r. v. X takes values $-3,-2,-1,0,1,2,3,4$ such that

$p(X=0)=p(X<0)=p(X>0)$

$p(X=-1)=p(X=-2)=p(X=-3)=p$

$p(X=1)=p(X=2)=p(X=3)=p(X=4)=q$

Find i) k ii) p iii) q iv) p. m. f. of r. v. X

38. If $P(x)=\frac{x}{25}\ x=1,3,5,7,9$ then

i) Find Mode ii) If Y= X-5, find p. m. f. of Y iii) Find median of Y.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc.-I Sem-II

Question Bank

Statistics Paper-III: Descriptive Statistics-II

Short Answer

1. Define positive correlation with suitable example.
2. Define negative correlation with suitable example
3. Define linear and non linear correlation
4. Define Spearman's rank correlation coefficient and state the limits of R.
5. Prove that $Corr(X, X)=1$
6. For 8 pairs of observation the sum of squares of differences in ranks is 42. Find the Spearman's rank correlation coefficient without ties.
7. If Karl Pearson's coefficient of correlation between X and Y is 0.85, standard deviation of Y is 5 and variance of X is 64. Find covariance between X and Y.
8. For 10 pairs of observation the sum of squares of differences in ranks is 66. Find the Spearman's rank correlation coefficient without ties.
9. Coefficient of correlation between two variables X and Y is 0.8 and their covariance is 20. If the variance of X is 16. Find the standard deviation of Y.
10. If the rank correlation coefficient between 6 pairs of observations is 0.6. Find the sum of squares of the difference between the ranks.
11. Let X and Y are two independent r. v. with same mean and same variance then find the correlation coefficient between X and X+Y.
12. Given n=10, the sum of squares of difference between ranks of X and Yis 85. Find Spearman's Rank correlation coefficient.
13. If $\sum d_i^2=416, n=12$ then find the value of rank correlation.
14. $If\ Cov(X,Y)=-13.0 \wedge \sigma_x=3.60 \wedge \sigma_y=4.07$,then find value of r.
15. Given $n=10, \sum XY=511$, A. M. of X and Y are 12 and 7 respectively. Find Cov(X,Y).
16. Given $Cov(X,Y)=-15, V(X)=441, V(Y)=484. Find\ r_{xy}$
17. Given $\sum (X-\overline{X})(Y-\overline{Y})=-40, \sum (X-\overline{X})^2=50, \sum (Y-\overline{Y})^2=60. Find\ r_{xy}$
18. Given $n=10 Cov(X,Y)=-15, \sum (X-\overline{X})^2=205, \sum (Y-\overline{Y})^2=255$.Find correlation coefficient between X and Y.
19. Given $\sum (X-\overline{X})(Y-\overline{Y})=26, \sum (X-\overline{X})^2=25, \sum (Y-\overline{Y})^2=41$. Find correlation coefficient between X and Y.
20. Given $\sum (X-\overline{X})(Y-\overline{Y})=-43, \sum (X-\overline{X})^2=73, \sum (Y-\overline{Y})^2=81. Find\ r_{xy}$
21. Given $n=10 Cov(X,Y)=-45, \sigma_x=7, \sigma_y=9. Find\ r_{xy}.$
22. Given $n=10 Cov(X,Y)=-55, \sigma_x=3, \sigma_y=5. Find\ r_{xy}.$

23. Coefficient of correlation between two variables X and Y is 0.28 and their covariance is 7.6. If the variance of Y is 9. Find the standard deviation of Y.

24. If $\sigma_x=0.5, \sigma_y=1.5 \wedge \sigma^2_{x-y}=1.25$. Find the correlation coefficient between X and Y.

25. If $V(X+Y)=V(X-Y)$, then find the correlation coefficient between X and Y.

26. Coefficient of correlation between two variables X and Y is 0.38 and their covariance is 10.2. If the variance of X is 16. Find the standard deviation of Y.

27. Coefficient of correlation between two variables X and Y is 0.4 and their covariance is 10. If the variance of X is 16. Find the second moment about mean of Y.

28. What are the lines of regression for bivariate data (X, Y)?

29. Define the two regression coefficients.

30. Define the term regression.

31. State the expression for the acute angle between two regression lines and discuss the case when $r=0$

31. State the expression for the acute angle between two regression lines and discuss the case when $r=\pm 1$

32. Given the two lines of regression as $3X-4Y+8=0 \wedge 4X-3Y=1$, then find mean values of X and Y.

33. Given the two lines of regression as $2X-3Y=5 \wedge 5X-10Y=7$, then find mean values of X and Y.

34. Given if $\sigma_x=\sigma_y \wedge r=\sqrt{2}-1$. Obtain the acute angle between two regression lines.

35. Given if $\sigma_x=\sigma_y=\sigma \wedge agnle\ between\ two\ regression\ lines\ is \tan^{-1}\left(\frac{4}{3}\right)$. Compute correlation coefficient.

36. If $\overline{X}=4, \overline{Y}=50, b_{xy}=0.57, b_{yx}=1.12$, then find the equation of line of regression of Y on X.

37. For a bivariate data $\sigma_x=\sigma_y=1 \wedge r=0.5$. Obtain the acute angle between two regression lines.

38. The regression equations are $X-4Y-5=0\ and X-16Y-64=0. Find corr(X,Y)$

39. The regression equations are $3X-Y-5=0 \wedge 4X-3Y=0. Find corr(X,Y)$

40. The coefficient of regression of Y on X is 3/4 . Also the ratio of two regression coefficients is 3/4 , then find coefficient of correlation.

41. If the $V(X)=25, r_{xy}=0.25 \wedge b_{yx}=0.5$. Find the covariance between X and Y.

42. If one of the regression coefficient is 1/4 and correlation coefficient is 1/3. Find other regression coefficient.

43. If $\overline{X}=4, \overline{Y}=50, \sigma_x=2 \wedge Cov(X,Y)=2$, then find the estimated value of Y when X= 4.

44. If the regression coefficients are 1.6 and 0.1, then find the Coefficient of correlation.

45. If $Cov(X,Y)=-1.25$ and $\sigma^2_y=4.5$ then find the value of bxy

46. Given $b_{yx}=-0.625 \wedge b_{xy}=-0.875$ Find r_{xy}.

47. Given $\overline{X}=\overline{Y}=20, b_{yx}=1.5 \wedge b_{xy}=0.75$. Obtain line of regression of Y on X.

48. Given $Cov(X,Y)=-15$ S.D. of X and Y are 11 and 7 respectively. Find b_{yx}.

49. The equation of line of regression of Y on X is $3.5Y+5X=60$.Find b_{yx}.

50. Given $r_{xy}=0.75, V(X)=81, V(Y)=100$ *Find* b_{yx}.

51. Given $b_{yx}=1.6, Cov(X,Y)=256,$ *Find* $V(X)$

52. If $\overline{X}=50, \overline{Y}=56, b_{xy}=0.80, b_{yx}=1.5$, then find the equation of line of regression of Y on X.

53. If $b_{yx}=0.4, r_{xy}=0.5, \sigma_y=4.$ Find the value of S.D. of X and Covariance between X and Y.

54. If the line of regression of Y on X is Y=2X+1 and X on Y is 6X=Y-3, then find correlation coefficient between X and Y.

55. If the two lines of regression are $X=\frac{-1}{18}Y+a$ *nad* $Y=-2X+b$ and the mean of the distribution is at $(-1,2)$. Find the values of a and b.

56. If $\overline{X}=9.2, \overline{Y}=16.5, \sigma_x=2.1, \sigma_y=1.6, r_{xy}=0.84$ then find the equation of line of regression of Y on X.

57. If the two lines of regression in a bivariate variables are X+9Y=7 and Y+4X=16 then find the ratio of $\sigma_x:\sigma_y$

58. Given if $\sigma_x=\sigma_y=\sigma \wedge$ *agnle between two regression lines is* $\tan^{-1}(6)$. Compute correlation coefficient.

59. The two regression lines are having their means standard deviations 31.6 , 38 and 3.72,6.31 and $r=-0.36$. Find the two regression lines

60. The angle between the two regression is $\tan^{-1}\left(\frac{1}{4}\right)$, coefficient of correlationis 2/3. Given that S.D of y is multiple of S.D of x. Find the ratio $\frac{\sigma_x}{\sigma_y}$

61. Test whether the equations 2x+3y = 4 and x-y =5 represent valid regression lines

62. Calculate expected value of y when x = 12 if $\overline{X}=7.6, \overline{Y}=14.8, \sigma_x=3.6, \sigma_y=2.5 \wedge r=0.99$

63. Find the correlation coefficients from the following regression lines : 2Y-X =50 & 3Y-2X =10

64. Explain the term association and disassociation with examples.

65. What is meant by consistency of data? State the conditions of consistency for one attribute A.

66. Define positive classes and negative classes.

67. Define the term attribute and ultimate class frequencies.

68. Define Yule's coefficient of association and coefficient of colligation.

69. Define fundamental sets of class frequencies.

70. If the attributes A and B are independent then prove that $\delta=0$

71. Define positive association.

72. Define negative association

73. Define complete disassociation.

74. Define positive class frequency and negative class frequency.

75. Define Laspeyre's price index numbers.

76. Define Laspeyre's quantity index numbers.

77. Define Paasche's price index numbers.

78. Define Paasche's quantity index numbers.

79. Define Fisher's price index numbers.

80. Define Fisher's quantity index numbers.

81. What is index number?

82. State important uses of index number.

83. If $P_{01}^{P}=126.2 \wedge P_{01}^{F}=125.6\, then Find\, P_{01}^{L}$

84. If $Q_{01}^{P}=124 \wedge Q_{01}^{F}=124.8\, then Find\, Q_{01}^{L}$

85. If $P_{01}^{P}=124.75 \wedge P_{01}^{F}=125 then Find\, P_{01}^{L}$

86. If $P_{01}^{L}=133.33 \wedge P_{01}^{F}=132.57\, then Find\, P_{01}^{P}$

87. If $P_{01}^{P}=134.5 \wedge P_{01}^{F}=133.5 then Find\, P_{01}^{L}$

88. If $P_{01}^{L}=125.5 \wedge P_{01}^{F}=126.34\, then Find\, P_{01}^{P}$

89. Given $\sum p_1 q_1=120, \sum p_0 q_1=105, \sum p_0 q_0=90.5$Find appropriate quantity index number.

90. Given $\sum p_1 q_1=120, \sum p_0 q_1=85, \sum p_1 q_0=95.5$Find appropriate price index number. P

91. Given $\sum p_1 q_1=18, \sum p_0 q_1=10, \sum p_0 q_0=15$Find appropriate price index number. P

92. Given $\sum p_0 q_0=25, \sum p_1 q_1=66, \sum p_1 q_0=33$Find appropriate price index number. L

93. Given $\sum p_1 q_1=230, \sum p_1 q_0=150, \sum p_0 q_0=125$Find suitable price index number. L

94. Construct a price index number by suitable formula. If you are given$\sum p_0 q_1=600, \sum p_1 q_1=900$

95. If $\sum p_1 q_1=1340, \sum p_0 q_1=1070, \sum p_1 q_0=2070$Find Paasche's price index number.

96. Suggest an index number that can be constructed and construct it when you are given
$\sum p_0 q_0=700, \sum p_1 q_0=1050$

97. The rank correlation coefficient of the marks obtained by 10 students in mathematics and statistics was found to be 0.5. It was later discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 3 instead of 7. Find the correct rank correlation coefficient.

98. Spearman's rank correlation coefficient between X and Y is 2/3. If sum of squares of difference between ranks is 55. Assuming that no rank is repeated, find number of pairs in the series.

99. Write a short note on types of correlation.

100. Suppose X, Y and Z are uncorrelated variables with same standard deviation σ. obtain the correlation coefficient between $X+Y \wedge Y+Z$

101. Suppose X and Y are uncorrelated variables with same arithmetic mean and variances. obtain the correlation coefficient between $X \wedge X+Y$

102. Suppose X and Y are uncorrelated variables with same arithmetic mean and variances. obtain the correlation coefficient between $\frac{X \wedge X+Y}{2}$

103. Suppose$\sigma_x=\sigma_y=\sigma_z, Corr(X,Y)=r_{xy}, Corr(Y,Z)=r_{yz}, Corr(X,Z)=r_{xz}$, and then show that

104. $r_{xy}+r_{yz}+r_{xz} \geq -\frac{3}{2}$

105. Suppose$\sigma_x=\sigma_y, Corr(X,Y)=r$, then show that $Corr(X, X+Y)=\sqrt{\frac{1+r}{2}}$

106. If Variables X and Y taking first n natural number values. Show that $Cov(X,Y)=\frac{n^2-1}{12}$
107. Spearman's rank correlation coefficient between X and Y is 0.8. If sum of squares of difference between ranks is 33. Assuming that no rank is repeated, find number of pairs in the series
108. If X and Y are independent variables with variances $V(X)=25$ and $V(Y)=15$, then find the correlation coefficient between $U=X+Y$ and $V=X-Y$
109. Spearman's rank correlation coefficient between X and Y is 0.6. If sum of squares of difference between ranks is 66. Assuming that no rank is repeated, find number of pairs in the series
110. Spearman's rank correlation coefficient between X and Y is 0.143. If sum of squares of difference between ranks is 48. Assuming that no rank is repeated, find number of pairs in the series
111. The rank correlation coefficient of the marks obtained by 10 students in Biology and Chemistry was found to be 0.8. It was later discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 7 instead of 9. Find the correct rank correlation coefficient.
112. The rank correlation coefficient of the marks obtained by 10 students in Statistics and Accountancy was found to be 0.5. It was later discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 9 instead of 7. Find the correct rank correlation coefficient.
113. Define:
114. line of regression of Y on X
115. line of regression of X on Y.
116. State and prove any two properties of regression coefficients.
117. Explain the concept of lines of regression.
118. Given $n=5, \sum X=30, \sum Y=40, \sum Xy=214, \sum Y^2=340$. Find the equation of line of regression to estimate X when $Y=10$
119. The equations of two regression lines are $8X-10Y+66=0 \wedge 40X-18Y-214=0$
120. Find i) Means of X and Y ii) Coefficient of correlation between X and Y.
121. Given $\overline{X}=20, \overline{Y}=15, \sigma_x=4, \sigma_y=3 \wedge r_{xy}=0.7$. Obtain the regression equation of Y on X and find the most likely value of Y when $X=24$
122. The equations of two regression lines are $3X+2Y=26 \wedge 6X+Y=31$
123. Find i) Means of X and Y ii) Coefficient of correlation between X and Y.
124. For a bivariate data $\overline{X}=53, \overline{Y}=28, b_{yx}=-1.5 \wedge b_{xy}=-0.2$. Find
125. a) Correlation coefficient between X and Y b) Estimate of Y when $X=60$.
126. The equations of two regression lines are $X-4Y-5=0 \wedge X-16Y-64=0$
127. Find i) Means of X and Y ii) Coefficient of correlation between X and Y.
128. What is effect of change of origin and scale on regression coefficients?
129. For 50 students of a class the regression equation of marks in Statistics (X) on the marks in Mathematics (Y) is $3Y-5X+180=0$. The mean marks of Mathematics is 44 and the variance of marks in Statistics is $\left(\frac{9}{16}\right)^{th}$ of the variance of marks in Mathematics. Find mean marks of Statistics and the coefficient of correlation between marks in the two subjects.
130. For a group of 30 couples the regression equation of age of wife (Y) on the age of husband (X) is
131. $3Y-4X+60=0$. The mean age of wife is 40 and the variance of age of husband is to be the variance of age of wife in the ratio 9:25. Find the mean age of husband and the coefficient of correlation.
132. You are given that the means of X and Y are 65 and 67, their standard deviations 2.5 and 3.5 respectively and the coefficient of correlation between them is 0.8. Find the equations of two lines of regression.
133. If $\sigma_x=0.5, \sigma_y=1.5, \sigma^2_{x-y}=1.25, \overline{X}=8 \wedge \overline{Y}=6$. Find the regression line of Y on X.
134. Define fundamental set of class frequencies. State any two fundamental sets of class frequencies if the data contains three attributes A, B and C.

135. Find number of attributes if the total number of class frequencies of the class of orders two is 84.
136. If A and B are independent then show that
137. i) $\alpha \wedge B$ *are independent* ii) i) $\alpha \wedge \beta$ *are independent*
138. What do you mean by independence of attributes? Give any one criteria for testing independence of two attributes A and B.
139. Find the number of attributes 'n' if total number of class frequencies of order 2 is 180 and the population is dichotomized according to n attributes.
140. If the attributes A and b are positively associated, then show that $\alpha \wedge \beta$ are also positively associated.
141. `For consistent data, with usual notations, show that $(ABC) \geq (A)+(B)+(C)-N$
142. If $(A)=(B)=\frac{N}{2}$, *then show that* $(AB)=(\alpha\beta)\wedge(A\beta)=(\alpha B)$
143. Explain the term association and disassociation with examples.
144. Given $(A)=(B)=(C)=\frac{N}{2}\wedge(ABC)=(\alpha\beta\gamma)$. Show that
145. $2(ABC)=(AB)+(BC)+(AC)-\frac{N}{2}$
146. With usual notations, show that $(ABC) \geq (A)+(B)+(C)-2N$
147. Find the conditions of consistency of data related to two attributes A and B.
148. If all A's are B's and all B's are C's show that all A's are C's.
149. Write a short note on index number.
150. Define Fisher's Price/ Quantity index number. Why it is called most ideal index number.
151. State the important uses of index numbers.
152. Define index number and state the features of it.
153. Write a note on Cost of living index number.
154. What is index number? Explain the types of averages used in index numbers.
155. Explain the weighted aggregate method of calculating index number.
156. Prove that Fisher's price index lies between Laspeyre's and Paasche's price indices.

Long Answer

1. Explain scatter diagram.

2. Prove that Karl Pearson coefficient of correlation lies between -1 and +1.

3. Derive the formula for Spearman's rank correlation coefficient.

4. With usual notation, prove that
$R=1-\frac{6\sum d_i^2}{n^3-n}$

5. Suppose X and Y are variables with variances $\sigma_x^2 \wedge \sigma_y^2$ respectively. Obtain the variance of $(X-Y)$ and hence show that $r=\frac{\sigma_x^2+\sigma_y^2-\sigma_{x-y}^2}{2\sigma_x\sigma_y}$

6. Derive the equations of lines of regression of Y on X by the method of least square.
7. Derive the formula for acute angle between two regression lines.

8. Obtain the expression for the acute angle θ between the two regression lines. Interpret the results
$\theta=0, \theta=\frac{\pi}{2}$
9. Obtain the relation between coefficient of association (Q) and coefficient of colligation (Y).

Deduce that |Q| >|Y|

10. Define Yule's coefficient of association (Q) and coefficient of colligation (Y) and show that

$$Q=\frac{2Y}{1+Y^2}$$

11. What do you mean by independence of attributes? If two attributes A and B are independent. Show that i) α, B ii) A, β and iii) α, β are independent
12. What are index numbers? How are they constructed? What are their uses?
13. What is an index number? State briefly its uses and limitations.
14. What is time reversal test of consistency? Verify the same for Laspeyre's index number.
15. What is time reversal test of consistency? Verify the same for Paasche's index number.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc.-I Sem-I

Question Bank

Statistics Paper-IV: Probability and Probability Distributions-II

Short Answer

1. Define Expectation of r.v. X.
2. Define Expectation of function of random variable
3. Define raw moments of r.v. X
4. Define central moments of r.v. X
5. Define factorial moments of r.v. X.
6. Show that $E(C)=C$
7. Define probability generating function of r. v. X.
8. If E(X) = 3 and let $Y=\frac{X-2}{5}$ What is E(Y)?
9. If X is a discrete random variable then show that $E(X^2)\geq[E(X)]^2$
10. Define joint probability mass function of r.v's (X,Y)
11. Define marginal probability mass function of r.v. X.
12. Define marginal probability mass function of r. v. Y.
13. Define independence of r.v.'s (X,Y)
14. Define bivariate expectation.
15. State the pmf of hypergeometric distribution with parameters N,M and n in usual notation.
16. Define Bernoulli random variable.
17. Define Two point distribution
18. Define binomial distribution.
19. Define One point distribution.
20. Define Uniform distribution.
21. Prove That $E(aX+b)=aE(X)+b$
22. Prove that $V(aX+b)=a^2V(X)$
23. What is effect of change of origin and scale on variance?
24. What is effect of change of origin and scale on probability generating function?
25. Let the probability distribution of discrete random variable be

    X : 0 1 2 3

    P(x); 0.2 0.3 0.1 0.4 Find p. g. f. and hence find E(X)
26. A random variable X assumes values -3, -2, -1, 0, 1, 2, 3 with equal probability. Find E(X) and E(2X+5)

27. The mean and variance of random variable X are 60 and 25 respectively. Find mean and variance of (i) $Y=\frac{X-60}{5}$ (ii) $Z=\frac{X-50}{10}$

28. Let X be a discrete random variable with mean 5 and S. D. 3 Compute mean and S. D. of (i) Y=2X-5 (ii) Z=3-7X

29. Let X be a discrete random variable with p. m. f.

30. $P(X=x)=\frac{x}{15}\, x=1,2,3,4,5\, Find\, E(X)\wedge V(X)$

31. If X is a random variable X is

P(x) = kx x= 1, 2,3

= 0 otherwise

Find k and E(X)

32. A fair coin is tossed 3 times. A person receives Rs. X^2, if he gets X number of heads in all. Find his expected gain.

33. For a discrete r. v. X, E(X) = 10 and V(X) = 25. Find the positive values of a and b such that $Y=aX-b$ has mean 0 and variance 1

34. A r. v. X has following probability distribution

X:	0	1	2	3
P(x):	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{3}{10}$	$\frac{1}{30}$

Find E(X) and V(X).

35. The joint p.m.f. of r.v. (X,Y) is given by

36. $P(x,y)=\frac{|x+y|}{8}\, x=-1,0,1,\, y=-1,0,1$

Find Marginal distribution of X and Y

37. The joint p.m.f. of r.v. (X,Y) is given by

38. $P(x,y)=\frac{2x+5y}{42}\, x=1,2\, y=1,2$

Find

a) Marginal distribution of Y b) Conditional p.m.f. of X given Y=2

39. The joint p.m.f. of r.v. (X,Y) is given by

40. $P(x,y)=\frac{1}{4}\, x=1,2\, y=1,2$

Discuss independence of X and Y.

41. State and prove addition theorem on expectation.
42. State and prove multiplication theorem on expectation.
43. Define two point distribution and find its mean and variance.
44. Find mean and variance of Bernoulli distribution.
45. Find mean and variance of uniform distribution.
46. State and prove the recurrence relation for probabilities of binomial distribution.
47. If the p.g.f. of discrete r. v. is $0.5+0.3S+0.2S^2$ then find E(X) and V(X).
48. A r.v. X has following probability distribution

49.

X	-2	-1	1	2
P(x)	$\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{3}$

Find E(X) and V(X).

Long Answer

1. The r. v. X has p.m.f. of the following form

   P(x) $= 3C^3$ if x=0

   $=4C-10C^2$ if x=1

   $=5C-1$ if x=2

   $=0$ o. w.

   i) Determine the value of C ii) E(X) and V(X)

2. From a lot of 10 items containing 3 defectives, a sample of 4 items is drawn at random without replacement. Let the r. v. X denote the number of defective items in the sample

   i) Find the probability distribution of X. ii) mean and variance

3. A r. v. X has following probability distribution

X:	1	2	3	4	5	6	7
P(x):	k	2k	3k	k^2	k^2+k	$2k^2$	$4k^2$

   Find i) k ii) E(X) iii) V(X)

4. A r. v. X takes values 0,1,2,3,4 such that $P(1<X\leq 4)=0.55, P(X\leq 1)=0.25,$

   $P(X=2)=2P(X=1), P(X>3)=0.2 \wedge P(0<X\leq 2)=0.45.$

   Find i) Probability distribution of X ii) E(X) iii) V(X)

5. Let X be a discrete r.v. having probability distribution

$$P(x)=k(2x^2+3x+1)x=0,1,2,3$$

   Find i) k ii) mean of X iii) variance of X

6. Let X be a discrete r.v. having probability distribution

$$P(x)=k\binom{5}{x}x=0,1,2$$

   Find i) k ii) mean of X iii) variance of X

7. The joint p.m.f. of r.v. (X,Y) is given by

X \ Y	0	1	2	3
0	C	2C	3C	4C
1	2C	4C	6C	8C
2	3C	6C	9C	12C

   Find

   a) C

   b) Conditional distribution of X given Y=2

   c) E(X/Y=2)

8. The joint p.m.f. of r.v. (X,Y) is given by

X \ Y	0	1
-1	0	$\frac{1}{3}$
0	$\frac{1}{3}$	0
1	0	$\frac{1}{3}$

Prove that (X,Y) are uncorrelated but not independent

9. The joint p.m.f. of r.v. (X,Y) is given by

X \ Y	-1	0	1
0	0.1	0.1	0.1
2	0.1	0.2	0.1
4	0.1	0.1	0.1

Find

a) Marginal probability distribution of X and Y

b) E(X), V(X)

c) Conditional probability distribution of X given Y=2

d) E(X/Y=2)

10. Define Bernoulli distribution. Find its mean, variance and probability generating function.

11. Find p.g.f. of binomial distribution. Hence find its mean and variance.

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Biochemistry

B.Sc. II Sem III Paper-II (Biochemical Techniques)
Question Bank

Que – 2. 2 marks each

1) Write the two advantages of TLC.
2) Write two advantages of HPLC.
3) Write two advantages of Gel Permeation Chromatography.
4) What is definition and principle of chromatography?
5) Write two applications of TLC.
6) Write two applications of HPLC.
7) What is electrophoric mobility?
8) What is the principle of electrophoresis?
9) Write two applications of 2 D electrophoresis.
10) Write two advantages of polyacrylamide gel electrophoresis.
11) How gel plates are prepared?
12) Which factors affects electrophoretic mobility?
13) Define transmission and absorbance.
14) Define molar absorbance and specific absorbance.
15) Write two applications of spectrophotometer.
16) Write two applications of colorimeter.
17) Write two limitations of colorimetric measurement.
18) State Beer's law.
19) What is Bradford assay?
20) What is Lawery's assay?
21) Define acid value and iodine number.
22) Define saponification value and ester value.
23) What is BCA assay?
24) What is DPA method?
25) Write two applications of PCR?
26) What is immunidiffusion?
27) What is immunoelectrophoresis?
28) What is blotting technique?
29) What is ELISA?
30) Write two significance of monoclonal antibodies.

Que – 3. 4 Marks each

1) Write principle and technique of TLC.
2) Write note on HPLC.
3) Write the definition and classification of chromatography.
4) Write note on mechanism of separation in HPLC.

5) Write mechanism of Gel Permeation Chromatography.
6) Write applications and advantages of GPC.
7) Write principle and technique of GPC.
8) Write principle and technique of 2 D electrophoresis.
9) Explain native and denaturing polyacrylamide gel electrophoresis.
10) Electrophoretic mobility?
11) Write note on 2 D electrophoresis?
12) Write note on agarose gel electrophoresis.
13) Explain Beer-Lambert's law.
14) Describe the construction of photoelectric colorimeter.
15) Write the working of spectrophotometer.

Que – 4. 4 Marks each

1) Explain absorption spectra of haemoglobin.
2) Write working of photoelectric colorimeter.
3) What are the limitations of photoelectric colorimeter?
4) Explain Liberman Burchard method for cholesterol estimation.
5) Explain Zak's method for cholesterol estimation.
6) Explain orcinol method for nucleic acids.
7) Explain resorcinol method for carbohydrates.
8) What is DNSA method for carbohydrates?
9) Explain iodine number method for lipids.
10) Write note on western blotting.
11) Write note on southern blotting.
12) Explain the technique of PCR?
13) Explain hybridoma technology.
14) How monoclonal antibodies are formed?
15) Explain the technique of ELISA.

Que – 5. 8 Marks each

1) What is immunotechniques? Explain Elisa technique and applications.
2) What are modern techniques? Explain technique and applications of polymerase chain reactions.
3) What are nucleic acids? Explain DPA method and orcinol method.
4) What are carbohydrates? Explain anthrone and phenol-H_2SO_4 method for carbohydrates.
5) What is absorption spectroscopy? Write the meaning of transmission and molar absorption. Explain mathematical derivation for Beer- Lambert's law.
6) Explain construction, working and applications of photoelectric colorimeter.
7) Define electrophoresis and write principle technique and applications of agarose gel electrophoresis.
8) Write preparation of gel plate, application of sample and mechanism of separation in 2 D electrophoresis.
9) What is chromatography? Explain principle, technique and applications of TLC.
10) What is chromatography? Explain principle, technique and application of HPLC?

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Biochemistry

B.Sc. II Sem IV Paper-III (Nutrition and Metabolism)
Question Bank

Que – 2. **2 marks each**

1) What is balanced diet?
2) What is calorific value of food?
3) What is BMR?
4) What is respiratory quotient?
5) Define vitamins and minerals.
6) Write two factors affecting BMR.
7) What are the functions of water?
8) Mention the blood buffers.
9) What is pH regulation?
10) How acid is produced by acid?
11) What is electrolyte balance?
12) How blood pH is maintained?
13) What are exergonic reactions?
14) What is mitochondrial respiration?
15) What is oxidative phosphorylation?
16) What are endergonic reactions?
17) What is bioenergetics?
18) Write significance of free energy compounds.
19) What is glycolysis?
20) What is ethanol fermentation?
21) Define transamination and deamination.
22) Define deamination and decarboxylation.
23) What is fate of pyruvate?
24) What is lactic acid fermentation?
25) What is degradation of purine?
26) What is degradation of pyrimidine?
27) What is β-oxidation?
28) Which are sources of atoms in purine?
29) Which are sources of atoms in pyrimidine?
30) What id lipid metabolism?

Que – 3. **4 Marks each**

1) Explain biosynthesis of palmitic acid.
2) Explain β-oxidation of palmitic acid.
3) Explain degradation of purines and pyrimidine.
4) Write energetics of β-oxidation in palmitic acid.
5) What are sources of atoms in purines and pyrimidine?

6) Write the energetics in biosynthesis of palmitic acid.
7) Explain TCA cycle.
8) Explain urea cycle.
9) Write general reactions of amino acid metabolism.
10) Write note on ethanol fermentation.
11) Write note on lactic acid fermentation.
12) Write energetics of TCA cycle.
13) Explain ATP as a high energy compound.
14) Write note on components of respiratory chain.
15) Write mechanism of oxidative phosphorylation.

Que – 4. 4 Marks each

1) Write the significance of free energy.
2) Explain exergonic and endergonic reactions.
3) Write note on mitochondrial respiration.
4) Write note on regulation of electrolyte balance in body.
5) Write note on production of acid and base by body.
6) Write note on protein buffer system.
7) Write note on phosphate buffer system.
8) Explain respiratory mechanism of pH regulation.
9) Explain CO_2 as a central molecule of pH regulation.
10) What are nutritional aspects of carbohydrates?
11) Write note on essential and non-essential fatty acids.
12) Explain bomb colorimeter.
13) Explain Douglas bag method.
14) What are the factors affecting BMR?
15) Explain calorific value measurements of food.

Que – 5. 8 Marks each

1) Define nutrition. Explain biological value, essential and non-essential amino acids and nitrogen balance.
2) What is BMR? Explain measurement of BMR, factors affecting BMR and its significance.
3) Explain respiratory and renal mechanism of pH regulation. Write disorders of acis-base balance.
4) Explain bicarbonate, phosphate and protein buffer system in body.
5) Explain oxidative phosphorylation and its mechanism. Which are the inhibitors of electron transport chain?
6) Explain free energy, high energy compounds and their significance.
7) What is glycolysis? Write TCA cycle and its energetics.
8) What is amino acid metabolism? Explain Urea cycle.
9) What is nucleotide metabolism? Explain biosynthesis and degradation of purine and pyrimidine.
10) What is lipid metabolism? Explain biosynthesis of palmitic acid and β-oxidation of palmitic acid.

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Biochemistry

B.Sc. II Sem IV Paper-IV (Molecular Biochemistry and Diseases)
Question Bank

Que – 2. 2 marks each

1) What is activation energy?
2) Define specific activity and turn over number.
3) Which factors affect enzyme activity?
4) What is competitive inhibition?
5) What is non-competitive inhibition?
6) What is irreversible inhibition?
7) What is replication?
8) What is operon concept?
9) What is acquired immunity?
10) What is gene expression?
11) What are inducible genes?
12) How antibodies are formed?
13) What is reverse transcriptase?
14) What is gene cloning?
15) What is BLAST?
16) Write two applications of generic engineering.
17) What is bioinformatics?
18) What are restriction endonucleases?
19) What are the types of tumor?
20) What is radiant energy?
21) Which are the oncogenic viruses?
22) Which are agents causing cancer?
23) Write two characteristics of tumor cells.
24) Which are the anti-AIDS drugs?
25) Which are the types of diabetes mellitus?
26) What are the symptoms of diabetes?
27) What is glucosourea?
28) What is kidney threshold?
29) Which are the hypoglycemic drugs?
30) Which factors stimulate insulin secretion?

Que – 3. 4 Marks each

1) How insulin is formed from preproinsulin?
2) Write metabolic effects of insulin.
3) Write mechanism of action of insulin.
4) Write note on introduction to nephropathy.
5) Explain hyperglycaemia and hypoglycaemia.

6) What are the long term effects of the diabetes.
7) Write note on tumor-markers.
8) What are characteristics of tumor-cells?
9) Write note on transmission of HIV.
10) What are the immunological abnormalities in AIDS?
11) What are Lysis of CD4 cells?
12) What is the natural course of AIDS?
13) Write note on restriction endonucleases.
14) How cDNA is prepared?
15) What are the applications of genetic engineering?

Que – 4. 4 Marks each

1) Write note on Data Retrieval Sources.
2) What are the applications of bioinformatics?
3) What is insulin gene cloning?
4) What is replication of DNA?
5) What is translation in prokaryotes?
6) Explain regulation of gene expression.
7) What is clonal selection theory for formation of antibodies?
8) What is acquired and natural immunity?
9) Write note on Lac operon in E.coli.
10) Write note on Lock and Key model.
11) Write note on induced fit hypothesis.
12) Write note on factors affecting enzyme activity.
13) Write derivation of Michaelis-Menten equation for single substrate.
14) Write note on Line weaver Burk plot.
15) Write note on concept of activation energy.

Que – 5. 8 Marks each

1) Define enzyme activity. What is specific activity and turnover number? Explain factors affecting enzyme activity.
2) What is significance of Km and Vmax? Write note on irreversible, competitive and non-competitive inhibition.
3) What is transcription in prokaryotes? Write note on Operon concept and Lac Operon in E.Coli.
4) Write note on natural and acquired immunity. Explain structure of IgG.
5) Write note on S1 nucleases, pBR-322 and λ-phage.
6) Write note on NCBI, GDB and MGD. Write applications of bioinformatics.
7) Write note on agent causing cancer, tumor markers, CEA and characteristics of tumor cells.
8) Write consequences of immunodeficiency, natural course of AIDS and graphical representation.
9) Write structure of insulin. Factors stimulating insulin secretion and mechanism of action of insulin.
10) Write introduction to nephropathy, neuropathy, retinopathy and cardiovascular diseases.

B.Sc. Part – III (Semester – VI) (CBCS) Examination, 2022

CHEMISTRY (Paper – XV)

Organic Chemistry

Question Bank

Max. Marks: 80

Q.2.	Answer the following questions (Any Eight)	16

1. Give the two methods of synthesis of Pyridine.
2. Explain chain lengthening of Aldoses.
3. How will you synthesize pyrrole from, i) Acetylene ii) Furan
4. Explain the nature of side chain in Adrenaline.
5. Give the synthesis of Tolbutamide.
6. Give the synthesis of Orange-IV.
7. What are carbohydrates? Draw the open chain structure of D-glucose.
8. Write a note on Mordant dye.
9. Explain why the electrophilic substitution occurs at three position in pyridine.
10. Draw the structure of lactose and give its uses.
11. Explain basic characters of pyridine.
12. Explain in brief the structure of Adrenaline.
13. Explain the Kiliani synthesis.
14. Give the synthesis and uses of Methoxychlor.
15. Define Bathochromes and Hypsochromes.
16. Define the terms: a) Anaesthetics b) Antineoplastic agents
17. How Fructose is converted into Glucose?
18. Give the synthesis and uses of Isoniazid.
19. Give the structure and uses of Cellulose.
20. Give the synthesis of Phenolphthalein.
21. What is the action of p-nitrobenzoic acid and manganese dioxide on Vitamin-A?
22. Give the action of sodamide on pyridine.
23. Explain Weerman's reaction.

24. Explain the classification of pesticides on the basis of chemical structure.
25. Give the synthesis of tolbutamide.
26. What are disaccharides? Write the structure of Sucrose.
27. Give the structural formula and uses of cellulose.
28. Give the synthesis of Isoniazid.
29. Give objections against open chain structure of D-glucose.
30. Give general mechanism of electrophilic substitution in pyrrole.
31. How will you prepare 2-pyridone and pyridine-3-sulphonic acid from pyridine?
32. What is meant by chromophore and auxochrome ?
33. How will you prove D-glucose contains six carbon atoms in the straight chain?
34. Explain the mechanism of metarotation.
35. Give the synthesis and uses of Ethophan
36. What happens when adrenaline is fused with KOH
37. What are dyes ? Give the qualities of good dye.
38. Give any two methods of preparation of pyridine.
39. Give synthesis of carbaryl.
40. Give any two examples of monoazo dyes.
41. Give the synthesis and uses of Methoxychlor.
42. How phenolphthalein is synthesized?
43. Explain - why pyrrole undergoes electrophilic substitution at C-2 position.
44. Why was the open chain structure for glucose discarded in favour of cyclic structure?
45. Write a note on Baygon.
46. Prove that vitamin-A contains five double bonds.
47. What do you mean by in vitro and in vivo testing of the drug?
48. What is dye? Why aniline and trinitrobenzene are not called dye?
49. Give a general account of agrochemicals.
50. Define the Rodenticide and give one suitable example.

Q.3	A)	Answer the following questions (Any Two)	10

1. Explain the interconversion of Glucose and Fructose.
2. Give the synthesis of Quinoline with mechanism.
3. How the vitamin-A is synthesized from the Van Drop and Tishler's method.
4. What are hormones? Give the Hems synthesis for thyroxine hormone.
5. What are hormones? Prove the structure of thyroxine on the basis of analytical evidences.
6. What are CNS drugs? Give the synthesis and uses of Phenobarbitone.
7. What are Agrochemicals? Give the synthesis and uses of Indole-3-acetic acid.
8. Give the general structure of penicillin-G and explain its acidic and alkaline hydrolysis.
9. Discuss the classification of dyes based on the chemical composition.
10. Give the synthesis of Vitamin-A.
11. Explain interconversion of glucose and fructose.
12. Explain the applications of vat and disperse dyes.
13. What are pyrethroids? Discuss the method of isolation, structure and uses of pyrethroids.
14. Discuss the alkaline or enzymatic hydrolysis of penicillin-G.
15. How will you synthesize quinoline from glycerol, aniline and conc. H_2SO_4?
16. Discuss structure of adrenaline analytically.

Q. 3	B) Write a short note on	06

1. What are heterocyclic compounds? Discuss its classification.
2. Discuss the mechanism of general electrophilic substitution reaction of pyrrole.
3. What are the positions available for Electrophile and Nucleophile attack in pyridine? Explain.
4. How will you derive the configuration of D-glucose from D-arabinose?
5. Write sources, structural formulae and uses of starch.
6. Explain location of four iodine atoms in the thyroxine.
7. Give the synthesis and applications of chlorambucil drug
8. Explain the basic character of pyrrole.
9. What is chemotherapeutic index? Explain its significance.
10. Give the synthesis and uses of Malachite green.
11. Write a note agrochemicals.

12. Give the synthesis and uses of ibuprofen.

Q.4	A)	Answer the following questions (Any Two)	08

1. Give the synthesis and uses of Indole-3-acetic acid.
2. Discuss the natural as well as synthetic pyrethroids with their advantages and disadvantages.
3. What are heterocyclic compounds? Write the synthesis of pyridine.
4. How pyrrole is prepared? Explain its weak acidic and basic characters.
5. Give the synthesis and uses of Chloromycetin.
6. Explain Witt's theory of chromophore and auxochrome.
7. Give the synthesis and uses of Orange-IV.
8. Explain synthesis of Quinoline with mechanism.
9. Give analytical evidences put forth in support of structure of Vitamin-A.
10. Determine the ring size of glucose by methylation method.
11. Give the general structure of penicillin-G and explain acidic
12. Give the synthesis of Vitamin-A.
13. Explain interconversion of glucose and fructose.
14. Explain the applications of vat and disperse dyes
15. Explain Witts theory. How the colour and chemical constitution are related ?

Q.4	B)	Answer the following questions	08

1. Explain the configuration of D-glucose from D-arabinose.
2. Give synthesis of thyroxine.
3. Give synthesis of isoniazid and ethambutol.
4. How is the conversion of aniline to quinoline is effected?
5. Write a note on Kiliani's synthesis
6. How will you prove adrenaline is a chatechol derivative?
7. Describe the synthesis and uses of paludrine
8. . Explain the classification of dyes based on the mode of application.
9. What are plant growth hormones? Give one example with synthesis and uses.
10. Explain the term antidiabetics. Give synthesis of tolbutamide

Q.5	Answer the following questions (Any Two)	16

1. What is mutarotation? Explain the mutarotation of D-glucose with mechanism.
2. What are hormones? Explain the structure of thyroxine on the analytical evidence. Give its synthesis.
3. What are antibiotics? Give an account of Penicillin- G.
4. What are dyes? Give the classification of dyes on the basis of chemical constitutions.
5. How will you derive the configuration of D-glucose from D-arabinose?
6. What are vitamins? Discuss the structure of Vitamin-A on the basis of analytical evidences.
7. Explain acidic and alkaline or enzymatic hydrolysis of Penicillin-G.
8. What are drugs? Explain in detail pharmacodynamic agent and chemotherapeutic agents.
9. What are hormones ? Discuss the structure of thyroxine with analytical and synthetic evidences.
10. Give the important sources and synthesis of vitamin-A.
11. Discuss the periodic method for size determination of D-glucose.
12. Explain the synthesis of 2, 3-benzopyridine with mechanism. Give the reaction of nitration and sulphonation of it.
13. What is the action of following on quinolone?

a) Conc. HNO_3 + Conc. H_2SO_4

b) $SO_3 – H_2SO_4$ / 220ºC

c) $NaNH_2$ / Δ

d) C_4H_9Li

e) C_6H_5Li

f) Na in liquid NH_3

g) H_2/Ni, 150 ºC, 160 atm.

h) H_2 – Pt /CH_3COOH

14. What are agrochemicals? Give an account of general idea of agrochemicals. Discuss their classification.
15. Give an account of electrophilic and nucleophilic substitution reactions of quinoline.

B.Sc. II Zoology

Semester II – Paper VII Fundamentals of Biochemistry

Q.2. Answer the following (2 marks questions)

1)What is biological significance of carbohydrate

2) What is biological significance of protein

3) What is biological significance of lipids

4) Define Monosaccharides

5) Define Polysaccharides

6) What are conjugate proteins

7)What is saturated fatty acids

8) What is unsaturated fatty acids

9) What is amino acids

10)What is primary structure of protein

11)What is function of antibody

12) Define Antibody / Immunoglobulin

13)What is DNA melting / denaturation

14)What is DNA annealing / renaturation

15)What is central dogma of molecular biology

16)Define replication

17) Define Enzyme

18) Define isoennzyme

19) Cofactors for enzyme action

20) Write general formula of Amino acid

21)Define Primary proteins

22)Define phospholipids

23)Write Structure of glucose

24)Define oligosaccharides

25)Write a general formula of carbohydrate

26)Define Quaternary proteins

27)Purines

28) Pyrimidine

29) Nucleo sides

30) Nucleotides

31) Transcription 32) Translation

33) Reverse transcriptase

Q.3) Answer any of the following/ write note on (4 marks questions)

1)Classification of amino acids

2) Tertiary structure of protein

3)IgG

4) IgM

5)IgA

6)IgD

7) IgE

8) Discuss nucleotide formation

9) Write base pairing pattern in B- DNA

10)Discuss properties of enzyme

11) Give an account on classification of proteins

12)Describe functions of carbohydrates

13)Explain Structure and functions of phospholipids

14)Write a note on peptide bond

15)Describe Acidic amino acid

16)Explain Basic amino acids

17)Explain structure Sucrose

18)Enlist properties of fatty acids

19)Explain properties of amino acids

20)Give the structure of Purines and Pyrimidine

21)Explain the structure of nucleoside and nucleotides

22)Biological significance of Immunoglobin

23)Complimentary determine region (CDRs)

24)Describe the types of DNA

25)Describe the types of RNA

26)Functions of RNA

27)Explain basic concept of transcription

28)Describe basic concept of translation

29)Describe basic concept of replication

30)Classification of enzymes

31)Describe mechanism of enzymes action

32) Describe non competitive enzyme inhibition

33)Describe competitive enzyme inhibition

Q.3. Answer the following (8 marks questions)

1)Explain competitive and non competitive enzyme inhibition

2) Describe replication in prokaryotes

3) Describe translation in prokaryotes

4)Explain B- type structure of DNA

5) Explain in detail Structure and functions of proteins

6) Give an detail account on Classification and significance of lipids

7) Describe structure, types and functions of carbohydrates

8) Explain Structure, types and functions of polysaccharides

9)Explain properties and importance of fatty acids

10)Explain in detail properties and importance of amino acids

11)Basic structure of an immunoglobin

12)Immunoglobulin classes

13)Describe the structure of DNA and give its biological significance

14)Describe the structure of RNA and give its biological significance

15)Explain in detail 'Central Dogma'

16)Give in detail classification of enzymes

17)Describe mechanism of enzyme action and functions of enzymes

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Nature of Question Paper for (CBCS) Semester Pattern

B.Sc.-II Sem-IV (w.e.f. Nov 2020)

Subject: -Microbiology

Industrial Microbiology P-VIII

Time: - 2 hrs. Total Marks-40

Q.No.2) Answer any four of the following (08)

1) Enlist two industrially important organisms with their products.

2) Define Fermentation.

3)What are Dual fermentations?

4) What is Chemostat?

5) What is Turbidostat?

6) Define Screening.

7) What are Multiple fermentations?

8) What is Surface culture fermentation?

9) What is Submerged culture fermentation?

10) What is Batch culture fermentation?

11) What is continuous culture fermentation?

12) Define the CrudeMedia.

13) What is the meaning of inoculum.

14) What is the Production medium?

15) What is Primary screening?

16) What is Secondary screening?

17) What is strain improvement?

18) Define cryopreservation.

19) What is inoculum development?

20) What is the Scale-up of fermentation?

21) Which organism is used for Penicillin production?

22) Which organism is used for Alcohol production?

23) What is SCP?

24) Give the name of the microorganism used as a producer of the amylase enzyme.

25)What are the precursors?

26) Define Synthetic media.

27) What isthe function of Spargers.

28) Give two examples of Antifoam agents.

29) What is downstream processing?

30) Whatis sulfite waste liquor?

Q.No.3 A) Write short notes on any two of the following (08)

1) Scope of industrial Microbiology

2) Continuous Fermentation process

3) Batch fermentation process

4) The basic concept of fermentation

5) Different parts fermenters

6) Media optimization

7) Use of waste as a fermentation media.

8) Inoculum development

9) Scale-up of fermentation

10)Recovery of penicillin.

11)Molasses as a raw material for fermentation media.

12) Various types of raw materialsare used for the production of SCP.

13)Antifoam agents.

14) Media sterilization.

15) Corn steep liquor.

Q. No.4) Answer any two of the following (08)

1) Preservation of strains by Lyophilization.

2) Describe therole of chemostat and turbidostat fermentation.

4) Discuss the fermentation product recovery by filtration.

6) Explain Media optimization

7) Explain pilot-scale fermentation.

9) Describe the inoculum development of the fermentation process

10) Explain the scale-up of fermentation

11) Explain the Nutritive value of SCP

12) Describe the amylase fermentation.

13) Explain the process of recovery of a product by crystallization

14) Describe the process of a product by Distillation.

15) Various microorganisms are used for SCP production.

Q.No.5) Answer any one of the following (08)

1) Describe in detail the penicillin fermentation process.

2) Describe the various method for the preservation of Industrially important organisms.

3) What is a screening? And describe in detailthe primary screening of Antibiotic producers.

4) Explain various methods of strain improvement.

5) Describe in detail various methods of preservation of industrially important microorganisms

6) Explain with a diagram a typical Fermenter with its Parts and their functions

7) Explain the process of filtration and centrifugation for the product recovery.

8) Explain in detail the recovery of the product by Drying and precipitation.

9) Describe in detail alcohol fermentation.

10) Describe in brief various raw materials used for designing of fermentation media.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Question Bank for B. Sc. (Part-III) (Semester –V) Examination, 2022
PHYSICS (Paper - XII) Nuclear Physics

Q. 1) A) Select the correct alternative from the following: (10)

Q. 1) B) Fill in the blank (06)

1) Negative packing fraction indicates -------

2) The radius of nucleus is directly proportional to ------- of atomic mass number

3) The minimum energy required to break the nucleus into its constituent particle is called ------

4) If electric quadrupole moment is greater than zero then charge distribution of nucleus is -------

5) 1 a.m.u. is = --------

6) In endothermic reaction, Q value should be ----------

7) In exothermic reaction, Q value should be ----------

8) The bombarding particle in the nuclear reaction is called -------

9) 1 barn is equal to ---------

10) The nucleus heat by projectile particle in the nuclear reaction is called -------

11) Cyclotron working on the principle of --------

12) Cyclotron mainly accelerates ----------

13) Betatron accelerates only ----------

14) In betatron, electron is made to move in a ---------- orbit.

15) ---------- machine can be used as a powerful X-ray generator.

16) An accelerator is used for increasing ---------- of a charged particle

17) The time at which G.M. tube is unable to count pulse is called --------- time.

18) In scintillation counter, the phosphor converts energy of the incoming particle into --------

19) G.M. counter works on the principle of ----------

20) The counting rate of scintillation counter is ---------- than G.M. counter.

21) The time interval after which the counter returns to its original state to produce the full sized pulse again is called --------- time.

22) In K-electron capture, the atomic number of the product nucleus decreased by -------

23) Neutrino hypothesis was postulated by --------

24) K-electron capture is likely to occur in -------- decay

25) K-electron capture reaction is always accompanied by the emission of --------- particle.

26) For K-electron capture to occur, the nucleus must be --------rich.

27) The antiparticle of electron is ----------

28) ----------is the antiparticle of positron.

29) The particle having ---------- spin quantum number are called fermions.

30) The value of packing fraction is ----------

Q. 2) Answer any Eight of the following. (16)

1) Define binding energy of nucleus.
2) Define Atomic Mass unit.
3) What is electric Quadrupole moment (Q) ?
4) Define Mass Defect.
5) Define Packing fraction?
6) Draw packing fraction curve.
7) What is meant by mass defect?
8) What is nuclear magnetic moment?
9) Explain electric dipole moment with quantum mechanical concept.
10) Explain electric dipole moment with classical concept.
11) Explain two methods to determine nuclear size.
12) What is isotopes of element? Give examples of isotopes.
13) Explain pick-up reaction.
14) What is Q value of nuclear reaction?
15) What is exothermic nuclear reaction?
16) What is endothermic nuclear reaction?
17) Define the cross-section of a nuclear reaction.
18) What is threshold energy?
19) What are limitations of Cyclotron?
20) Draw neat diagram of betatron.
21) Draw neat diagram of cyclotron.
22) What is accelerator?
23) Explain the principle of phase stability.
24) What are uses of Betatron ?
25) What are limitations of Betatron?
26) What is the principle of Betatron?
27) What is need of accelerators?
28) State the types of particle accelerators.
29) Distinguish between Cyclotron and Betatron accelerators.
30) How much equivalent voltage required for the acceleration of ion in Cyclotron.

31) Derive the equation of frequency of revolution of charged particle in Cyclotron.
32) What is the difference between synchrotron and Syncrocyclotron?
33) Draw neat diagram of G.M. Counter.
34) What is quenching? State the types of quenching.
35) Explain self quenching mechanism.
36) Explain external quenching mechanism.
37) What are the limitations and uses of G.M. Counter?
38) Explain classification of detectors.
39) Explain the dead time of the counter with neat diagram.
40) Explain the recovery time of the counter with neat diagram.
41) What are the advantages of scintillation counter?
42) Draw neat diagram of scintillation counter.
43) What is the principle of scintillation counter?
44) What is the principle of cloud chamber?
45) What are the advantages of cloud chamber?
46) What are the disadvantages of cloud chamber?
47) Define α-disintegration energy.
48) Draw a diagram of continuous nature of β-ray spectrum.
49) Explain Pauli's neutrino hypothesis.
50) Draw a diagram of magnetic α- ray spectrometer.
51) Draw a diagram of β- ray spectrometer
52) Write any two properties of neutrino.
53) Explain the electron emission process.
54) Explain the positron emission process.
55) Explain the electron capture process.
56) What are elementary particles?
57) What are types of interaction?
58) What is quark?
59) What is Leptons? State the types of Leptons.
60) What is Hyperons? State the types of Hyperons.

Q. 3) A) Attempt any Two of the following. (10)

1) Define binding energy of nucleus. Explain binding energy curve.
2) Explain Electric quadrupole moment.
3) What is packing fraction? Explain packing fraction curve.
4) Explain stripping reaction.
5) What is Q value of nuclear? What are exothermic and endothermic reaction?
6) Derive an expression for the energy gained by an electron in betatron.

7) Describe the construction and working of betatron.
8) Describe the construction and working of cyclotron.
9) Explain quenching of discharge.
10) Write notes on magnetic α- ray spectrometer.
11) Write notes on β- ray spectrometer.
12) Explain fine structure of α line.
13) Explain long range α particle spectrum.
14) Discuss different types of mesons.
15) Discuss different types of Baryons.

Q. 3) B) Short note/Solve **(06)**

1) Write short notes on Radius of nucleus.
2) Write short notes on nuclear mass.
3) Calculate Q Value of nuclear reaction ${}_{19}K^{39}(\propto, P\,){}_{20}Ca^{42}$ and state its type of reaction.
Given Mass of ${}_{19}K^{39}$= 39.9706 a.m.u.
Mass of ${}_{2}He^{4}$= 4.00387 a.m.u.
Mass of ${}_{20}Ca^{42}$= 41.97216 a.m.u.
Mass of ${}_{1}H^{1}$= 1.00814 a.m.u.
4) Calculate Q Value of nuclear reaction ${}_{3}Li^{7}(P, \propto)\ {}_{2}He^{4}$ and state its type of reaction.
Given Mass of ${}_{3}Li^{7}$= 7.01882 a.m.u.
Mass of ${}_{2}He^{4}$= 4.00387 a.m.u.
Mass of ${}_{1}H^{1}$= 1.00814 a.m.u.

5) Calculate mass of neutron from the given reaction
${}_{5}B^{11} + {}_{2}He^{4} \rightarrow {}_{7}N^{14} + {}_{0}n^{1} + Q$
Given Mass of ${}_{5}B^{11}$ =11.00825 a.m.u.
Mass of ${}_{2}He^{4}$ = 4.00106 a.m.u.
Mass of ${}_{7}N^{14}$ = 14.00420 a.m.u
Q value = -1.443

Q. 4 A) Attempt any Two of the following. **(08)**
1) Explain liquid drop model of nucleus.
2) Explain nuclear magnetic moment.
3) Explain pick up reaction.
4) Discuss the cross-section of a nuclear reaction. State its unit.
5) Explain the general scheme of Nuclear reaction.
6) Explain the principle of phase stability.
7) What is an accelerator? What is its need?
8) Derive an expression for the maximum energy gained by an ion in cyclotron.
9) Explain dead time and recovery time in G.M. Counter.

10) Explain advantage and disadvantage of cloud chamber.
11) Explain ionization, discharge and plateau region in G.M. Counter.
12) Discuss β-decay process.
13) Explain continuous nature of β- ray spectrum.
14) Explain Pauli's neutrino hypothesis.
15) Explain different types of interaction.

Q. 4) B) Describe/Explain/Solve (08)

1) Explain the construction and working of cyclotron. Find the condition of resonance.
2) Explain the principle, construction and working of betatron. Derive betatron condition.
3) Explain the construction and working and characteristics of G.M. Counter.
4) Explain the principle, construction and working of scintillation counter. State the advantages of scintillation counter.
5) Explain stripping reaction and pick up reaction.

Q. 5) Attempt any Two of the following. (16)

1) Derive the semi-empirical binding energy formula for a nucleus on the liquid drop model.
2) Explain the Weizsakar mass formula.
3) What is a nuclear reaction? Explain the general scheme of representation of a nuclear reaction. Give one example each of $(\propto, \mathrm{P})$, $(\mathrm{P}, \propto)$, (D, P) reaction.
4) What is threshold energy? Find the equation of threshold energy.
5) Describe the construction and working of cyclotron. Derive an expression for the maximum energy gained by an ion in cyclotron.
6) Describe the principle, construction and working of betatron. Derive an expression for the energy gained by accelerated electron.
7) Explain how ionization, discharge and avalanche of electrons takes place in G.M. Counter.
8) Explain the principle, construction, working, advantages and disadvantages of cloud chamber.
9) Define α-disintegration energy and show that $\mathrm{Q}_{\alpha} = \mathrm{E}_{\alpha}\left[1 + \frac{\mathrm{M}_{\alpha}}{\mathrm{M}_{\mathrm{Y}}}\right]$
10) Explain the principle, construction and working of magnetic α- ray spectrometer.
11) Describe Nuclear Energy levels.
12) Discuss β- ray spectrometer to determine K.E. of β particle.
13) Explain the β-decay process and describe the construction and working of β-ray spectrometer.
14) Explain the classification of elementary particles.
15) What are elementary particles? Give a brief history of elementary particles.

Question Bank B.Sc.l Chemistry

Analytical Chemistry Paper-lV

Q.2. (two marks each)

1) Dedine i) Additive property ii) Constitutive property
2) Define i)Fluidity ii) Environment .
3) Define Qualitative & Quantitative analysis
4) Draw neat labelled diagram of Ostwald'sviscometer.
5) Draw neat labelled diagram of Stalagmometer.
6) Define parachor.Give Macleod's equation..
7) Draw labeled diagram of refraction of light.
8) Give principle of Abbes refractometer.Give snell's law.
9) Give two advantages of Abbes refractometer.
10) Give advantages of Ostwald's Viscometer.
11) Give advantages of Stalagmometer.
12) Give types of pollution.
13) Give health effect of Sox.
14) Give health effect of oxides of carbon.
15) What green house effect.
16) Name the type of water pollutants.
17) Name the resources of water.
18) Name the type of water pollution.
19) Draw neat labelled diagram of ozonolysis of water.
20) Draw neat labelled diagram of actvated sludge process.
21) Draw neat labelled diagram of ion exchange process..
22) Draw neat labelled diagram of Liebig's combustion method.
23) How will you detect nitrogen from organic compound.Give reactions.
24) How will you detect sulphur from organic compound. Give reactions.
25) How will you detect nitrogen from organic compound. Give reactions.
26) Give principal involved in Leibig's combustion method.
27) Give principal of Kjeldahl's method.

28) Draw neat labelled diagram of Kjeldahl's apparatus.

29) Draw CO_2 cycle.

30) Give the synthesis of paracetamol.

31) Give the principal involved in detection of halogen by Carious method.

32) Draw neat labeled diagram of refining of petroleum.

33) Give the principal involved in detection of sulphur by Carious method .

34)Define sound pollution.Give its unit.

Q. 3 Write short notes on any TWO

1) Determination of coefficient of viscometer by Ostwald's viscometer.
2) Determination of surface tension by Stalagmometer.
3) Construction & working of Abbe's refractometer.
4) Advantages of Abbe's refractometer.
5) Air pollution.
6) Sound pollution.
7) Nuclear pollution.
8) Soil pollution.
9) Automobile pollution.
10) Health effect of carbonmonoxide.
11) Oxides of sulphur.
12) Ion exchange method.
13) Activated sludge process.
14) Detection of carbon & hydrogen by combustion method.
15) Halogen by Carius method.
16) Sulphur by Carius method.
17) Refining of petroleum.
18) Knocking.
19) Octane number.
20) Cracking.

Q.4 Answer the following

1) How will you determination of coefficient of viscometer by Ostwald's viscometer.
2) How will you determine parachor.
3) State health effect of SO x
4) What do you understand the term Green House Effect.
5) Define air pollution Classify air pollutants on the basis of chemical composition.
6) Explain types of water pollution.
7) Give difference between point source & non point source.
8) Explain ozonolysis of water.
9) How will you determine percentage of halogen by carius method.
10) How will you determine percentage of sulphur by carius method.
11) How will you determine molecular weight of acid by titration method.
12) Give the method of preparation of ethylene oxide.Give its uses.
13) Give the method of preparation of B- phenylethanol.Give its uses.
14) Give the method of preparation of paracetamol.Give its uses.
15) Give the method of preparation of adipic acid.Give its uses.

Q.5 Answer any one (8 Marks)

1) Define viscocity.Explain process to determine coefficient of viscometer by Ostwald's viscometer. Give its advantages,
2) Define surface tension.Explain process to determine surface tension of liquid. Give its advantages,
3) Explain types of pollution.
4) Explain types of water pollutants.
5) Define hard & soft water.Explain Ion exchange method. Give its advantages.
6) How will you determine percentage of C & H by Liebigs combustion method.
7) How will you determine percentage of nitrogen by Kjeldahl's method.

8) Explain Carius method to determine percentage of halogen by Carius methid. Example.
9) Explain Carius method to determine percentage of sulphur by Carius methid. Example.
10) Explain cracking,knocking & octane number.

P. A. H. S. U. Solapur

Question Bank - 2021-22

Semester- VI Paper- XVI - BIOSTATISTICS (Elect.)

Q. 2) Solve any Eight of the following (40) **(16)**

1. Give the definition of biostatistics
2. Define classification of data.
3. What is mean by central tendency
4. Give the formula to calculate probability.
5. What is meant by the null hypothesis?
6. Define primary data.
7. Define probability.
8. What is statistical inference?
9. Give the formula of arithmetic mean
10. What is meant by variable?
11. What is statistics?
12. Define limitations.
13. Give the definition of measurement.
14. What is data?
15. Define tabulation.
16. Define mode.
17. Give the definition of dispersion.
18. What is deviation?
19. Define the range.
20. What is addition theorem of probability
21. Give the definition of t-test.
22. What is meant by the chi square test.
23. Define sampling method.
24. Write two uses of statistics.
25. Define secondary data
26. Define median
27. Define sample space
28. What is population
29. What is stratified random sampling
30. Define degree of freedom
31. What is simple random sampling
32. What is convenience sampling
33. Define mathematical probability
34. What is statistical probability
35. What is multiplication theorem of probability
36. Define paired t test
37. Define graphic presentation of data
38. Define dependent events
39. Give any four application of t-test
40. Give assumptions of chi square test

Q. 3 A) Write notes on any Three of the following (15) **(12)**

1. Mention the uses of biostatistics
2. Give the difference between primary and secondary data.
3. Give the merits and demerits of Mode.
4. Mention the sampling methods you have studied.
5. Write a note on the Chi Square Test.
6. Explain the compound and independent event.
7. Describe the merit of standard deviation.
8. Explain the collection of data and organization studied by you.
9. Give the discrete and continuous variable.
10. Explain the indirect oral interview studied by you.
11. Explain the measures of probability
12. Give kinds of probability
13. Explain different parts of table
14. What is qualitative and quantitative classification of data
15. Describe the statistical methods

Q. 3 B) Answer the following question. (5) **(04)**

1. Mention merits and demerits primary data collections.
2. Describe the standard deviation studied by you.
3. Explain the Demerit of range.
4. Give the Merit of Mode studied by you.
5. Explain different types of variables

Q. No. 4) Attempt any Two of the following (15) **(16)**

1. Discuss the statistical Methods of investigation.
2. Write note on two-dimensional diagrams
3. Mention any two types of events.
4. Give merits and demerits of median
5. Explain the stratified and systematic sampling.
6. Describe the classification of data.
7. Explain the arithmetic mean studied by you.
8. Give the merit and demerit of arithmetic mean.
9. Describe the deliberate sampling studied by you.
10. Explain the merits and demerits of secondary data collection.
11. Give uses and scope of biostatistics
12. Differentiate between histogram and bar chart
13. Give methods of collecting primary data
14. Give merits and demerits of standard deviation
15. Explain different types of classification of data

Q. 5) Attempt any Two of the following (15) **(16)**

1. Mention the Limitations of biostatistics
2. Calculate the range of following data by using formulas.

3. (The heights (in cm) of ten individual wheat plants in a plot are 60, 40, 50, 80, 70, 55, 30, 65, 45 and 75)
4. Write a short note on the t- test.
5. Explain the stratified and systematic sampling.
6. Describe the classification of data.
7. Explain the method of collecting secondary data.
8. Describe the use of statistics.
9. Write the basic principles studied by you.
10. Explain the tabulation studied by you.
11. Give sources of secondary data
12. Describe the methods of data sampling
13. Write a note on coefficient of variation
14. What is chi square test and give its assumptions
15. Describe basic principles of biostatistics

--XX–

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc Biotechnology- II Examination sem-III 2021-2022
(CBCS) Pattern Subject – Animal Biotechnology- II
w.e.f June-2020

Time:- 2 hrs. Total Marks-40

Instructions:

1. All questions are compulsory.
2 Draw neat diagrams and give equations wherever necessary.
3. Figures to the right indicate full marks.
4. Use of logarithmic table and calculator is allowed.
(At. Wts H-1, C-12, 0-16, N= 14, Na -23, CI - 35.5)

Q.No.2) Answer any four of the following (08)

1) Define Animal Biotechnology.

2) Define Transgenic animals.

3) Define Biotechnology

4) Define Transgenesis

5) Define transgene.

6) What is mean by Transfection?

7) Describe Objectives of gene transfer.

8) Who discovered Transgenic animals.

9) Give examples of Transgenic animals

10) Explain gene construct.

11) Define promoter in gene construct.

12) Describe method of transfection.

13) How FMD get transmitted.

14) Explain Foot and mouth diseases (FMD)

15) Applications of biotechnology in FMD.

16) How FMD get treated or cured?

17) How FMD does affect Animals?

18) Explain Coccidiosis.

19) Application of biotechnology in Coccidiosis.

20) write two names of anticoccidial drugs.

21) What is Trypanosomiasis?

22) Trypanosomiasis caused by which parasite?

23) Why trypanosomiasis is called sleeping sickness?

24) Where is parasites of trypanosomiasis is present in body?

25) What is biomass?

26) Improvement of biomass.

27) Types of biomass.

28) What are livestock biomass farming products?

29) Name the products we get from livestock.

30) Pharmaceutical products produced by mammalian cells.

Q.No.3 A) Write short notes on any two of the following (08)

1) Write short note on Transgenic animals.

2) History of Transgenesis.

3) Describe transgenic cow.

4) Describe transgenic pig.

5) Describe transgenic sheep..

6) Describe transgenic goat.

7) Describe transgenic bird.

8) Describe transgenic mice.

9) Write note on transgenic mice model for tackling human diseases.

10) Explain Foot and mouth diseases.

11) Explain Theileriosis.

12) what are the genetic modifications in medicine.

13) Explain gene therapy.

14) use of genes to prevent or treate diseases.

15) Write a short note on Augmention gene therapy.

Q. No.4) Answer any Two of the following (08)

1) Explain in detail Animal Biotechnology .

2) Write a short note on applications of Animal biotechnology.

3) explain in detail livestock farming products.

4) Write in detail about use of animals for research and testing.

5) Cell culture based vaccines.

6) Explain in detail Improvement of biomass .

7) Describe about cell culture based vaccine.

8) Describe monoclonal antibody production.

9) Explain human genetic engineering.

10) Explain clonning- ethical and social issues.

Q.No.5) Answer any one of the following (08)

1) Explain in detail Bioethics.

2) Describe in detail gene augmention therapy.

3) Describe in detail applications of transgenic animals.

4) Describe in ethical issues associated with consumptions of genetically modified foods, animal and human genetic engineering.

5) Define and Describe in detail Gene therapy.

6) write in brief about applications of Biotechnology.

7) Describe in detail coccidiosis and its treatement.

8) Describe use of animals for research and testing.

9) Explain use of cell culture.

10) Explain in detail about monoclonal antibody production and its mechanism;.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
B.Sc. Biotechnology-Part III Sem-VI
New CBCS-wef June 2021
DSE 4B Environmental Biotechnology

QUESTION BANK

Q. 1) B) Define following terms. (06)

1. Gasohol
2. Conventional energy sources
3. Fuel
4. Molasses
5. Nitrogen fixation
6. Corn steep liquor
7. Rhizofiltration.
8. Bioleaching
9. Mycoremediation
10. Phytoremediation
11. Phycoremediation
12. Rhizofiltration
13. Genetically modified organisms
14. Oil spill
15. Biofertilizer
16. Biopesticide
17. Environmental biotechnology
18. Oil spill
19. Mycorrhiza

Q. 2) Solve any Eight of the following.(2Marks) (16)

1. Enlist any two microbes involved in production of Biogas
2. Enlist any two microbes involved in production of Biohydrogen
3. Enlist any two microbes involved in production of Bioethanol
4. Differentiate between Conventional & non-conventional energy sources.
5. Write any two names of fungi involved in VAM.
6. Write any two names of bacteria involved in phosphate solubilization
7. Give two examples of Asymbiotic Nitrogen fixing bacteria.
8. Give two examples of Symbiotic Nitrogen fixing bacteria
9. Write significance of Mycoremediation.
10. Write significance of Phytoremediation.
11. Give any two examples of leguminous plants.
12. Give names of any two bacteria involved in oil spill bioremediation.
13. Give names of any two bacteria involved in heavy metal bioremediation.
14. Give names of any two bacteria involved in detergents bioremediation.
15. Give names of any two bacteria involved in pesticide bioremediation.
16. Give names of any two bacteria involved in insecticide bioremediation
17. Give names of any two bacteria involved in herbicide bioremediation
18. Give names of any two bacteria involved in plastic bioremediation
19. Give names of any two microbes involved in diesel bioremediation
20. Give names of any two bacteria involved in kerosene bioremediation
21. Give names of any two bacteria involved in paraffin wax bioremediation
22. Give names of any two microbes involved in radioactive waste bioremediation
23. Give names of any two microbes involved in diesel bioremediation
24. Give names of any two microbes involved in lignin
25. Give names of any two microbes involved in cellulose bioremediation
26. Name any to radioisotopes used in nuclear fission reaction
27. Give two examples of non-conventional energy sources
28. Give two examples of conventional energy sources
29. Write the chemical reaction of nitrogen fixation
30. Give the names of any two Petroleum products.
31. Name any two physical methods for industrial effluent treatment
32. Name any two chemical methods for industrial effluent treatment.
33. Name any two biological methods for industrial effluent treatment

34. Give any two advantages of bioleaching process.
35. Enlist any two examples of algae used in biofertilizers.
36. Name the bacteria involved in Gold bioleaching.
37. Name the bacteria involved in Uranium bioleaching.
38. Name the bacteria involved in Copper bioleaching.
39. Name any two genetically modified microbes involved in Environmental clean-up
40. Enlist any two Acts covered under Environmental protection act
41. Write significance of Environmental biotechnology.

Q. 3) A) Attempt any Two of the following.(5Marks) (10)

1. Write a note on Modern fuels
2. Describe Biogas production
3. Describe Mechanism of hydrogen by using microbes
4. Describe raw materials used for ethanol production
5. Write a short note on bioremediation of cellulose
6. Write a note on Bioremediation of radioactive waste
7. Write a note on physical methods for industrial effluent treatment
8. Explain Biomedical waste management
9. Describe role of VAM in increasing soil fertility
10. Explain types of Bioleaching process

Q. 3) B) Describe the process of Alcohol production by using sugar industry waste (06)
Explain in detail the conventional & non-conventional energy sources
Explain in detail the bioremediation of Oil spills
Explain in detail role of Symbiotic nitrogen fixating microbes for soil enrichment
Explain role of Phosphate solubilizing microbes in soil fertility

Q. 4 A) Write a short note on (Any two)

1. The Air Act
2. The Water Act
3. Biosynthesis of Bio-hydrogen
4. Bioremediation of plastic
5. Bioremediation of detergents
6. Bioremediation of petroleum waste
7. Azotobacter
8. Rhizobium
9. Azolla

Q. 4) B) Explain in detail Symbiotic nitrogen fixation for soil enrichment (08)
Explain in detail the production of Gasohol
Explain in detail the phytoremediation for heavy metal pollution
Describe in detail the process of Biohydrogen.

Q. 5) Attempt any Two of the following. (16)

1. Give a detailed account of Bioremediation of insecticide & pesticide.
2. Write in detail about the biological methods of wastewater treatment
3. What is bioleaching? Explain in detail bioleaching of copper
4. What is bioleaching? Explain in detail bioleaching of Uranium
5. What is bioleaching? Explain in detail bioleaching of Gold
6. Give a brief account of phytoremediation.
7. What is Environmental Protection act? Explain its establishment & Regulations.
8. Give a detailed account of Bioremediation of Lignin & cellulose.

P.A.H.S.U.S
TY B.SC. BIOTECHNOLOGY
QUESTION BANK
DSE 1B - Bio-Analytical Tools

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2 Marks Questions.

1. Define acids
2. Define bases
3. Define pH
4. Dissociation of acids
5. Dissociation of bases
6. Define pH indicators
7. Enlist the pH indicators
8. Enlist the errors in pH measurement
9. Enlist the applications of pH meter.
10. Define electrophoresis
11. Enlist the applications of agarose gel electrophoresis.
12. Enlist the applications of starch gel electrophoresis.
13. Enlist the applications of pulse field gel electrophoresis.
14. Enlist the applications of immuno electrophoresis.
15. Enlist the applications of isoelectric focussing.
16. Enlist the applications of SDS-PAGE.
17. Enlist the applications of Native PAGE.
18. Define electromagnetic waves
19. Define electromagnetic spectrum.
20. Enlist the applications of UV region of Electromagnetic spectrum
21. Enlist the applications of Visible region of Electromagnetic spectrum
22. Enlist the applications of IR region of Electromagnetic spectrum
23. Define Excitation
24. Define Absorption
25. Define Emission.
26. State Lamberts Beers law.
27. Write a note on light source in colorimeter.
28. Write a note on light source in IR spectroscopy.
29. Write a note on radiation source in AAS.
30. Enlist the applications of centrifugation.
31. Define differential centrifugation.
32. Write note on rate zonal centrifugation
33. Write note on isopycnic centrifugation
34. Enlist the applications of paper chromatography.

35. Enlist the applications of thin layer chromatography
36. Enlist the applications of column chromatography
37. Enlist the applications of gel filtration chromatography
38. Enlist the applications of affinity chromatography
39. Enlist the applications of ion exchange chromatography
40. Enlist the applications of gas chromatography
41. Enlist the applications of HPLC
42. Define blotting.
43. Define southern blotting
44. Define northern blotting
45. Define western blotting.
46. Define dot blot
47. Define autoradiography
48. Write note on southern hybridization
49. Write note on northern hybridization
50. Write note on western hybridization

4 Marks Questions.

1. Describe in detail acids and bases
2. Explain dissociation of acids and bases
3. Explain measurement of pH by pH indicators
4. Write a note on operation and calibration of pH meter
5. Write a note on errors in pH measurement
6. Write a note on starch gel electrophoresis
7. Write a note on agarose gel electrophoresis
8. Explain types of transition
9. Write a note on deviation from beers law.
10. Explain Differential centrifugation.
11. Write a note on autoradiography
12. Write a note on dot blot technique
13. write a note on silica gel chromatography

5 Marks Questions.

1. Explain pH measurement by glass electrode.
2. Explain pulse field gel electrophoresis
3. Explain immunoelectrophoresis.
4. Explain isoelectric focussing.
5. Give detail explanation of lamberts –beers law.
6. Explain Turbidometer
7. Explain nephelometer.

8. Explain monochromators used in colorimeters
9. Explain rate zonal centrifugation
10. Explain isopycnic centrifugation
11. Explain analytical ultracentrifugation
12. Explain paper chromatography

6 Marks Questions.

1. Explain gel filtration chromatography
2. Describe Column chromatography
3. Explain thin layer chromatography

8 Marks Questions.

1. Give details of HPLC.
2. Give details of affinity chromatography
3. Explain ion exchange chromatography
4. Explain gas chromatography
5. Explain in detail southern blotting
6. Explain in detail northern blotting
7. Explain in detail western blotting
8. Explain in detail principle of centrifugation
9. Give details of UV Visible spectroscopy
10. Give details of AAS
11. Explain IR spectroscopy
12. Explain Colorimeter.
13. Explain in detail applications of colorimetry
14. Explain in detail applications of UV Visible spectroscopy
15. Give details of SDS-PAGE
16. Give details of native PAGE.

P. A. H. S. U. Solapur

Question Bank - 2021-22

Semester- VI Paper- XVI - NURSERY, GARDENING & HORTICULTURE (Elect.)

Q. 2) Solve any Eight of the following (40) (16)

1. Define Horticulture.
2. Define landscaping.
3. What is Olericulture?
4. What is Pomology?
5. Define floriculture.
6. What is seed?
7. What is seed dormancy?
8. Define vegetative propagation.
9. Define Air layering
10. Define budding.
11. Define Grafting
12. Define cutting.
13. What is manure?
14. Define Biofertilizer.
15. Define Biopesticides.
16. What is fertilizer?
17. What are Plant growth regulators?
18. Define weed.
19. What are cut flowers?
20. What is Bonsai?
21. What is a flower show?
22. What is CAD?
23. Enlist the objectives of Nursery.
24. Enlist the scope of Gardening.
25. Enlist the objectives of Gardening.
26. Enlist the scope of Nursery.
27. Enlist the methods of seed dormancy breaking.
28. What are the three types of nurseries?
29. What is seed testing?
30. Define seed banks.
31. What is seed viability?

32. What is genetic erosion?
33. Define seed germination.
34. Define seed technology.
35. Define T-budding.
36. Define approach grafting.
37. Define cleft grafting.
38. Define whip or splice grafting.
39. Define side grafting.
40. Define stone grafting.
41. Define patch budding.
42. Define scion.
43. Define stock.
44. Define runner.
45. Define tubers.
46. What is rhizome?
47. What is corm?
48. Define suckers.
49. Define the bulb.

Q. 3 A) Write notes on any Three of the following (15) **(12)**

1. Write a short note on scope and objectives of Nursery and gardening.
2. Seed dormancy.
3. Importance of seed dormancy.
4. Germination test
5. Vigour test
6. Genetic erosion
7. Grafting
8. Cutting
9. Budding
10. Layering

Q. 3 B) Answer the following question. (5) **(04)**

1. Computer applications in Landscaping.
2. Home gardening and its types.
3. Formal gardening
4. Informal gardening
5. Mound layering

6. Serpentine layering

Q. No. 4) Attempt any Two of the following (15) **(16)**

1. Define Gardening and types of gardening it details studied by you.
2. What is CAD? How CAD helps in landscaping?
3. What is seed? Describe the structure and types of seed studied by you.
4. What is seed? Describe the importance of seed testing and seed certification.
5. What is vegetative propagation? Describe in detail any two types of vegetative propagation studied by you.

Q. 5) Attempt any Two of the following (15) **(16)**

1. What is weed? Describe in detail methods of weed control.
2. What is floriculture? Describe the importance of flower shows and exhibitions.
3. What is Bonsai? Describe in detail the method of making Bonsai.
4. What are Plant Growth regulators? Describe the role of PGR in Horticulture.
5. What is layering? Describe different types of layering techniques.
6. What is grafting? Describe different types of grafting techniques.
7. What is budding? Explain in detail different types of budding methods.
8. What is cutting? Explain in detail different types of cottage.

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P. A. H. S. U. Solapur

Question Bank - 2021-22

Semester- VI Paper- XV - CELL BIOLOGY

Q. 2) Solve any Eight of the following (40) **(16)**

1. What is Microscopy?
2. Write Principle of Light Microscopy.
3. Define Prokaryotic Cell.
4. What is a Eukaryotic cell?
5. Draw and Label ultrastructure of Chloroplast.
6. What is Cell membrane?
7. Give functions of Cell wall.
8. Give functions of Plasma membrane.
9. What are Chromosomes?
10. Define Karyotype.
11. What is Mitosis?
12. Define Meiosis.
13. Give any 4 significance of Mitosis.
14. Give any 4 significance of Meiosis.
15. What are Cyclins?
16. What is Cell Cycle?
17. Define Cytoskeleton.
18. Give functions of the cytoskele
19. Give uses of Transmission electron microscopy.
20. Write about types of Endoplasmic reticulum.
21. Sketch and label the Metacentric chromosome structure.

22. Give any four functions of Lysosome cell organelle.
23. Give any four functions of Peroxisome microbodies .
24. Give any four functions of the cell membrane wall.
25. Give the any four function of Nucleus cell organelle
26. Give the any four function of Golgy body cell organelle
27. Give the any four function of Mitochondria cell organelle
28. Give the any four function of Chloroplast cell organelle
29. Write the distinguishing characters of Eukaryotic cell .
30. Write the distinguishing characters of Prokaryotic cell ..
31. Write the characteristics of Y chromosomes.
32. Write the characteristics of X, chromosome.
33. What is mean by holendric gene .

34. Define the G1 phase. cell cycle
35. Define the G2 phase cell cycle

36. What is characteristic of patchatean
37. Define the S phase cell cycle
38. What is the importance of phase diplotene?
39. Draw neat labeled diagram of Mitochondria
40. What is mean by M phase in cell cycle

Q. 3 A) Write notes on any Three of the following (15) (12)

1. Write a note on Phase contrast microscopy.
2. Describe the structure of the Eukaryotic cell with a suitable diagram.
3. Write a note on cell Theory.
4. Describe the ultrastructure of Golgi bodies.
5. Explain the types of Chromosomes.
6. Describe the steps in cell cycle.
7. Write a note on the ultrastructure of the cytoskeleton.

8,What is significance of mitosis

9, Write the importance of scanning Electron Microscope. (SEM)

10. Write the difference between prokaryotic and eukaryotic cell.

11. Write the note on L, type chromosome

12 Write the note on J, type chromosome

13. Write the note on telocentric chromosome.

14. Write the note on Metaphase of Mitosis.

15.Write the note on Metaphase -I of Meiosis

Q. 3 B) Answer the following question. (5) (04)

1. Describe the principle and uses of scanning electron microscopy.
2. Describe the structure,cell size & shape of a prokaryotic cell.
3. Write a note on Morphology, size & shape of chromosomes.
4. Write significance of scanning transmission electron microscope (STEM)
5. Write ultra structure and function Mitochondria.

Q. No. 4) Attempt any Two of the following (15) (16)

1. Describe Principle, working & uses of light microscopy.
2. Describe in detail Transmission electron microscopy.
3. Explain the difference between prokaryotic & eukaryotic cells.
4. Write ultrastructure & functions of Chloroplast.

5. Explain in detail Ultrastructure of Lysosomes.
6. Describe the structure of chromosomes.
7. Describe in detail regulation of cell cycle.
8. Describe the principle and uses of scanning transmission electron microscopy. {STEM }

9.Describe the regulation of synthesis phase (S) cell cycle.

10. Describe the Danile -Dawson cell membrane model .

11.Describe the ultra structure of cell wall and functions

12. Describe the sample prepration of Electron Microscope.

13.Describe the ultra structure and function of Mitochondria.

14 Define Mitosis ? describe the stages of the mitosis.

15. Describe the morphology and shape of the chromosome.

Q. 5) Attempt any Two of the following (15) **(16)**

1. Describe Principle, working & uses of Light microscopy.
2. Describe sample preparation for light microscopy.
3. Draw a neat labeled diagram of prokaryotic cells & explain it in detail.
4. Write a note on the ultrastructure of Nucleus.
5. Write a note on Peroxisome & Glyoxysome.
6. Explain in detail structure & types of chromosomes.
7. What is Meiosis? Explain different stages of meiosis.
8. Describe ultrastructure of Mitochondria
9. Define Mitosis and describe stages of mitosis.
10. Describe the phase contrast microscopy

11. Write the construction , principle and use of the Scanning Electron Microscope .

12. Describe the different models of cell membrane.

13.Describe the types of chromosomes with labeled digram..

14. Describe the stages of meiosis -II and give its significance.

15.Describe the steps in cell cycle in brief with significance.

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Embryology of Angiosperm

Que 2- Answer the following **2 marks**

1. Define flower as a modified shoot
2. Define cross pollination
3. Define self pollination.
4. What is endosperm?
5. What is double fertilization?
6. Why fruits and seeds are dispersed?
7. Write a note on dispersal of seed by Animals?
8. Sketch and label Orthotropous type of Ovule.
9. Sketch and label anatropous type of Ovule.
10. What is mean by Anemophily?
11. What is mean by Endosperm?
12. Define Flower?
13. Define triple fusion?
14. Enlist different agents of seed and fruit dispersal.
15. Sketch and label Dicotyledon embryo.
16. What is mean by Homogamy?
17. Describe cleistogamy.
18. Define megasporogenesis
19. Define microsporogenesis
20. Draw a well labelled structure of microspore/male gamete
21. Draw a well labelled diagram of typical ovule
22. Draw well labelled diagram of typical gynaecium
23. Draw a well labelled diagram of typical androecium
24. Enlist layers of anther wall
25. Give the function of stigma & style
26. Give the function of anther & connective
27. Draw well labelled diagram of anther wall
28. Any two contrivances to achieve self pollination
29. Any two contrivances to achieve cross pollination
30. Write any two applications of self pollination
31. Write any two applications of cross pollinbation
32. Define malacophily

33. Define Ornithophily
34. Give the examples of wind pollinated seeds & fruits
35. Give the function of anther wall
36. Sketche & label monocot embryo
37. Define nuclear endosperm
38. Define helobial endosperm
39. Draw a well labelled diagram of cellular endosperm
40. Define porogamy

Que 3- Write short notes on any Two of the following **4 marks**

1. Mechanism in entomophily (*Calotropis*)
2. Nuclear endosperm
3. Explosive seed dispersal mechanism
4. Describe nuclear type of Endosperm.
5. Explain dispersal by explosion and write a note on mechanism of Popping.
6. Mention the evidences of flower as a modified shoot.
7. Explain in details structure of typical ovule.
8. Describe the structure of microspore (pollen grain).
9. Describe types of entry of pollen tube in ovule with suitable diagram
10. Describe in detail process of double fertilization
11. Describe advantages & disadvantages of self pollination
12. Describe advantages & disadvantages of Cross pollination
13. Describe the process of development of male gamete
14. Describe the process of development of female gamete
15. Describe the pollination mechanism in hydrophytes
16. Write a note on any two types of ovule
17. Write a note on development of helobial endosperm
18. Give applications of cross pollination
19. Write a note on biotic factors of pollination
20. Write a note on typical ovule

Que 4) Answer any Two of the following **4 marks**

1. Describe the types of ovule
2. Describe the development of monosporic embryo sac
3. Explain in brief the wind dispersal of fruits and seeds.
4. Mention the significance of Double fertilization.
5. Explain abiotic factor with reference to Wind and Water dispersal.

6. Describe helobial endosperm.
7. Describe pollination mechanism in *Vallisneria*.
8. Describe in detail process of megasoporogenesis
9. Describe in detail process of microsporogenesis
10. Describe the process of development of female gamete
11. Describe mechanism of pollination in Vallisnaria

Que 5) Answer any One of the following 8 mark

1. Give an account of microsporogenesis and write a note on development of male gametophyte.
2. Describe in brief development of embryo in dicotyledons.
3. Describe mechanism of Double fertilization in Angiosperm.
4. Describe structure and development of embryo in monocotyledons.
5. Explain in brief development of female gametophyte.
6. Describe the development of bisporic embryo sac with suitable example
7. Describe the process of development of dicot embryo
8. Write a note on differences in self & cross pollination
9. Describe in detail development of cellular & nuclear endosperm
10. Describe the development of monosporic embryo sac with suitable example

PAH Solapur University Solapur.
B.Sc. Entrepreneurship

Subject – Principles of Business Management & Business Organization Sem-III

Time: - 2 hrs. Total Marks-40

Q.No.2 Answer any four of the following (08)

1. Definition of business management

2. Define Nature of business management

3.Introduction of Business Management

4. Definition of Leadership

5. Define Motivation

6 Explain a concept of Business Management

7. Define styles of leadership

8. Define Direction,

9. Define staffing

10. Define Controlling

11. Define Business organisation

12. Definition of control

13. Meaning of Business Planning

14. Meaning of Decision Making

15. Define organization

16. Meaning of Controlling

17. How many types of Theories?

18. Meaning of financial incentives

19. Importance of leadership

20. Methods of Staffing

Q.No.3 Write short notes on any two of the following (08)

1. Importance of motivation

2. Methods of Staffing

3. Theory of motivation

4. Functions of leader

5. Importance of leadership

6. Features of Planning

7. Types of Decision

8. Importance of Direction

9. Structure of organization

10. Managerial grid and leadership style

Q. No.4) Answer any Two of the following (08)

1) Nature and Importance of business management

2) Explain in Managerial Process

3) Describe the roles of manager

4) Explain F.W. Taylor

5) Describe in detail Peter Ducker

6) Explain Types of Decision

7) Characteristics and Importance of organization

8)Define steps in control

9) Explain Functions of leader

10)Define Staff training and appraisal system

Q.No.5) Answer any one of the following (08)

1) Explain in detail Meaning, definition, Characteristics of **Business Organization**

2) Describe the Meaning & definition of motivation And Theories of Motivation

3) Explain Meaning & definition, Characteristics and Importance of Direction

4)Describe the functions and qualities of leader, Managerial grid and leadership style

5) Define Types of Decision, nature of decision

PAH Solapur University Solapur.
B.Sc. Entrepreneurship

Subject – International Marketing & Marketing Decision Sem-IV

Time: - 2 hrs. Total Marks-40

Q.No.2 Answer any four of the following (08)

1. Definition of Designing Product

2. Define Product Planning

3.Introduction of Product Planning

4. Definition of Product Life cycle

5. Define Pricing

6 Explain a concept of Distribution

7. Define price decision

8. Define price sensitivity

9. Define Consumer Behaviour

10. Define Need of buyer

11. Define Global Marketing

12. Definition of New Trends in Marketing

13. Meaning of technology product

14. Meaning of customized product

15. Define Product idea

16. Meaning of Channel Strategy

17. Introduction of Whole sellers

18. Meaning of price war

19. Importance of Retailer

20. Meaning of competitive market

Q.No.3 Write short notes on any two of the following (08)

1. Product idea & its process
2. Methods of Brand Management
3. Element of positioning
4. Segmentation& Targeting
5. commodity product
6. Product line & product mix
7. consumer behaviour
8. Need of buyer
9. political and Government
10. Technology Environment

Q. No.4) Answer any Two of the following (08)

1) Definition, price decision and its objectives
2) Explain Factors influence price decision
3) Describe the Methods of pricing
4) Explain Types of Distribution Channel
5) Describe information needed for pricing
6) Explain Retailer – Meaning & Forms- supermarket and hyper market
7) Explain Sales promotion, sponsorship & Exhibitions
8)Define Meaning of consumer behaviour, Determinants of consumer behaviour
9) Explain Emergence of Global Marketing
10)Define competition environment & Technology Environment

Q.No.5) Answer any one of the following (08)

1) Explain in detail Determinants of consumer behaviour, Models of behaviour, buying process & Customer loyalty

2) Describe the Emergence of Global Marketing, Use of website in marketing

3) Explain steps involved in import& Export

4)Describe the E- commerce & E- marketing.

5) Define Global Brand and Multinational Company

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

QUESTION BANK

B.Sc. I Zoology, Semester: II, 2022

PAPER IV – DEVELOPMENTAL BIOLOGY OF VERTEBRATES

Q.2 Answer the following questions (Questions of 2 Marks)

1. Chicken egg
2. Define Vitellogenesis
3. Polyspermy
4. Significance of grey crescent
5. Amphimixis
6. Frog Blastula
7. Fate map in frog
8. Fate map in human
9. Haemo endothelia placenta
10. Haemo chorial placenta
11. Cell potency
12. Define Cellular differentiation
13. Types of mammalian cells
14. Totipotency
15. Stem cells
16. Define apoptosis
17. Define metamorphosis
18. Causes of miscarriage
19. Procedure of ultrasound
20. Apoptosis and cancer
21. Fate of three germ layers
22. Conjointed twins

23. Different types of ultrasound

24. Types of miscarriage

25. Examples of spiral cleavage

26. Holoblastic cleavage

27. Centrolectithal egg

28. Telolecithal egg

29. Isolecithal egg

30. Megalecithal egg

31. Blastodisc

32. Irregulative type of egg

33. Define Epiboly

34. Draw a figure of discoidal with example

35. Define Spermatogenesis

36. Emboly

37. Fate map

38. Blastula

39. Differentiate between external and internal fertilization with example.

40. Define piezoelectric effect in ultrasonography.

41. Define miscarriage.

42. Spermiogenesis

43. Define polar bodies

44. Define the terms corpus luteum and corpus albicans

Q.3 Write notes on (Questions of 4 Marks)

1. Describe types of eggs

2. What is convergence?

3. Functions of zona pellucida

4. Cleavage in frog

5. Cleavage in mammals

6. Syndesmochorial placenta

7. Epithelio chorial placenta

8. Monozygotic twins

9. Dizygotic twins

10. Use of ultrasound in cardiology

11. Genetic issues in miscarriage

12. Medical risks in twin pregnancy

13. Morphological changes in metamorphosis

14. Examples of epiboly

15. Role of vitelline membrane

16. Write note on miscarriage

17. Give an account of types and functions of placenta

18. Draw a neat labelled diagram of hen's egg and explain.

19. Spermatogenesis

20. Internal fertilization

21. Cleavage and blastulation in frog

22. Oogenesis

23. Haemochoroidal placenta

24. Apoptosis and its significance

25. Metamorphosis in frog

Q.4 Write notes on (Questions of 4 Marks)

1. Describe ultrastructure of ovum

2. Describe ultrastructure of sperm

3. Describe internal fertilization in mammals

4. Describe significance of fertilization

5. Describe fate maps

6. Describe gastrulation in mammals

7. Describe physiology of placenta

8. Significance of gastrulation

9. How apoptosis is involved in human nervous mechanism

10. How cellular differentiation occur in multicellualr organisms

11. Describe various types of changes in metamorphosis

12. Different parts of ultrasound machine

13. Diagnosis and treatment of miscarriage

14. Describe fraternal twins

15. Karyotyping

16. Note on three germ layer formation in Amphioxus

17. Explain hormonal regulation of metamorphosis in frog

18. Describe Types of twins in human

19. Causes of miscarriage

20. Internal fertilization in mammals

21. External fertilization in frog

22. Cleavage

23. Define and discuss process of implantation of blastocyst in human.

24. With a suitable diagram discuss fate map of frog blastula.

25. Discuss the process of oogensis in mammsls.

26. Explain the process of spermatogenesis.

27. Explain epiboly and emboly as cellular movements and their significance in gastrulation.

Q.5 Answer the following (Questions of 8 Marks)

1. Describe egg membranes and their significance

2. Describe gastrulation in frog

3. Describe functions of placenta

4. Describe external fertilization in amphibians

5. What is apoptosis? With neat labelled diagram describe intrinsic pathway of apoptosis

6. Describe hormonal regulation in metamorphosis of frog.

7. What are MPFs. Describe their structure?

8. Explain cleavage and blastulation in frog

9. Describe Hen's reproductive system

10. Difference between spermatogenesis and oogenesis

11. Define Apoptosis and add a note on general mechanism and significance

12. Describe Fate map of blastula in frog

13. Write an account of Principles and applications of Ultrasound in human embryology.

14. Describe cellular differentiation

15. Explain the process of cleavage, blastulation and gastrulation in human.

16. Give a detailed account on types of placenta on the basis of histology.

18. Define and discuss mechanism of fertilization in mammals with suitable diagram(s).

Punyashlok Ahilyadevi Holkar Solapur university, Solapur

Question Bank

Class: B.Sc. I

Subject: Mathematics

Paper No. III

Paper Name: Geometry

Questions of Two Marks:

1) Transform the equation $2x^2+4xy+5y^2-4x-22y+7=0$ to parallel axis through the point $(-2,3)$
2) Transform the equation $2x^2+y^2-4x+4y=0$ when the origin is shifted to $(1,-2)$.
3) Transform the equation $x^2-4xy+3y^2-10x+16y+21=0$ when the origin is shifted to $(1,-2)$.
4) Find the polar coordinate of the point whose Cartesian coordinates are given as $A(-\sqrt{3},1)$
5) Find the polar coordinate of the point whose Cartesian coordinates are given as $A(-1,1)$
6) Find Cartesian coordinate of the point whose polar coordinates are $(-3,45°)$
7) Change the Cartesian equation to the polar form $x^2+y^2=2ax$ and $(x^2+y^2)^2=a^2(x^2-y^2)$
8) Identify the conic by the equation $x^2+xy+y^2+x+y-1=0$
9) Identify the conic $16x^2+24xy+9y^2-104x-172y+44=0$.
10) Identify the conic by the equation $5x^2-6xy+5y^2+22x-26y+29=0$
11) Identify the conic $13x^2+12xy+25y^2+46x+16y+41=0$.
12) Find equation of the plane whose X intercept, Y intercepts and Z intercept are 3, 4, 7 respectively.
13) Find equation of the plane which passes through the point $(2,-3,4)$ and is parallel to the plane $2x-5y-7z=6$.
14) Find the angle between $11x+6y+5z+86=0$ and $3x-6y+2z+5=0$.
15) Find the angle between the lines whose direction ratios are $(3,-6,2)$ and $(12,4,-3)$
16) Show that the origin and the point $(2,-4,3)$ lie on different sides of the plane $x+3y-5z+7=0$.
17) Find distance of the point $(1,1,4)$ from the plane $3x-6y+2z+11=0$.
18) Find distance of the point $(3,4,2)$ from the plane $6x-2y+3z+7=0$.
19) Show that the points $(-2,3,5),(1,2,3),(7,0,-1)$ are collinear.
20) Show that the points $A(1,-2,3),B(2,3,-4)$ and $C(0,-7,10)$ are collinear.

21) Find the equation of sphere described on $(2,-3,1)$ and $(3,-1,2)$ as extremities of the diameter
22) Find equation of sphere having the join $A(1,-2,3)$ nd $B(-3,1,2)$ as a diameter.
23) Find centre and radius of the sphere $2x^2+2y^2+2z^2-2x+4y+2z+3=0$
24) Find centre and radius of the sphere $2x^2+2y^2+2z^2-2x+4y-6z=2$
25) Find centre and radius of the sphere $x^2+y^2+z^2-2x+4y-6z=11$
26) Find centre and radius of the sphere $x^2+y^2+z^2-4x-6y+8z+4=0$
27) Write equation of sphere in diameter form.
28) Write equation of sphere whose centre is (a,b,c) and radius .
29) Obtain the equation of sphere described on the join of $A(2,3,-4)$, $B(-5,6,-7)$ as diameter
30) Find the equation of the sphere whose centre is at $C(2,3,-4)$ and radius 5.

Questions of Four Marks:

1) Find the intercept form of the equation of the plane
2) Find equation of the tangent plane to the sphere $x^2+y^2+z^2-2x+4y+6z-16=0$ which are parallel to plane $x+5y+2z-1=0$
3) Transform the equation $x^2-4xy+3y^2-10x+16y+21=0$ to parallel axis through thepoint $(1,-2)$.
4) Transform the equation $4x^2+2\sqrt{3}xy+2y^2=2a^2$ when axes are rotated through 30^0
5) Find angle between planes $2x-y+z=6$ and $x+2y+2z=7$
6) If the origin is translated to (h,k) the equation of the curve $x^2+3xy+2y^2+5x-4y+6=0$ doesnot contain the linear term in x and y find the point (h,k)
7) By eliminating the cross product term show that the equation $x^2+xy+y^2=0$ will represent ellipse.
8) Show that that if the equation $ax^2+2hxy+by^2=1$ and $a'x'^2+2h'x'y'+b'y'^2=1$ represent the same conic then $(a-b)^2+4h^2=(a'-b')^2+4h'^2$
9) Transform the equation $x^2+4xy+y^2=a^2$ when axes are rotated through an angle $\frac{\pi}{4}$
10) By rotation of axes the expression $\alpha x+\beta y$ changes to $\alpha' x'+\beta' y'$ then prove that $\alpha^2+\beta^2$ is invariant.
11) Show that the second degree equation $x^2+y^2+z^2+2ux+2vy+2wz+d=0$ represent a sphere with centre $(-u,-v,-w)$ and radius $\sqrt{u^2+v^2+w^2-d}$
12) If axes are rotated through an angle θ the equation $ax^2+2hxy+by^2$ transforn to $a'^{x'^2}+b'y'^2$ then prove that $\theta=\frac{1}{2}\tan^{-1}\left(\frac{2h}{a-b}\right)$
13) Obtain the equation of the plane through the point $(-1,3,2)$ and perpendicular to the two planes $x+2y+2z=5$ and $3x+3y+2z=8$

14) Find the equation of the plane passing through $(2,1,1)$ and the line of intersection of the plane $2x+3y+4z=5$ and $3x-2y+z+1=0$.
15) Define angle between the planes and find acute angle between the planes $ax+by+cz=d$ and $a'x+b'y+c'z=d$
16) Find equation of the plane through the point $(-1,3,2)$ and perpendicular to the two planes $x+2y+2z=5$ and $3x+3y+2z=8$
17) Find equation of the plane through the intersection of the planes $x+y+z=6$ and $2x+3y+4z+5=0$ and the point $(1,1,1)$
18) Find equation of the plane through the points $P(2,2,-1), Q(3,4,2)$ and $R(7,0,6)$.
19) Define a plane and show that the general equation of first degree represents a plane also find the points where the three coordinate axes intersect the plane.
20) Show that the equation of tangent plane to the sphere $x^2+y^2+z^2+2ux+2vy+2wz+d=0$ at a point (x_1,y_1,z_1) is $xx_1+yy_1+zz_1+u(xx_1)+v(y+y_1)+w(z+z_1)+d=0$
21) Find equation of tangent plane which is perpendicular to the plane $2x+3y+6z+8=0$ and which contains the line of intersection of the planes $x+2y+3z+4=0$ and $2x+y-z+5=0$.
22) Find equation of the sphere through the circle $x^2+y^2+z^2+2x+3y+6=0, x-2y+4z-9=0$ and the centre of sphere $x^2+y^2+z^2-2x+4y-6z+5=0$
23) Find equation of the sphere through the circle $x^2+y^2+z^2-2x+4y-6z+5=0$ which are parallel to the plane $2x+2y=z$
24) Find the equation of the plane through the point $(2,2,1)$ and $(9,3,6)$ and perpendicular to the plane $2x+6y+6z=9$.
25) Obtain the equation of tangent plane to the sphere $x^2+y^2+z^2=14$ at the point $(1,2,3)$ on it.
26) Find equation of tangent plane to the sphere $x^2+y^2+z^2=49$ at the point $(6,-3,2)$
27) Obtain the equation of sphere whose diameter has end points $P(x_1,y_1,z_1)$ and $Q(x_2,y_2,z_2)$
28) Show that thw curve of intersection of two sphere $S=x^2+y^2+z^2+2ux+2vy+2wz+d=0$ and $S'=x^2+y^2+z^2+2u'x+2v'y+2w'z+d'=0$ is circle
29) Obtain equation of tangent plane at the point $P(x_1,y_1,z_1)$ to $x^2+y^2+z^2=a^2$
30) Find the equation of sphere for which the circle $x^2+y^2+z^2+7y-2z+2=0$ and $2x+3y+4z=8$ is great circle

Questions of Eight Marks:

1) If by rotation of axis the expression $ax^2+2hxy+by^2$ becomes $a'x'^2+2h'x'y'+b'y'^2$ then prove that $a+b$ and $ab-h^2$ are ivvarient.
2) By rotation an axes through an angle θ show that g^2+f^2 is invariant in the eqution of the curve $ax^2+2hxy+by^2+2gx+2fy+c=0$.

3) Show that the plane $2x-2y+z+12=0$ touches the sphere $x^2+y^2+z^2-2x+4y+z-3=0$ find the point of contact.
4) Show that the equation of the plane whose normal form the origin has the direction cosines l,m,n and the length p is $lx+my+nz=p$.
5) A Variable plane is at a constant distance p from the origin and cuts the xes A,B,C ,prove that thw locus of centriod of the triangle $\triangle ABC$ is $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}$
6) Prove that the plane $Ax+By+Cz=D$ touches the sphere $x^2+y^2+z^2+2ux+2vy+2wz+d=0$ if and only if $(Au+Bv+Cw+D)^2=(A^2+B^2+C^2)(u^2+v^2+w^2-d)$.
7) Find the normal form of equation of the plane.
8) Show that the plane $2x-2y+z+16=0$ touches the sphere $x^2+y^2+z^2+2x-4y+2z=3$ .Find the point of contact.
9) Find equation of plane passing through three points $(3,4,2),Q(4,6,5),R(8,2,9)$.
10) Show that the equation of tangent plane to the sphere $x^2+y^2+z^2+2ux+2vy+2wz+d=0$ at a point (x_1,y_1,z_1) is $xx_1+yy_1+zz_1+u(xx_1)+v(y+y_1)+w(z+z_1)+d=0$ and hence find the equation of tangent plane to the sphere $x^2+y^2+z^2-6x-4y+10z+12=0$ at $(2,-1,-1)$

Question Bank

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B. Sc. (Part-I) (Semester-I) Examination

(Paper-I): Physical Chemistry (CBCS)

Q.2 A) Answer the following **02 Marks each**

1. What do you mean by cyclic process.
2. Write the half life time expression for second order reaction.
3. For a straight line equation y = mx -C, sketch the nature of the graph.
4. Give the significance of the terms involved in van der Waals equation.
5. For a straight line equation y = mx, sketch the nature of the graph.
6. Give one example of pseudo-unimolecular reaction.
7. Give one example of first order reaction.
8. Give the mathematical rate expression for first order reaction.
9. Why Joule-Thompson effect is not shown by ideal gas?
10. What do you mean by isotherm?
11. What is excluded volume?
12. Give one example of second order reaction.
13. Define catalyst.
14. Write the chemical reaction between K2S2O8 and KI
15. Write the chemical reaction of hydrolysis of methyl acetate.
16. Define closed and open system.
17. Give the differential of a constant term.
18. Give the scope of chemical kinetics.
19. Give the expression for half life time for second order reaction.
20. State first law of thermodynamics.
21. Give the requirements for the liquefaction of the gases.
22. What do you mean by adiabatic process?
23. Define rate of a chemical reaction.
24. What do you mean by isothermal process.
25. Give any two examples of reversible process.
26. Give the expression for half life time for first order reaction.
27. Integrate the following by rule

    i. $dy/dx = x^2$ ii. $Dy/dx = x^3/x^2$

28. Differentiate the following by rule

i. $y = x^2$ ii. $y = e^x$

29. Write Boyle's law.

30. Write equation for straight line.

Q.3 Write short notes **04 Marks each**

1. Ideal and non-ideal gas
2. Characteristics of slope of a straight line.
3. Characteristics of intercept of a graph
4. Critical constants
5. van der Waal's constants
6. Joule-Thompson effect
7. Liquefaction of gases
8. Heat engine
9. Carnot cycle
10. Spontaneous processes
11. Statements of second law of thermodynamics
12. Different forms of straight line equations
13. Rules of differentiation
14. Rules of integration
15. Half life periods of a chemical reactions

Q.4 Answer the following **04 marks each**

1. Derive the expression for the rate constant for first order reaction. .
2. A second order reaction where the reactant concentrations are equal is completed to the extent of 40% in 420 s. How long will it take for the reaction to go to 80% completion?
3. What do you mean by the term half life period of a chemical reaction? The rate constant for a chemical reaction is $3x10^{-2}$ min^{-1} at 298 K. Calculate the half life period of the reaction.
4. What are the characteristics of first order reactions?
5. What are unimolecular and psedo-unimolecular reactions? Explain each with suitable example.
6. Discuss how catalyst affects the rate of a chemical reaction with the help of suitable examples.
7. Deduce the equation $w/q_2 = T_2\text{-}T_1/T_2$

8. Calculate the critical constants of a gas. Given data a = 5.33×10^5 $Nm^2(dm^3)^2mol^{-2}$ and b = 0.046 dm^3mol^{-1}

9. What are the characteristics of second order reactions?

10. Discuss PV isotherms of real gas.

11. With the help of Andrew's isotherm, explain the concept of continuity of state.

12. Derive the rate constant expression for second order reaction where the initial concentration of the reactions is equal.

13. A engine operates between 520 K and 420 K. What is the maximum amount of heat absorbed from hot reservoir to obtain 1000 J work?

14. Explain the efficiency of a heat engine on the basis of Carnot's cycle.

15. Find the values for van der Waal's constants 'a' and 'b'. Given Tc = 560 K and Pc = 48.7×10^5 Nm^{-2}

Q.5. Answer the following **08 Marks each**

1. With PV diagram, explain various stages of operation in Carnot's cycle
2. Describe the deviations from ideal behavior of a real gas.
3. Explain the factors which affects the rate of chemical reactions.
4. Discuss in detail decomposition of N_2O_5
5. Discuss Andrew's isotherm
6. Establish the relationship between critical constants and van der Waal's constants.
7. Discuss in detail the reaction between potassium persulphate and potassium iodide.
8. Illustrate the terms: spontaneous and non spontaneous processes
9. Give the rules of integration with suitable examples
10. Give the rules of differentiation with examples

B. Sc. I Geography Sem. II

Human Geography. Paper III

Question Bank

Short Question

1. Write the branches of economic geography.
2. Write the type of Economic Activities
3. State the importance of human geography
4. Define human geography.
5. Distributional nature of human geography
6. Write the branches of human geography
7. Write view of human demography
8. State the view of human resources
9. Concept of land use pattern
10. Write the human tribes in the world
11. Write the Impact factor of population composition and structure.
12. Write the Group of the human Activity
13. Write the name of Scholar in human Geography.
14. Write the Type of human Settlement.
15. Branches of social geography.
16. State the definite features of the human race
17. Describe the uncertainties of human race taxonomy
18. Define race

19. Describe the characteristics of Christianity
20. Name the Indo-European language group
21. Define any four characteristics of Islam
22. Territories and Population of Hindus
23. Characteristics of Jainism
24. Name of the global linguistic group
25. Write the causes of global population growth.
26. Economic factors affecting on population distribution
27. Agriculturally densely populated region
28. Write hypothesis of population transition theory
29. Demerits of Post-transition stage
30. Define age structure.

B. Sc. - I Geography. Sem. II

Human Geography. Paper III

Question Bank

Broad Question

1. Explain the nature of human geography.
2. Descibe the scope of human geography
3. Explain the importance of human geography
4. Explain the branches of human geography
5. Define human geography. Explain nature and scope of human geography
6. Define race and explain the Basis of racial classification.
7. Explain the racial classification of Griffith Taylor.
8. Describe the Social and economical condition of Naga.
9. Explain the major tribes in the world.
10. Describe the social and economical condition of Eskimo.
11. Describe the social and economical condition of Bushmen
12. Explain the region and Characteristics of Buddhism.
13. Explain the various language families in the world.
14. Explain the Religious Groups in the world.
15. Explain the geographical and climatic condition of major tribes in the world.
16. Explain the region and Characteristics of Christianity.

B.Sc.-II (Semester-IV), Examination / 2022

Chemistry (Paper No.-VIII)

(New CBCS w.e.f. June 2019)

Paper Title : Analytical & Industrial Inorganic Chemistry (CBCS Pattern)

Question Bank

Q.No.1) Answer any four of the following 08

i) Define the terms – a) Primary standard b) Secondary standard
ii) Give the pH range of phenolphthalein and methyl orange indicator.
iii) What is acid –base indicator? & give examples.
iv) What is metal ion indicator ? & give examples.
v) Draw the structure of Ca-EDTA complex.
vi) Define the terms – a) Precipitant b) Precipitation
vii) What is the effect of digestion in process of precipitation?
viii) What are the types of precipitate? & give their particle size.
ix) Give the conditions for good precipitation in gravimetric analysis.
x) Give any for advantages of organic precipitant in gravimetric analysis.
xi) Define the terms- a) Catalyst b) Promoter
xii) What are the favorable conditions for better yield of ammonia by Haber's process.
xiii) Explain the role of catalyst in the production of sulphuric acid by contact process
xiv) Give the merits of contact process for the manufacture of sulphuric acid .
xv) Draw the diagram of manufacturing plant for sulphuric acid by contact process.
xvi) Define the terms- a) Mineral b) Ore
xvii) Give two examples of phosphate and sulphide ores.
xviii) What are native ores?
xix) What are the steps involved in metallurgy.
xx) Give the principle of Froth floatation method.
xxi) Give important minerals of iron.
xxii) Define roasting.
xxiii) Define smelting.
xxiv) What are the products of blast furnace.
xxv) What are the merits of Bessemer process.
xxvi) Draw the diagram of L.D. converter.

xxvii) Define the terms- a) Equivalence point b) End point
xxviii) Give the disadvantages of organic precipitant.
xxix) Give favorable conditions to get good yield of sulphur trioxide.
xxx) Draw a neat labelled diagram of Electrolytic refining of copper.

Q. No. 2) Write short notes on any two of the following (8)
i) Eriochrome Black-T
ii) Quinoid theory
iii) Co–precipitation
iv) Post–precipitation
v) Applications of ammonia
vi) Applications of sulphuric acid
vii) Magnetic separation method
viii) Electrolytic reduction of Alumnium
ix) Froth floatation method
x) Electrorefining of copper
xi) Occurance of metals
xii) Heat treatment on steels
xiii) Carbon steel
xiv) L.D. process
xv) Types of iron

Q. No. 4) Answer any two of the following (08)
i) Explain Ostwald's Theory.
ii) What are the types of EDTA titrations? Explain in detail direct titration.
iii)What is precipitate? Explain three physical forms of precipitate.
iv) What is digestion? What are advantages of digestion in gravimetric analysis.
v) Which chemicals are called as heavy chemicals? What are different conditions to get good yield of sulphuric acid in contact process?
vi) Draw a neat labelled diagram of Haber's process for manufacture of ammonia. Give experimental conditions of Haber's process to get good yield.
vii) Define the terms – a) Metallurgy b) Gangue c) Flux d) Slag
viii) Give the steps involved in metallurgical process. Explain thermite smelting.
ix) Explain heat treatment process hardening and case hardening.
x) Explain normalising and nitriding process of heat treatment on steel.
xi) What are merits and demerits of Bessemer process.

xii) What are merits of L.D. process.
xiii) Explain the concentration of ore by gravity separation.
\xiv) Draw a neat labeled diagram and construction of blast furnace.
xv) Discuss he alloy steel.

Q. No. 5) Answer any one of the following (08)

i) What is neutralization curve? Explain the choice of indicator for titration between strong acid and weak base with the help of neutralization curve.

ii)What is complexometric titration? Draw the structure of EDTA. Explain disodium salt of EDTA acts an as important titrating agent in complexometric titration.

iii) Draw and discuss structure of Eriochrome Black –T and explain its color change with the change of pH.

iv) Explain the color change interval theory of acid- base indicator with giving example.

v) Give the three steps in process of precipitation. Explain it.

vi)Discuss the various zones of blast furnace and give the products of blast furnace.

vii) Explain co-precipitation and post- precipitation.

viii) Explain the role of DMG and oxine in gravimetric analysis.

ix) Explain the manufacturing process of sulphuric acid by contact process.

x)What is meant by smelting. Explain smelting of iron ore in blast furnace.

B.Sc.-II (Semester-IV), Examination / 2022

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(New CBCS w.e.f. June 2019)

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vi) Applications of sulphuric acid
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x) Electrorefining of copper
xi) Occurance of metals
xii) Heat treatment on steels
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xiv) L.D. process
xv) Types of iron

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xv) Discuss he alloy steel.

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ii)What is complexometric titration? Draw the structure of EDTA. Explain disodium salt of EDTA acts an as important titrating agent in complexometric titration.

iii) Draw and discuss structure of Eriochrome Black –T and explain its color change with the change of pH.

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Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B Sc III Biotechnology (Sem-VI)

Paper- -XIV- DSE-3B: Evolutionary Biology

QUESTION BANK

Q. 1) B) Fill in the blank/Definition/One sentence answer/ One word answer/ Give the name/Predict the product etc. (06)

1. Define Macroevolution.
2. Define adaptive radiation.
3. Define vestigial organs.
4. Define missing link.
5. Define endosymbiosis theory
6. Define Paleontology.
7. Define species.
8. Define Macroevolution
9. Define connecting link
10. Define morphological species concept.
11. Define ecological species concept.
12. Define cline.
13. Define races.
14. Define cast
15. Define mould
16. Define allopatric species
17. Define sympatric species
18. Define parapatric species
19. Write the Era of tertiary and quaternary period.
20. Define point mutations?
21. Define molecular evolution.
22. Name the theory of evolution given by Lamarck.
23. Who proposed the theory of use and disuse?
24. Give example of missing link.
25. Define analogous organs.
26. Define homologous organs
27. Which animal showing characters of reptiles and aves?
28. Give example of homologous structures in vertebrates.
29. Write the name of connecting link between annelid and arthropods.
30. Which geological period is called the age of reptiles?
31. Define autocatalism.

Q. 2) Solve any Eight of the following. (16)

1. What are coacervates?
2. What is hot dilute soup?
3. Write characteristic features of primates.
4. Write the names of fossil man of Europe.
5. What is K-T extinction?
6. What is polyploidy?

7. What are sibling species?
8. What are living fossils?
9. Write the name of various eras.
10. What is allopatric speciation?
11. What is sympatric speciation?
12. What is parapatric speciation?
13. What is euploidy?
14. What is anneuploidy?
15. Write the name of asian human fossils.
16. Write the names of Miocene horses.
17. Write the names of various eras.
18. What is convergent evolution?
19. What is divergent evolution?
20. What is parallel evolution?
21. What is gene mutation?
22. What is gene flow?
23. What is genetic drift?
24. What is sexual selection?
25. What is gene pool?
26. What is gene frequency?
27. What is Mendelian population?
28. What are polytypic species?
29. What are sibling species?
30. What are semispecies?
31. What are acquired variations?
32. What is chromosomal deletion?
33. What is chromosomal duplication?
34. What is chromosomal inversion?
35. What is chromosomal translocation?
36. Define frame shift mutation.
37. Define substitution mutation
38. What is sexual selection?
39. What is industrial melanism.
40. What is proteinoids?

Q. 3) A) Attempt any Two of the following. **(10)**

1. Write a note on *Homo habilis*.
2. Write a note on *Dryopithecus*
3. Describe Lamarckism.
4. Write causes and effects of mass extinction.
5. Write a note on Paleozoic era
6. Give causes of micro evolutionary changes
7. Explain bottleneck effect.
8. Write a note on temporal isolation.
9. Write a note on seasonal isolation
10. Write a note on ethological isolation
11. Discuss the importance of nucleoproteins in the origin of life

12. Write contributions made by Urey and Miller.
13. Write contributions made by Sydney Fox.
14. Write Mechanical and physiological isolation with suitable example.
15. Write cytological and zygote mortality isolation with suitable example.

Q. 3) B) Describe Millers experiment. (06)
Describe evolution of globin gene family.
Write a note on *Ramapithecus*
Write a note on habitat isolation
Write a note on Cro-Magnon man

Q. 4 A) Attempt any Two of the following. (08)

1. Write short notes on Oligocene horses.
2. Write short notes on Miocene horses.
3. Write short notes on Pliocene horses.
4. Describe various sources of variations.
5. Differentiate between allopatric and sympatric speciation.
6. Describe different types of fossils with suitable examples.
7. Write short notes on Eocene horses.
8. Write conditions are necessary for formation of fossils.
9. Write post-mating isolating mechanisms.
10. Write pre-mating isolating mechanisms
11. Write note on the survival of the fittest.
12. Discuss steps in the chemical evolution leading to emergence of first cellular life.
13. Describe characteristic of modern man.
14. Write hybrid inviability and sterility isolation with suitable example.
15. Write hybrid breakdown and gamete mortality isolation with suitable example.

Q. 4) B) Describe adaptive radiation with suitable example. (08)
Write a note on behavioral isolation
Write a note on *Australopithecus*
Write a note on variations.
Write a note on chromosomal aberrations.

Q. 5) Attempt any Two of the following. (16)

1. Trace the paleontological history of modern horse.
2. Describe the evolution of horse.
3. Describe origin and evolution of Humans.
4. Give an account of fossil history of man.
5. Discuss role of isolation in evolution of new species.
6. Describe the characteristic features of Mesozoic era.
7. Discuss in detail the adaptive radiation with suitable examples.
8. Explain role of geographic isolation in speciation.
9. Explain synthetic theory of evolution.
10. Discuss Darwin's theory of natural selection and origin of species.
11. Describe the theory of inheritance of acquired characters.
12. Discuss the evidences in favor of organic evolution.
13. Write an essay an origin of life.

14. Describe briefly the contributions of Stanley Miller and Louis Pasteur.
15. Discuss the importance of coacervates in the origin of life.

QUESTION BANK

Punyashlok Ahilyadevi Holkar, Solapur University, Solapur
Faculty of Science
(w.e.f. June 2021)
B.Sc. III Biotechnology, Sem- VI
DSE- 2B Genomics and Proteomics

Time : 3 Hr. **Marks -80M**

Q1 B) Write one-word answer of the following. **(06 M)**

1. Genomic material in *Homo sapiens* is -
2. Extrachromosomal material in bacteria called as -
3. DNA structure was discovered by -
4. Any one computer tool used for sequencing DNA-
5. Genomic size of *Arabidopsis thaliana* -
6. Long form of SDS PAGE –
7. Genomic material in plants –
8. Human genome project started in year –
9. starting year of 1000 genome project –
10. Structural and functional unit of life is –
11. Long form of DNA-
12. Name any one purine nitrogen base –
13. Name any one pyrimidine nitrogen base –
14. Targeted cell in sickle cell anaemia –
15. Tracking dye used in gel electrophoresis is –
16. Haemophilia linked to chromosome called -
17. Lack of clotting factor leads to genetic disease called as -
18. Long form of NCBI –
19. Long form of RNA-
20. Function of mRNA –
21. Number of nitrogen base pair per helix of DNA –
22. SNP stands for –
23. Agar powder prepared from –
24. Enlist any two names of genome projects -
25. Polyacrylamide gel electrophoresis used for isolation of -
26. Long form of YAC -
27. Shotgun sequencing method used for sequencing of -

28. Length of Human genome –

29. Length of mouse genome -

30. Length of *Saccharomyces cerevisiae* genome -

Q2) Define any eight of the following **(16 M)**

1. Genomics
2. Proteomics
3. Macromolecules
4. Electrophoresis
5. Molecular taxonomy
6. Nucleosides
7. Chromosome
8. Omics
9. Breeding
10. DNA
11. RNA
12. Protein
13. Taxonomy
14. Gene
15. Plasmid
16. Nucleoside
17. spectroscopy
18. Tracking dye
19. Anaemia
20. Haemophilia
21. Toxicology
22. Lead compound
23. Glycobiology
24. Genetic disease
25. Promoter
26. Cell
27. Glycobiology
28. Translation
30. Transcription
31. Transcripton
32. mRNA
33. tRNA
34. rRNA
35. Nucleosides
36. Taxonomy
37. Genome diversity
38. Genome
39. Structural genomics
40. Diagnosis
41. FASTA
42. BLAST
43. Genetic material
44. Peptide bond
45. Resolution

Q3. Attempt any two of the following **(10 M)**

1. Describe in detail gel electrophoresis.
2. Write a note on HapMap project.
3. Molecular diagnosis of Sickle cell anaemia.
4. Molecular diagnosis of Haemophilia.
5. Explain structure of DNA.
6. Explain in brief primary, secondary and tertiary structure of protein.
7. Write in brief Significance of genomes *Arabidopsis.*
8. Write in brief Significance of genomes yeast.
9. Write in brief Significance of genomes bacteria.
10. Write in brief Significance of genomes –Drosophila.
11. Write in brief Significance of genomes - Caenorhabditis
12. Write in brief Significance of genomes - *Homo sapiens*
13. Explain in brief Polyacrylamide gel electrophoresis.

14. Write note on Image analysis of 2D gel electrophoresis.

15. Write a note on steps in drug discovery.

Q3 B) Short note on **(06M)**

1. Computer tools for sequencing project.

2. Define RNA and types of RNA with their function.

3. Discuss in detail ENCODE project.

4. Origin and structure of macromolecules

5. Define toxicology and application of proteomics in toxicology.

Q4 A) Attempt any two of following **(08M)**

1. Write in brief findings of Human Genome Project.

2. Explain in brief application of proteomics in plants genomics and breeding.

3. Write a note on the ENCODE project.

4. Write a note on secondary structure of protein.

5. Write a note on Analysis of Genomes- Human.

6. Write a note on Analysis of Genomes- *Mycobacterium tuberculosis*.

7. Explain in brief application of proteomics in Glycobiology and toxicology

8. Write note on definition, general feature and application of omics.

9. Write a note on Analysis of Genomes- *Plasmodium falciparum.*

10. Write a note on Analysis of Genomes- *Saccharomyces cerevisiae*.

11. Write a note on importance and general features of genomics.

12. Write a note on importance and general features of genome.

13. Write a brief account on the 1000 genome project.

14. Write in detail tertiary structure of protein with diagram.

15. Explain principle of gel electrophoresis.

Q4 B) Describe in brief **(08 M)**

1. Shotgun Sequencing method of genomic material.

2. Explain in brief steps included in drug discovery and development.

3. Write note on Mass spectrometry based methods for protein identification.

4. Explain in brief 2-DE gel electrophoresis coupled with mass spectrometry.

5. Define structural genomics and explain any one method of genome sequencing.

Q5) Attempt any two of following **(16 M)**

1. Define proteomics and explain in brief two dimensional polyacrylamide gel electrophoresis.

2. Write significance of Bacteria, Yeast, Drosophila, *Arabidopsis* genomes.

3. Write brief account on the origin of macromolecules, RNA and DNA.

4. Explain in brief steps in Genome sequencing assembly clone counting method.

5. Explain in brief application of proteomics in plant genetics and breeding.

6. Explain in brief history, methods and application of ENCODE Project.

7. Write a note on Analysis of Genomes- Human, Mouse, *Plasmodium falciparum*, *Saccharomyces cerevisiae.*

8.Write in brief Significance of genomes – Bacteria, Yeast, Drosophila, *Caenorhabditis, Homo sapiens, Arabidopsis.*

9. Write a note on molecular diagnosis of sickle cell anaemia and haemophilia.

10. Write brief account on history, methodology and findings of the Human genome project.

11. Explain in brief introduction, methodology and findings of the 1000 genome project.

12. Write a note on general feature and importance of genome, genomics and omics.

13. Describe in detail Application of proteome analysis in drug development and toxicology, Glycobiology.

14. Describe in detail structure of DNA and RNA.

15. Explain in brief Sample preparation, Solubilization, Reduction, Resolution, Reproducibility of 2DE.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur.

B.Sc. Entrepreneurship -III Examination Sem-V w.e.f 2021

Subject-Spectroscopic Methods

Q.1 Fill in the blank/Definition/One sentence answer /one word answer /Give the name /predict the product etc. **(6marks)**

1)What is mean by J value?

2)Define pi bond.

3) Write formula for number of fundamentals mode of vibrations for non-linear molecule.

4) Define equivalent proton.

5) Define molecular ion.

6) Draw the structure of TMS.

7) What is mean by bar graph?

8)Define electromagnetic radiation.

9) Write the types of stretching vibrations.

10) Define nonequivalent proton.

11) What type of the energy is bombarded in mass spectroscopy?

12) Which type of energy is used in mass spectroscopy?

13) Define sigma bond.

14) Write the range of finger print region.

15) What is IR spectrum?

16) Define diamagnetic shielding.

17) What is mean by bathochrome?

18) Define splitting.

19)State Lambert's law.

20)Define bending vibration.

21) Give the any one example of splitting of the signals.

22) What is mean by conjugation?

23) State Beers law.

24) Give the examples of nonmagnetic nuclei.

25)Define mass spectrum.

26) Define parent peak.

27) Define chromophore.

28)How much electron beam is used in mass spectroscopy?

29)Which internal standard used in NMR spectroscopy.

30)Define coupling constant.

Q.2) Solve any Eight of the following.(16 marks)

1) State the Hooks law.

2)What is mean by nonmagnetic nuclei?

3) Write any two application of UV spectroscopy.

4) What is mean by precessional motion of nuclei?

5) Explain the term hyperchromic shift.

6)Draw the schematic diagram for mass spectrophotometer.

7)Mention the different types of ions formed in mass spectroscopy/

8) Why far UV region not useful for study of organic compound.

9) What is mean by deshielding?

10) Define non-bonding electron

11) What mean by tau scale?

12) Explain fragment ion.

13) Why are UV bands broad?

14) State the nitrogen rule.

15) What is mean by delta scale?

16) Write any two advantages of TMS

17) Explain isotope ions.

18) What is the basic principle of UV spectroscopy?

19) What is the basic principle of mass spectroscopy?

20) What is mean by peak area?

22)Explain mass spectrum.

23) What the types of the bending vibrations?

24) Write any one example of rearrangement ion.

25) What is aromatic region?

26)Define chemical shift.

27) What is mean by auxochrome?

28) Write the selection rule for the absorption of radiation in IR spectroscopy

29) What is mean by inductive effect?

30)What is mean by shielding?

31) What is mean by fermi resonance?

32) What is mean by IR active transition?

33)What is mean by magnetic nuclei?

34) What is mean by nonmagnetic nuclei?

35)Which information obtained from the peak area in NMR signals?

36) Write the importance of nitrogen rule.

37) Write any two uses of mass spectroscopy.

38)Mention the factors affecting on chemical shift.

39) Explain formation of ions in mass spectroscopy.

40) Give the examples of magnetic nuclei.

Q.3) A) Attempt Any Two of the Following.(10 marks)

A) State and Explain Lambert-Beer law.

B) State nitrogen rule. What is its importance in determination of structure of compound?

C) Explain the factors affecting vibrational frequencies.

D) Explain types of electronic transition.

E) What do you understand by the term splitting of signals? Explain with example.

F) Explain use of mass spectroscopy in determination of structure of the compound?

G) Comment on flipping the spin.

H) Mention the different types of electronic transition involved in UV transitions.

I)Calculate the fundamental mode of vibrations of methane and benzene.

J) Explain the measurement of chemical shift by using delta scale.

Q.3) B) Short note/Solve.(6 marks)

1)Woodward –Fieser rules.

2)Finger print region

3) Molecular ion

4) Magnetic and nonmagnetic nuclei.

5) Coupling constant

Q.4) A) Attempt any Two of the following. (8 marks)

A) Explain the term chromophore. Give two example.

B) Explain the functional group region.

C)Comment the flipping of the spin.

D) Write note on mass spectrum.

E)How will you Differentiate between 1, 5- hexadiene and 1,3,5 hexatriene using UV spectroscopy?

F) what are the different types of the ions formed in mass spectroscopy? Explain any one type in detail.

G) What is the spin - spin splitting?

H) Why mass spectrum of methyl bromide shows two molecular ions?

I). Explain Basic principle involved in IR spectroscopy.

J) Explain the J value.

Q.4) B) Describe /Explain /Solve. (8 marks)

1) Write the application of mass spectroscopy.

2) Explain the basic principle of NMR spectroscopy.

3) Explain the Hook's law.

4) Discuss in detail effect conjugation on the position of UV bands.

5) Explain the basic principle of mass spectroscopy

6) Explain types of electronic transition.

Q.5) Attempt any Two of the following.(16 marks)

A) Explain trans cinnamic acid absorbs at a longer wavelength than cinnamic acid.

B) What is the figure print region in IR spectra? Draw the double beam IR spectrophotometer.

C) What information is obtained from peak area in NMR spectroscopy?

D) What is meant by (M+1) and (M+2) peaks in mass spectroscopy?

E) The wavelength of maximum absorption for methyl chloride is Λ_{max}= 169, while for methyl iodide it is Λ_{max}=258. Explain.

F) What is the chemical shift? How it is measured relative to tetra methyl silane.

G)Sketch the mass spectrophotometer and explain in brief its working.

H) Discuss in detail the applications of UV spectroscopy.

I) Give an account of factors affecting values of vibrational frequencies.

J) Discuss in detail flipping of the spin.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur.

B.Sc. Entrepreneurship -III Examination Sem-VI w.e.f 2021

Subject-Techniques in industrial chemistry

Q.1 Fill in the blank/Definition/One sentence answer /one word answer /Give the name /predict the product etc. **(6marks)**

1)What is chromatography?

2)Write any one name of zeolite.

3) Name the scientist who invent the chromatography technique.

4) What is mean by distillation?

5) Write any one principle of green chemistry.

6)Why porcelain pieces are put into the distillation flask.

7)Which mobile phase is used in paper chromatography?

8)Titanium and aluminium materials can be classified under which of the following Categories of fire?

9)What is mean by Fridal craft's alkylation?

10)Give the any one example of type fire A

11)What is mean by solvent front?

12) Write any two name of enzymes

13) Define the term melting point.

14).Write the oxidation of of benzene to phenol.

15)Write the components of soda ash fire extinguishers

16) Name any one absorbent used in column chromatography.

17) Define the term boiling point.

18)In green chemistry how many principles are involved?

19) Which gases are used as carrier gas in gas chromatography?

20)How biocatalytical reactions are catalyzed?

21)What is mean by Halon-1301?

22)Define microwave assisted reaction.

23)What is mean by spinning cone?

24)Write application of thin layer chromatography

25)Which of the colors allows you to identify a foam fire extinguisher?

26) Define green chemistry

27)Write the advantages of bio catalytical reactions.

28)Which type of fire extinguishers are specifically designed in order to tackle a class F fire.

29) Write any one name of fractionating column.

30)Write the name of the dry chemicals.

Q.2) Solve any Eight of the following.(16 marks)

1) What is green chemistry?

2) What is the basic principle of chromatographic process?

3)Why spinning cone is used in distillation?

4)What is steam distillation of essential oils?

5)Write the class of fire extinguishers

6)What type of solvents are generally employed in chromatography?

7)Why carbon dioxide is used in fire extinguisher?

8) What do you understand by biocatylatical reaction?

9)What is the difference between normal distillation and vacuum distillation?

10) Write the properties of enzymes.

11)Which are the different types of fractionating column.

12)What are the different types of Chromatography?

13)What is mean by CO_2 as fire extinguisher?

14) Define Fridal craft's acylation.

15) Name the factors which affects the distillation.

16) What is mean by batch distillation?

17)How Rf value can be calculated?

18)Write one example of safer solvent and hazardous solvent.

19)How does fractional distillation separate crude oil?

20) Write the oxidation reaction of benzene to phenol and benzoquinone.

21) What is mean by packed column?

22)Which materials are used in class D fire extinguishers?

23) Write reduction reaction of benzoquinone to hydroquinone.

24)Write the principle of continuous distillation.

25)Write the different adsorbents used in thin layer chromatography.

26) What is men by portable fire extinguisher?

27) Mention the factors affecting on enzyme activity.

28)Which materials are used in class B fire extinguishers?

29)What are the mobile and stationary phase in paper chromatography?

30) Write the principle of fraction distillation.

31) Write the different types of the fire.

32) Write any two characteristics of adsorbent.

33) What is mean by portable fire extinguisher?

34) What is general principles of chromatography?

35)Where are Halon 1301 is used?

36) Explain Williamson's synthesis of ethers.

37)Draw the neat labelled diagram of continuous distillation

38) Give the biochemical uses of gas chromatography.

39) Explain any one type of fractionating column.

40) What is mean by enzymes?

Q.3) A) Attempt Any Two of the Following.(10 marks)

1)Write structure and uses of Zeolite.

2)Describe the Soda acid extinguishers

3) Write the application of the gas chromatography.

4)Draw the neat labeled diagram of continuous distillation and explain it.

5) Explain the aromatic nucleophilc substitution reaction.

6)Describe dry chemicals used as fire extinguishers.

7) How is TLC technique employed in the chemical analysis?

9)What are the biocatalysts? Write the advantages of biocatalyst.

10)Explain the separation of acetone and water by fraction distillation.

Q.3) B) Short note/Solve.(6 marks)

1) Concept of Rf value

2) Types of fire

3)Green principles.

4) Fractionating column

5) Microwave assisted reaction.

Q.4) A) Attempt any Two of the following. (8 marks)

1)Write the experimental technique for column chromatography.

2)Explain CO_2 as fire extinguisher.

3) Write the working of the vacuum distillation.

4) Explain the advantages of thin layer chromatography over paper chromatography.

5)Write notes on oxidation of benzene to phenol and hydroquinone

6) What is the difference between batch distillation and continuous distillation?

7)Discuss the classification of chromatography.

8) How do antifreeze fire extinguishers work?

9)Write any two examples of microwave assisted reaction.

10) Explain the structure and uses of zeolites.

Q.4) B) Describe /Explain /Solve. (8 marks)

1)Write any two biocatlytical reactions.

2)Give an account of rate of value in chromatographic technique.

3)Write the advantages of fraction distillation.

4)Explain the factors affect on activity of enzymes.

5)Explain portable fire extinguisher.

Q.5) Attempt any Two of the following.(16 marks)

1) What is chromatography ? Explain the High pressure liquid chromatography.

2)Give the brief description of the principle of fractional distillation.

3)What is green chemistry? Explain in detail 12 principle of green chemistry.

4)Describe Halon-1301 fire extinguisher.

5)Explain indetail batch distillation.

6) What is the basic principle of paper chromatography? Discuss different types of paper chromatography.

7)Draw the neat labelled diagram of continuous distillation and explain its principle in detail.

8)Explain the portable fire extinguishers and antifreeze extinguishers.

9)What are the zeolites? How they are obtained? Explain its structure and uses.

10) Explain in detail Fridal craft's alkylation and acylation.

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Punyashlok Ahilyadevi Holkar Solapur University, Solapur
B.Sc.-III, Semester-VI
Subject: Zoology
Paper-XV (DSE-3B): Animal Behavior and Chronobiology

Q.1) B) Give one sentence answer to the following. (6)

1) Give an example of eusocial animal **(Answer: Honey bees/termites)**
2) Non-reproductive sterile females in honey bee society are called as ----- **(Answer-Workers)**
3) Moth flying towards light in an example of ----- behavior **(Answer:Taxis)**
4) Wood lice moving faster in dry areas than is moist is an example of ----- **(Answer: Kinesis)**
5) ----- is given credit for developing concept of imprinting **(Answer-Konrad Lorenz)**
6) Define the term 'orientation'
7) Define the term 'learning' in behavioral context.
8) When an animal no longer responds to repeated stimulus, it has become ----- to the stimulus **(Answer: habituated)**.
9) Define the term 'stimulus'.
10) ----- biologist discovered the meaning of dance language of honey bees **(Answer: Karl von Frisch)**
11) ----- biologist published the famous book **'sociobiology' (Answer: E.O.Wilson)**
12) Cry-wolf effect is an example of ---- behavior **(Answer: Habituation).**
13) The other name for reward and punishment learning is ----- **(Answer-Operant/instrumental learning)**
14) Ivan Pavlov performed his classical conditioning experiment on ----- animal **(Answer: Dog)**
15) Nest building in bird is an example of ----- behavior **(Answer: Innate/Instinctive)**

Q.2) Solve any eight of the following. (16)

1) Mention the contribution of Thorndike and Skinner in ethology.
2) Give examples of verbal-vs-non-verbal communication
3) Give examples of positive-vs-negative taxis behavior.
4) Give meanings of thermotaxis and geotaxis behavior.
5) List two important contribution of Charles Darwin in behavioral science.
6) Give two examples of innate or instinctive behaviors.
7) Give two examples of acquired/learned behaviors.
8) Differentiate the meanings of 'nature-vs-nurture' in behavior.
9) Define the term 'fixed action pattern(s)' with an example.
10) Write role of pheromones in communication.
11) Enlist contributions of E.O.Wilson in ethology.
12) Write on the meaning of kin selection with one example.
13) Write on the meaning reciprocal altruism with one example.

Q.3) A) Attempt any TWO of the following (10)

1) Give an overview of the contributions of Konrad Lorenz in behavioral science.
2) Define and discuss proximate causes of behavior with suitable examples.

3) Write a brief profile of Ivan Pavlov's contributions in behavioral biology & significance of his work
4) Discuss the advantages of instinctive behavior with examples.
5) Explain chemical, tactile and auditory component in the foraging behavior of honey bees.

Q.3) B) Write short note (06)

1) Discuss with illustration the meaning of ***sickle dance*** in social communication in bees.
2) Give a brief profile of Karl von Frisch's contribution in ethology.
3) Define stereotyped behaviors along with their characteristics and examples.
4) Give an account on operant conditioning with example(s).
5) Discuss visual communication in animals with examples.

Q.4 A) Attempt any TWO of the following (08)

1) Discuss with illustrations the meaning of waggle dance in honey bee colony.
2) Explain the ultimate cause of behavior with suitable examples.
3) Write contributions of Niko Tinbergen and his famous four questions for ethological studies.
4) With suitable examples, write on the advantages of social behavior(s) in animals.
5) Discuss the concept of society with suitable examples in ethological context.

Q.4 B) Describe/Explain/Solve (08)

1) Define and discuss characteristics of habituation with examples.
2) Explain imprinting behavior with examples and add a note on its advantages.
3) Discuss altruistic behavior with examples and mention its evolutionary significance.
4) Discuss olfactory communication among animals with suitable examples.
5) Give an account communication mechanism during round dance of honey bees.

Q.5) Attempt any TWO of the following (16)

1) Discuss with suitable examples on the use of tactile and auditory senses for communication among animals.
2) Give a detailed account on insect society with honey bee as an example.
3) Define associative learning and give a brief account on classical conditioning experiment of Ivan Pavlov with suitable illustrations.
4) Differentiate between instinctive and learned behaviors with suitable examples
5) Discuss origin and historical account of ethology from early to contemporary periods.

Q.2) Answer the following. 2 marks

a) What is asymmetry of sex

b) What is mean by sexual dimorphism in animals.

c) what is tidal rhythm

d) What is associate learning behaviour in animals.

e) What is Lunar rhythms.

f) Give significance of biological rhythms.

g) What is Chronotherapy.

h) What is the male rivalry.

i) What is inter -sexual selection (female choice).

j) Describe long term rhythm.

k) What is the chronomedicine.

l) Give an example of biological rhythms.

m) What is role of melatonine in animals.

n) What is short term rhythm.

o) What is mean by geotropism.

p) Imprinting behaviour.

q) Selective learning.

r) Habituation learning.

Q.3) Answer the following. **4 marks**

a) Describe types of sexual behaviours in animals.

b) what is biological oscillation giving the concept.

c) What is photo period and regulation.

d) What is historical development of chronobiology.

e) Explain intrinsic and extrinsic adaptive values of biological rhythm.

g) What is an example of intersexual selection.

h) Give an example maternal behaviour.

i) Give an example of social behaviour.

j) Importance of biological rhythm.

k Define the circadian rhythm.

l) Adaptive significance of biological clock.

m) role of medicine in pharmacology.

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Q. 4 A) Answer the following. 8 marks

a) Describe purpose of scent marking in various animals.

b) Describe in detail chronobiology.

c) Describe various types of biological rhythms.

d) Explain the role of males in sexual behaviour in different animals.

e) Wheat is chronopharmacology and its role in various diseases.

f) Describe classical and operant conditioning behaviour.

g) Describe photoperiod and regulation of seasonal reproduction in vertebrates.

h) Describe aggressive behaviour in males in vertebrates.

i) Describe various types of learning behaviours in animals.

j) Give an account of social behaviours in animals.

QUESTION BANK

B.Sc.-III (Semester-V) (w.e.f. June-2021)

(CBCS Pattern) Chemistry (Paper IX)

(Physical Chemistry)

Questions for 1 mark-

1.Give example of reversible cell.
2. What are concentration cells?
3. What is standard electrode potential?
4. Give overall cell reaction for Daniel cell.
5. In Nernst equation, the constant 0.0591 at 298 K represents the value of-----.
6. In salt bridge, KCl is used becauseK^+ and Cl^- ions have the same transference number. True/False.
7. The standard cell potential of Daniel cell is-----.
8. The chemical reaction : $Cu^{2+} + 2e^- \rightarrow Cu$ is an example of ------reaction.
9. When free energy change is zero cell emf is zero. True/False
10. The cell that converts chemical energy in to electrical energy is known as ----- cell.
11. The cell, $Pt/H_2(g)/HCl(aq)/AgCl(s)/Ag(s)$ is an example of Chemical cell or Concentration cell.
12. The standard electrode potential of hydrogen electrode is ------ volt.
13. NaCl is used in the preparation of salt bridge. True/False
14. The electrode at which reduction occurs is called---- electrode.
14. What do you mean by triple point?
15. What is reduced phase rule.
16. What is mathematical equation for phase rule?
17. In phase diagram why curves are bivariant systems.
18. Define the terms true equilibrium
19. Define metastable equilibrium.
20. Areas are univarient systems in phase diagram.True/False
21. In sulphur system sulphur exist in ------phases.
22. In Pattinson's process -----phase diagram is used.
23.Give one example photochemical equilibrium reaction?
24. Give mathematical equationLamberts- Beer's law.
25. Give the reactions involved in the decomposition of HI.
26. State Lambert-Beer's law.
27. ISC and IC represent nonradiative transitions in Jablonski diagram. True/False

28. In photoelectric effect the kinetic energy of ejected electrons -----with increase in wavelength.
29. The waves having permitted frequencies, which do not exhibit interference are known as stationary waves. True/False
30. The energy associated with each quantum for a particular frequency is E = ----.
31. Ejection of electron by visible light from the metal surface is called ------ effect.
32. The perfect black body is only absorber of electromagnetic radiation. True/False.

.**Question for 2 marks-**

1. Give representation and cell reaction for reversible cell.

2. Give the representation and electrode reaction for calomel electrode.

3. Write cell reaction and EMF equation for following cell. $Pt,H_2(g,p)$ / HCl / AgCl,Ag(s)
4. Mention any two applications of emf measurement.
5. What do you meant by electrochemical series?

6. Explain oxidation-reduction electrode.

7.Give relation between emf of the cell and Gibbs free energy change?

8. What is metal-insoluble salt electrode ?

9. What is oxygen gas electrode ?

10. What is electrochemical cell ?

11. Define the term degree of freedom.

12. What is phase?

13. Explain the term degree of freedom.

14. What are homogeneous and heterogeneous systems?

15. Mention various stable hydrates formed in $FeCl_3 – H_2O$ system.

16. Explain the term number of components.

17. What is polymorphism ?

18. What is cryohydric point ?

19. Define congruent melting point in salt-water system.

20. What is condensed system ? Give the mathematical equation for reduced

phase rule.

21. Define the term number of components of the system and give one

example.

22. Define the terms:a) Phaseb) Number of components.

23. State Gibb’s phase rule and give its mathematical equation.

24. What is Heisenberg’s uncertainty principle?
25. Define the term photoelectron.

26. Why Black body is perfect absorber and emitter.

27. What is quantum of radiation?

28. Give the statement for Photoelectric effect.

29. Give the expression for Schrodinger wave equation.

30.State Lambert's law.

31. State Beer's law.

32. What are thermal reactions?
33. What is meant by photosensitizer?
34. What is fluorescence?

35. Define the term chemiluminescense.

36. Write on kinetic energy of photoelectrons.

37. What is stationary wave?

38. What is photochemical equilibrium?

39. Give mathematical equation for Lambert's-Beer's law and name the terms in equation.

40. What is transition temperature?

41. Show cryohydric point in phase diagram of salt-water system.

42. Define congruent melting point.

43. Give two examples of oxidation-reduction electrode.

44. Represent metal-metal ion electrode and its reaction.

45. Give any two examples of phosphorescent substances.

46. What are photochemical reactions?

47. Give Stark-Einstein's law.

48. What is quantum yield?

49. Why decomposition of HI shows quantum efficiency less than two?

50. Represent calomel electrodeand write the EMF equation for it.

Question for 4 marks-

1. Discuss the application of emf measurement in the determination of pH of solution.

2. How emf measurement is useful in the determination of solubility of sparingly soluble salt.
3. What are the methods used to find relation between equilibrium constant and EMF of cell?
4. Write note on "Reversible cells".

5. Explain how emf measurements may be used to determine thermodynamic

parameters ΔG, $\Delta H$and ΔS.

6. Write electrode reaction for reduction and expression for single electrode

potential for each of the following :a) ^{-}Cl, AgCl/Ag(s) and b) Fe^{++} ,Fe^{+++}/Pt

7. Explain in detail “Irreversible cells”.

8. Write a note on Pattinson’s process for desilverization of lead.

9. State Gibb’s phase rule and explain the term degree of freedom involvedin it.

10. Draw neatly phase diagram of water system and explain the number of curves involved in it.

11. Draw neat and labelled phase diagram for sulphur system.

12. Define the terms cryohydric point and congruent melting point in salt-water system.

13. What is Stefan-Boltzmann 4^{th} power law?
14. Write a note on Black body radiation.
15. What is de Broglie hypothesis?

16. What are radiative transitions? Give examples.
17. State first and second law of photochemistry.

18. Draw Jablonski diagram depicting various processes occurring in excited state.
19. Write a note on fluorescence phenomenon.
20. What is phosphorescence? Explain with examples.
21. Distinguish between thermal and dark reactions.

Question for 5 marks-

1. Derive an equation for emf of chemical cell without transference.

2. Derive an expression for emf of an electrode concentration cell without transference which is reversible to cation.

3. How is single electrode potential determined? Explain.

4. What are concentration cells? Explain in detail electrolyte concentration cell with suitable example.

5. Derive an expression for emf of an electrolyte concentration cell withouttransference.

6. Discuss the applications of emf measurements in determination of solubility product and solubility of sparingly soluble salts.

7. Discuss the application of phase rule to water system.

8. Discuss the application of phase rule to Pb-Ag system.

9. What is degree of freedom? Explain with suitable examples.

10. Explain in brief photoelectric effect.

11. Write a note on Compton Effect.

12. State and explain Heisenberg’s uncertainty principle

13. Give a brief account on photosensitized reactions.

14. State and explain Einstein’s law of photochemical equivalence.

15. Discuss in detail, "Jablonski diagram."

16. What is quantum yield? Give the causes of high and low quantum yield of photochemical reactions.

17. What is the chemiluinescence? Explain the phenomenon with suitable example.

18. Define Grotthus-Draper law and Lambert law of photochemistry.

Question for 6 marks-

1. How pH is determined from cell emf?Emf of the cell:$Pt/H_2(g)$, (P=1 atm)/H^+(aq.)//SCEis 0.362 volt at 298 K. Find the pH of the solution.Given: E^0_{SCE} = 0.2410 volt.

2. What is the cell reaction for following cell? Calculate emf of the cell at 298K.
   H_2(g, 1 atm.)/HCl(a=0.2M)/$Hg_2Cl_{2(s)}/Hg_{(l)}$(Pt)
   Given: $E^0_{Hg,Hg2Cl2}$= 0.268 volt.

3. How will you determine equilibrium constant from cell emf ? Calculate the value of equilibrium constant for the cell reaction in Daniel cell at 298 K

   $Zn_{(S)} + Cu^{2+} \longrightarrow Zn^{2+} + Cu_{(S)}$ (E^0_{Zn} = -0.76 V and E^0_{Cu} = 0.34 V)

4. Discuss the application of phase rule to lead-silver system.

5. State Gibbs phase rule. Discuss the application of phase rule to water system.

6. State Gibbs phase rule and explain the term involved in it.

7.Describe in detail de Broglie hypothesis.

8. Explain photoelectric effect on the basis of quantum theory.

9. What are photosensitized reaction ? Explain with the suitable example.

10. Write note on "Photodimerisation of Anthracene".

11. What is the Chemiluminescence? Explain the phenomenon with suitable examples.

12. What is quantum yield? A substance absorbs 2×10^6 quanta of radiation per second and 0.002 molesof it react in 20 minutes. Calculate quantum yield of this reaction. ($N = 6.023\times10^{23}$).

Question for 8 marks-

1.Derive an Expression for the emf of electrode concentration cell.Calculate the emf of followingelectrode concentration cell $Pt/H_2(P_1)$/HCl/ H_2 (P_2)/Ptat 298 K.

   If P_1=600 torr and P_2=400 torr.

2. Discuss the application of emf measurements ina) Determination of pH of solution and b) Determination of solubility product and solubility of sparingly soluble salts.

3. Derive an expression for emf of an electrolyte concentration cell without transference.

4. Derive relation between equilibrium constant and EMF of cell. Write the half cell reactions, cell reaction and calculate equilibrium constant of the reaction occurring in the cell at 298 K. Zn/Zn^{2+} (a=1)//Fe^{2+} (a=1),Fe^{3+} (a=1)/Pt.
   E^0_{Zn} = - 0.761 V and $E^0_{Fe3+/Fe2+}$= 0.771 V.

5. Derive an expression for emf of an electrolyte concentration cell withouttransference.

Calculate emf of the given cell, at 298 K, Ag/Ag^{+} (a= 0.1) Zn^{2+} (a= 0.1)/Zn

Is the reaction is spontaneous? Give reason.(Given :E_{Ag}= 0.799 V. andE_{Zn}= - 0.76 V.

6. What is phase rule equation? Discuss the application of phase rule to $FeCl_3$-H_2O system.

7. What is polymorphism? Discuss with respect to the application of phase rule to sulphur system.

8. Discuss the application of phase rule to lead-silver system. How it is used in Pattinson's process?

9. What is transition temperature? Discuss in detail the application of phase rule to sulphur system.

10. What is photoelectric effect? Give its characteristics. How it is explained on the basis of Plank's quantum theory?

11. What is Schrodinger wave equation? Explain Physical significance of wave functionψ and $\psi 2$.

12.State and explain Einstein law of photochemical equivalence. When substance irradiated with light at 5000 A° wavelength, 1×10^{-4} moles of it decomposed how many photons are absorbed during the reaction if its quantum efficiency is 10 Given N = 6.023×10^{23}.

13. What is photochemical equilibrium? Explain with respect to photodimerization of anthracene.

14. What are photochemical reactions? Calculate the energy associated with i) one quantum and ii) one Einstein.Given that the wavelength of radiation is 7500A°. (N = 6.024×10^{23}, h = 6.62×10^{-27} erg. sec, C = 3×10^{10} cm/sec, 1 cal = 4.184×10^{7} ergs)

15. State and explain the law of photochemical equivalence. What are the reasons for high and low quantum yield? Explain with suitable examples.

16. Explain with example:a) photosensitized reactions and b) chemiluminescence.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty: Science & Technology

Examination B.Sc. III, Physics, Semester-V

DSE 1 A

Paper-IX: Mathematical Physics and Statistical Physics (w. e. f June 2021)

Question Bank

Q. 2 Two-mark questions

1. Define order and Degree of differential equation.
2. State Bessel's and Legendre's differential equations.
3. State Laplacian Operator.
4. Describe Cartesian coordinate system.
5. Define micro canonical and canonical ensembles.
6. Define accessible microstates and phase space.
7. State various thermodynamic functions.
8. Define Fermi energy.
9. Deduce Wines formula from Planck Radiation formula.
10. Write any two conclusions of Lummer and Pringsheim experiment.
11. Define microstates and macrostates
12. What is phase space?
13. Define most probable distribution.
14. What is Cartesian co-ordinates system?
15. What is Fermi energy?
16. Define Boson and Fermions
17. Define orthogonal curvilinear coordinate.
18. Define canonical and micro canonical ensemble.
19. Define R.M.S Velocity
20. Write basic postulates of Bose-Einstein statistics.
21. Define priori probability.
22. State Stokes theorem
23. State Gauss theorem
24. Define linearity, homogeneity of differential equation
25. Define most probable speed.
26. What do you mean by an ensemble?
27. Define accessible microstates.

28. Define fermi energy.

29. Give statistical definition of entropy.

30. Give two differentiating points between M-B, B-E and F-D statistics.

31. What are thermodynamic functions?

32. Define thermodynamic probability

33. Draw a diagram indicating most probable speed, average speed, root mean square speed.

34. Define average speed

35. Describe Cartesian coordinate system

36. State gradient in orthogonal curvilinear coordinates

37. State curl in orthogonal curvilinear coordinates

38. State divergence in orthogonal curvilinear coordinates

39. Give the mathematical form of Gauss's theorem

40. Give mathematical form of Stoke's theorem

Q. 3 Five/Six- mark questions

1. Obtain relation between entropy and probability.

2. Derive Maxwell- Boltzmann distribution law.

3. Compare M-B, B-E and F-D statistics.

4. Using Maxwell's law of distribution of speeds of molecules in gas obtain expressions for most probable, average, root mean square speeds

5. Obtain an expression for average speed of gas molecules.

6. Obtain an expression for R.M.S Velocity of gas molecules

7. Explain postulates of priori probability.

8. Explain microstates and macrostates

9. Explain black body radiation.

10. Describe the Lummer and Pringsheim experiment. What are the results of the experiment?

11. Obtain an expression for divergence of vector field in orthogonal curvilinear coordinates System

12. Derive Rayleigh- Jean's law from Planck's law.

13. Derive Wein's law from Planck's law

14. Obtain Stefan's law from Planck's law.

15. Extend expressions of orthogonal curvilinear coordinates in Cartesian coordinates.

16. Extend expressions of orthogonal curvilinear coordinates in Spherical coordinates.

17. Extend expressions of orthogonal curvilinear coordinates in cylindrical coordinates.

Q. 4) Four- mark questions

1. Obtain Greens first and second theorem.
2. Define thermodynamic probability. Obtain an expression for thermodynamic probability.
3. Explain electronic specific heat.
4. Derive Rayleigh-Jean's formula from Planck' s radiation formula.
5. Deduce Wien's displacement law from Planck's radiation formula
6. Explain canonical and micro canonical ensembles.
7. Explain basic concepts of Maxwell- Boltzmann's statistics.
8. Explain basic concepts of Fermi - Dirac statistics.
9. Obtain most probable speed of gas molecules
10. Obtain spherical polar coordinates

Q.5) Eight-mark questions

1. State and prove Stoke's theorem in vector field.
2. Obtain an expression for curl of a vector in orthogonal curvilinear co-ordinates.
3. Derive Fermi-Dirac distribution law.
4. Derive Planck's radiation formula in terms of frequency.
5. Derive Planck's radiation formula in terms of wavelength of black body radiation.
6. Explain Maxwell Boltzmann statistics and derive its distribution law
7. Explain the basic concepts of Bose Einstein statistics and obtain distribution law.
8. State and prove Gauss theorem.
9. Obtain cylindrical coordinates.
10. Explain Green's symmetrical theorem.
11. Derive solution of Hermite's differential equation.
12. What are thermodynamic functions? Explain them in terms of Boltzmann partition function.

Punyashlok Ahilyadevi Holkar, Soapur University Solapur

Question Bank.

B.Sc.III , Sem VI , Paper XIV

Q.2 Short answer questions (marks 02 each)

1. Why lanthanides are called as sub-transition elements?

2. Why lanthanons are placed along with lanthanum in IIIB group of periodic table ?

3.Why lanthanons show +3stable oxidation state?

4. Give reason why atomic radius decreases from La to Lu ?

5. Explain why La, Gd and Lu show +3 oxidation state.

6. Explain why Eu and Yb show +2 oxidation state.

7. Why f- orbital electrons of lanthanides do not take part in bonding?

8. Why lanthanides are found to occure in variety of minerals?

9. What are actinons?

10. What are lanthanons?

11. What is a conductor?

12. What is semiconductor?

13. What is insulator ?

14. What is superconductor?

15. Give the types of semiconductors.

16. What is intrinsic semiconductor ?

17. What is extrinsic semiconductor ?

18. Define n- type and p- type semiconductor .

19. Why do metals show good luster ?

20. What are crystalline solids ?

21. Why does B_2H_6 is termed as diborane ?

22. Borazine is called as inorganic benzene. Why ?

23. Explain why diborane is an electron deficient molecule ?

24. Xenon hexafluoride has distorted octahedral shape. Why ?

25. Why xenon tetroxide has a perfect tetrahedral structure ?

26. Why diborane can not be methylated beyond $Me_4B_2H_2$?

27. SO_2 molecule has V shape. Explain.

28. Why borazine undergoes addition reaction ?

29. Draw the structure of P_4O_{10}.

30. Draw the structure of P_4O_6.

31. What is corrosion ?

32. What is passivity ?

33. Mention the theories of passivity.

34. What are types of passivity ?

35. What is chemical passivity ?

36. What is electrochemical passivity ?

37. What are corrosion inhibitors ?

38. what is electroplating ?

39. Mention the factors affecting corrosion.

40. What is the principle of electrochemical theory ?

41. Define organometallic chemistry and organometallic compounds ?

42. What is back bonding ?

43. What are carbonyls ?

44. What do you mean by 4c-2e bond ?

45. Draw the structures of alkylaluminium compounds.

46. Draw the structures of alkylberyllium compounds.

47. What are methods of preparation of metal carbonyls ?

48. Give the synthesis of alkyl compounds of lithium.

49. What are mononuclear carbonyls ?

50. What are properties of alkyl lithium compounds ?

Q.3 A) Answer the following (5 marks each)

1. Bulk separation method for lanthanides

2. Electronic configuration of lanthanides

3. Electronic configuration of lanthanides

4. What is purity of metal?

5. Explain oxide film theory of passivity.

6. How to prevent corrosion ?

7. What are bond characteristics of borazine ?

8. What is structure of XeO_4 ?

9. Formation of 3c-2e bond in B_2H_6.

10. Explain accelerated projectile bombardment method.

11. What is heavy ion bombardment method ?

12. Discuss V shaped SO_2 molecule.

13. What is the structure of xenon difiuoride

14. Explain the structure of SO_3 molecule.

15. Comment on the structure of P_4O_6 molecule.

B) Answer the following (6 marks each)

1. What are metallic solids ? Explain the properties of metallic solids.

2. What are semiconductors ? Explain p- type semiconductors.

3. Explain metallic bonding on the basis of free electron theory.

4. What are semiconductors ? Explain in brief n – type semiconductors.

5. What are applications of semiconductors ?

Q. 4 A) Answer the following (4 marks each)

1. Describe the formation of 4c – 2e bonding in organolithium compounds.

2. Give the various methods of preparation of organolithium compounds.

3. What are carbonyls ? Give the methods of preparation of metal carbonyls.

4. Distinguish between organometallic compounds and transition compounds.

5. Distinguish between organometallic compounds and carbonyl compounds.

6. Give the IUPAC nomenclature of super heavy elements.

7. What are actinons ? Why they are called as sub transition elements ?

8. Write a note on electronic configuration of lanthanons.

9. Write a note on electronic configuration of actinons .

10. What are lanthanons ? Give their occurrence.

11. Give the names and symbols of lanthanons.

12. Give the names and symbols of actinons .

13. Write a note on transuranic elements ?

14. What are f – block elements ?

15. What are actinons ? Why are they called sub transition elements ?

B) Answer the following (8 marks each)

1.Give the methods of prevention of corrosion.

2. What is corrosion ? Explain electrochemical theory of corrosion.

3. Discuss modern theory of corrosion.

4. What is passivity ? Explain the applications of passivity.

5. How does a metal becomes passive ? How is the passivity of metal removed ?

Q. Answer the following. (8 marks each)

1. Explain the structure and bonding in diborane .

2. Explain in detail the structure and bonding in borazine.

3. Discuss the structures of XeF_2 and XeF_6 on the basis of VB approach.

4. Discuss the structures of P_4O_6 and P_4O_{10}.

5. Explain in detail the structures of SO_2 and SO_3.

6. Explain the metallic bonding on the basis of molecular orbital theory.

7. What are semiconductors ? Explain in brief n - and p - type semiconductors.

8. What are metals ? Explain properties of metals.

9. What are superconductors ? Give the structure , preparation and properties of $YBa_2Cu_3O_7$.

10. What is metallic bonding ? Discuss free electron theory of metals.

11. What are actinides ? Give the electronic configuration of them.

12. What are lanthanides ? Discuss electronic configuration of lanthanides.

13. What are lanthanons ? Describe ion exchange method for separation of lanthanons ?

14. What are transuranic elements ? Mention the methods of preparation of transuranic elements. Explain any one of them.

15. What are sub transition elements ? Give the oxidation states of lanthanides.

P. A. H. S. U. Solapur

Question Bank - 2021-22

Semester- VI Paper- XIV - PLANT BIOTECHNOLOGY

Q. 2) Solve any Eight of the following (40) **(16)**

1. Define Recombinant DNA Technology
2. Restriction endonuclease type II
3. Enlist types of vector used in R-DNA technology
4. Microinjections
5. Define explant
6. DEfine callus
7. Define anther culture
8. Define micropropagation
9. Enlist types of media used in tissue culture
10. Define somatic hybridization
11. Give any two applications of Plant Biotechnology
12. Enlist the enzymes required in protoplast isolation
13. Define transformation
14. Define DNA library
15. Enlist chemicals use for sterilization in tissue culture
16. Define reporter gene
17. Define Primer
18. Enlist steps of PCR with temperature & time required
19. Role of enzyme polymerase
20. Role of enzyme ligase
21. Define totipotency
22. Define marker gene
23. Give any two applications of biotechnology in forestry
24. Define direct propagation
25. What are oligonucleotides
26. Enlist types of enzymes used in R-DNA technology
27. Define complementary DNA
28. Define indirect propagation
29. Enlist factors affecting Anther culture
30. Define hardening
31. What are ribonucleases
32. Define C-DNA library
33. Enlist physical methods of sterilization
34. Enlist REQUIREMENTS for performing PCR
35. Define complementation
36. Define colony hybridization
37. Give any two roles of biotechnology in agriculture
38. Applications of Biotechnology
39. Applications of Genetically modified plants
40. Applications of PCR

Q. 3 A) Write notes on any Three of the following (15) **(12)**

1. Write a note on somatic hybridization
2. Write a note on southern bloating
3. Write a note on applications of PCR
4. Write a note on northern blotting
5. Write a note on any four enzymes involved in R-DNA Technology
6. Write an note on marker gene
7. Write a note on Micropropagation
8. Write a note on factors affecting anther culture
9. Describe in detail steps involved in Anther culture
10. Write a note on colony hybridization
11. Write a note on bacterial transformation
12. Write a note on agrobacterium mediated gene transformation
13. Write a note on physical methods of gene delivery
14. Describe in detail process of tissue culture
15. Describe somatic hybridization

Q. 3 B) Answer the following question. (5) **(04)**

1. Describe the process of PCR
2. Write a note on steps involved for production of golden rice
3. Write a note on enzymatic method of protoplast isolation
4. Write a note on role of biotechnology in agriculture
5. Write a note on role of biotechnology in Industry
6. Advantages of anther culture
7. Disadvantages of anther culture

Q. No. 4) Attempt any Two of the following (15) **(16)**

1. Describe any one biotechnological institute studied by you
2. Write a note on applications of tissue culture
3. Describe southern blotting and add a note on its applications
4. Describe roles of enzymes involved in tissue culture
5. Describe DNA Fingerprinting and add a note on its applications
6. Describe chemical & biological method of gene transformation
7. Write a note on applications of R-DNA Technology
8. Write the steps involved in formation of flavor saver tomato with its application
9. Describe in detail process of northern blotting
10. Describe bacterial transformation
11. What are different types of vector used in DNA technology
12. Describe in general method of making transgenic plants
13. What are the applications of transgenic plants
14. Write process of micropropagation with its application

15. Define Recombinant DNA technology, and write a note on any two vectors used in r DNA technology

Q. 5) Attempt any Two of the following (15) (16)

1. Describe characters of good vector and describe any three vectors studied by you
2. Describe the type of gene transformation used for plants & add a note on applications of biotechnology
3. Describe in detail role of biotechnology in agriculture
4. Write a note on types of restriction endonucleases
5. Describe in detail process of PCR with its application
6. Describe the physical & chemical methods used for sterilization in plant tissue culture
7. Describe the steps for micropropagation its types and add a note on its application
8. Write a note n anther culture & add a note on factors affecting Anther culture
9. Describe factors affecting protoplast isolation
10. Describe in detail protoplast isolation
11. Describe in brief tissue culture laboratory
12. Describe in detail process of DNA fingerprinting
13. Describe the process of making Flavour saver tomato with its application
14. Describe role of biotechnology in forestry
15. Describe the preparation of DNA library

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P. A. H. S. U. Solapur

Question Bank - 2021-22

Semester- VI Paper- XIII - PLANT PATHOLOGY

Q. 2) Solve any Eight of the following (40) **(16)**

1. Define host.
2. What is infection?
3. Give the definition of plant pathology.
4. Define Immunity.
5. What is rot?
6. Give the definition of wilt.
7. What is meant by powdery mildew?
8. Define aerobiology.
9. What is seed borne?
10. Define the seed pathology.
11. Define Disease
12. Give the definition of Pathogen
13. What is Pathogenicity?
14. Define Pathogenesis
15. What is bacteriology?
16. What is meant by Host?
17. What is meant by Inoculum?
18. What is meant by Penetration?
19. What is meant by Infection?
20. What is meant by Incubation period?
21. What is meant by Disease cycle?
22. What is meant by Symptoms?
23. What is meant by Syndrome?
24. What is meant by Virulenc?e
25. What is meant by Predisposition?
26. What is meant by Susceptibility?
27. What is meant by Tolerance?
28. What is meant by Disinfectant?
29. What is meant by Fungicide?
30. Resistance Endemic disease
31. What is meant by Epiphytotic disease or epidemic?
32. What is meant by Pandemic disease?
33. What is meant by Compatibility?
34. What is meant by Antibiosis?
35. What is meant by Competition?
36. What is meant by Hyper parasitism?.
37. What is meant by Hypersensitivity?
38. What is meant by virology?
39. What is meant by Hypertrophy?
40. Plant pathology or phytopathology

41. What is meant by Disease
42. What is meant by Pathogen
43. What is meant by Pathogenicity
44. Inoculum
45. Penetration
46. Incubation period
47. Symptoms
48. Virulence
49. Susceptibility
50. Resistance
51. Immunity
52. Pandemic disease
53. Infection
54. Saprophytes
55. Pathogenicity
56. Inoculum
57. Eradication
58. Write two importance of plant disease
59. Define rots
60. Define Damping offs
61. Define Downy mildews
62. Define powdery Mildews
63. Define white rust
64. Define smut
65. Write any two Symptoms of fruit rot of Cucurbita
66. Write any two Symptoms of late blight of potato
67. Write any two Symptoms of smut of jawar
68. Write any two Symptoms of Brown rust of wheat
69. Write any two Symptoms of Tikka disease of Groundnut
70. Write any two Symptoms of Wilt of Pigeon pea
71. Write any two Symptoms Brown spot of Maize
72. Write any two Symptoms Red rot of Sugarcane
73. Write any two Symptoms Little Leaf of Brinjal
74. Write any two Symptoms of Citrus Canker
75. Write any two Symptoms Oily Spot of Pomegranate
76. Write any two Symptoms of Tobacco Mosaic disease
77. Write any two control Measures of fruit rot of Cucurbita
78. Write any two control Measures of late blight of potato
79. Write any two control Measures of smut of jawar
80. Write any two control Measures of Brown rust of wheat
81. Write any two control Measures of Tikka disease of Ground nut
82. Write any two control Measures of Wilt of Pigeon pea
83. Write any two control Measures of Brown spot of Maize
84. Write any two control Measures of Red rot of Sugarcane
85. Write any two control Measures of Little Leaf of Brinjal
86. Write any two control Measures of Citrus Canker
87. Write any two control Measures of Oily Spot of Pomegranate
88. Define Aerobiology
89. Define forecasting
90. Write any two scopes of aerobiology

91. Write any two importance of aerobiology
92. Define Seed pathology
93. Write any two seed borne disease
94. Write any two seed borne disease pathogen
95. Define seed treatment
96. Define seed certification
97. Write any two uses of seed treatment.

Q. 3 A) Write notes on any Three of the following (15) **(12)**

1. Describe the concept of disease studied by you.
2. Explain the symptoms and disease cycle of downy mildew of grapes.
3. Describe the symptoms and control measures of white rust of crucifers.
4. Describe the symptoms and causal organism of powdery mildew of Mango.
5. Give the symptoms and disease cycle of cucurbits.
6. Disease forecasting
7. Seed Treatment
8. Seed certification
9. Scope of Aerobiology
10. Importance of Aerobiology
11. Importance of Plant Disease
12. Symptoms
13. Cause of disease
14. Severity of Infection
15. Oily Spot of Pomegranate
16. Little Leaf of Brinjal
17. Tobacco Mosaic disease
18. Red rot of sugarcane
19. Downy mildew of Grapes
20. Smut of Jawar

Q. 3 B) Answer the following question. (5) **(04)**

1. Symptoms of late blight of potato.
2. Control measures of brown rust of wheat.
3. Write symptoms of smut of Jawar
4. Write control measures of smut of jawar
5. Write control measures of Tikka disease of Groundnut
6. Write symptoms of red rot of Sugarcane
7. Write control measures of red rot of Sugarcane
8. Write symptoms of citrus cancer
9. Write control measures of citrus canker
10. Write symptoms of little leaf of Brinjal
11. Write control measures of little leaf of Brinjal
12. Describe hot water treatment of seed treatment
13. Describe solar treatment of seed treatment
14. Describe chemical treatment of seed treatment
15. Describe seed certification
16. Describe scope of aerobiology

17. Describe importance of aerobiology

Q. No. 4) Attempt any Two of the following (15) (16)

1. Explain the chemical seed treatment studied by you.
2. Write the symptoms, causal organism and control measures of Tikka Disease of Groundnut.
3. Describe the symptoms, causal organism and control measures of Red Rot of Sugarcane.
4. Describe the symptoms, causal organism and control measures of Brown spots of Maize.
5. Describe the symptoms, causal organism and control measures of Wilt of Pigeon pea.
6. **D**escribe Classification of plant diseases based on symptoms
7. **D**escribe Classification of plant diseases based on spread and Severity of infection
8. Describe Importance of plant diseases
9. Describe methods of seed treatment
10. Define Aerobiology and describe disease forecasting.
11. Describe cause of disease
12. Describe Importance of plant disease
13. Write causal organism, symptoms and control measures of Fruit rot of cucurbits
14. Write causal organism, symptoms and control measures of Downy mildew of Grapes
15. Write causal organism, symptoms and control measures of White rust of Crucifers
16. Write causal organism, symptoms and control measures of Late Blight of Potato
17. Write causal organism, symptoms and control measures of Powdery mildew of Mango
18. Write causal organism, symptoms and control measures of Smut of jawar
19. Write causal organism, symptoms and control measures of Brown rust of Wheat
20. Write causal organism, symptoms and control measures of Brown spot of maize

Q. 5) Attempt any Two of the following (15) (16)

1. Explain the symptoms, causal organism and control measures of Telya Disease.
2. Describe the symptoms, disease cycle and control measures of Citrus Canker.
3. Explain the seed certification studied by you.
4. Describe the symptoms, disease cycle and control measures of Little Leaf of Brinjal.
5. Explain the Solar Seed Treatment studied by you.
6. Write causal organism, symptoms and control measures of Red rot of Sugarcane
7. Write causal organism, symptoms and control measures of Wilt of Pigeon pea
8. Write causal organism, symptoms and control measures of Tikka disease of groundnuts
9. Write causal organism, symptoms and control measures of Little leaf of Brinjal
10. Write causal organism, symptoms and control measures of Citrus Canker
11. Write causal organism, symptoms and control measures of oily spot of pomegranate
12. Write causal organism, symptoms and control measures of Tobacco Mosaic
13. Write causal organism, symptoms and control measures of Tomato Mosaic
14. Write causal organism, symptoms and control measures of any one Bacterial disease
15. Write causal organism, symptoms and control measures of any one mycoplasma disease
16. Write causal organism, symptoms and control measures of any one virus disease
17. Write causal organism, symptoms and control measures of any one rust disease
18. Write causal organism, symptoms and control measures of any one smut disease

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Plant Physiology

Q. 2. Answer any four of the following (m-8)

1. Define Photorespiration
2. Draw Calvin cycle
3. Enlist the photosynthetic pigment.
4. Draw neatlabeleddiagram of mitochondria
5. What is light reaction?
6. What is phloem transport?
7. Define Photoperiodism.
8. What is Vernalization?
9. Define Photosynthesis.
10. Define Respiration.
11. What is Photorespiration?
12. What is Translocation?
13. Define Long Day Plants. Give any two examples.
14. Define Short Day Plants. Give any two examples.
15. Define symplastic transport.
16. Enlist the different photosynthetic pigments
17. What is sink?
18. What is source?
19. What is mean by photophosphorylation?
20. What is mean by phosphorylation?
21. What is mean by photolysis of water?
22. Write any two significance of photosynthesis.
23. Draw neat labeled diagram of Chloroplast.
24. Draw neat labeled diagram of mitochondria.
25. Enlist the growth regulator studied by you.
26. Why carotenoids are called photo protective in nature.
27. Give functions of Lumen of thylakoid.
28. Define Light reaction and give its characters.
29. What is Dark reaction?
30. Enlist the name of electron carriers involved in cyclic and Non- cyclic photophosphorylation.
31. What is Non cyclic photophosphorylation?
32. Define Cyclic photophosphorylation

33. Define Photosynthesis & give reaction of photosynthesis.
34. What is Glycolysis?
35. Define respiration & give its suitable reaction.
36. Give any 4 significance of mitochondria.
37. What is Glycolysis?
38. Define Oxidative Phosphorylation.
39. Define aerobic respiration.
40. Give 2 main functions of Pentose Phosphate Pathway.

Q. 3 Write short notes on any two of following (M-8)

1. Describe mass flow hypothesis
2. Describe photosynthetic apparatus
3. Explain in brief process of vernalization
4. Phloem loading.
5. Photosynthetic apparatus.
6. Site of photorespiration.
7. Explain role of phytochrome
8. Write a note on – Apoplastic transport
9. Symplastic transport
10. Mass flow hypothesis
11. Acetyl CoA formation
12. Write the significance of GA
13. Write the significance of IAA
14. Describe cyclic photophosphorylation.
15. Describe Non-cyclic photophosphorylation.
16. Describe structure of mitochondria with suitable diagram.
17. Describe structure of chloroplast with suitable diagram.
18. Write significance of C_3 Cycle.
19. Describe C_4 cycle.
20. Describe Glycolysis process.

Q.4. Answer any two of the following (m-8)

1. Write a note on Long Day Plant
2. Describe CAM pathway

3. Write a note on photosynthetic pigments
4. Write a note on Short Day Plant
5. Explain in brief mechanism of photorespiration
6. Explain in brief CAM Pathway.
7. Explain in brief mechanism of translocation in phloem (Mass flow hypothesis).
8. Explain in brief ultra-structure of Mitochondrion
9. Write a note on – Structure of Photosynthetic apparatus
10. Write a note on Kranz anatomy
11. Explain in brief assimilate partitioning during vegetative phase.
12. Explain in brief assimilate partitioning during reproductive phase.
13. Describe Calvin cycle.
14. Explain Electron transport.
15. Describe Oxidative Phosphorylation in mitochondria.
16. Write a note on TCA cycle.
17. Describe Hatch Slack pathway.
18. Explain structure and functions of mitochondria.
19. Describe photosynthetic pigments.
20. Describe Light reaction.

Q.5. Answer any one of the following (m-8)

1. Describe cyclic & non cyclic photophosphorylation
2. Explain in brief phloem loading & unloading
3. Explain in detail Process of Glycolysis
4. Explain in detail C_3 cycle of photosynthesis
5. Explain the process of Glycolysis.
6. Explain in brief HSK pathway.
7. Describe in detail C_4 cycle & its Significance.
8. Describe in detail Pentose phosphate pathway.
9. Explain in detail Krebs's cycle.
10. Explain in detail CAM pathway & its significance.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc. Part-I(Semester- II) CBCS Examination

BOTANY

PaperIII- Plant Ecology

Question Bank

Q.2) Answer the following.

1. Define Ecology.
2. Defineautecology.
3. Definesynecology.
4. What are heliophytes?
5. What are sciophytes?
6. Enlist different soil separates
7. What is soil humus?
8. What is photoperiodism?
9. Define hydrophytes.
10. Write any two morphological adaptations of hydrophytes.
11. Write any two physiological adaptations in xerophytes.
12. What is plant density?
13. Give the formula for calculating density.
14. What is phenology?
15. Define cryptophytes.
16. Give two examples of geophytes.
17. Enlist biotic components of an ecosystem.
18. What is food chain?
19. What is ecological pyramid?
20. What is food chain?
21. What is food web?
22. Define ecosystem.
23. Enlist biotic components of an ecosystem.

24. Enlist abiotic components of an ecosystem.
25. What is plant succession?
26. Define Primary succession.
27. Define Secondary succession.
28. Enlist sequential steps that occur in the process of succession.
29. What is xerosere?
30. What is hydrosere?
31. Enlist various stages of hydrosere?
32. Enlist various stages of xerosere?
33. Enlist sequential steps that occur in the process of succession.
34. Define conservation ecology.
35. Define resource ecology.
36. Write useful effect of wind
37. What is ecesis
38. What is stratification
39. What is IVI
40. Define density & give its formula
41. Define frequency & give its formula

Q.3) Write short notes on the following.

1. Discuss 'Light' as a climatic factor
2. Comment up on the soil profile
3. Discuss about soil humus and soil organisms.
4. Morphological and two physiological adaptations in hydrophytes.
5. Morphological and anatomical adaptations in xerophytes.
6. Morphological and anatomical adaptations in hydrophytes.
7. Role of decomposers in an ecosystem.
8. Stratification in forest community.
9. Classification of plant community based on the habitat.
10. Biotic components of an ecosystem.
11. Abiotic components of an ecosystem.
12. Productivity of an ecosystem.
13. Pyramid of number in forest ecosystem.
14. Comment on primary succession.

15. Comment on secondary succession.
16. Write chemical properties of soil
17. What is capillary water
18. Describe soil profile
19. Explain water holding & field capacity of soil
20. Explain wind as ecological factor

Q.4) Answerthe following.

1. Explain in brief soil reaction and cation exchange capacity of soil
2. What is soil texture? Comment up on the 'Textural classes' of soil
3. Discuss in detail any three physical and any two chemical properties of soil.
4. What is the difference between weather and climate? Discuss any two climatic factors you have studied.
5. Describe any three important anatomical adaptations of hydrophytes.
6. Write any four morphological adaptations in hydrophytes.
7. What are xerophytes? Write any three anatomical adaptations in xerophytes.
8. Draw phenogram of any one plant species you have studied.
9. Comment on the association between Rhizobium and root nodule cells.
10. What is plant succession? Give an outline of possible trend of succession in aquatic environment.
11. What is plant succession? Give an outline of possible trend of succession in xeric environment.
12. What is plant succession? Comment on Primary succession.
13. What is plant succession? Comment on Secondary succession.
14. What is plant succession? Enlist sequential steps that occur in the process of succession.
15. Discuss the first two stages of xerosere.

Q. 5) Answerof the following.

1. Discuss the impact of light and wind on plant life.
2. Explain in detail formation of soil (Pedogenesis).
3. What are xerophytes? Explainmorphological andanatomical adaptations in xerophytes.

4. What are hydrophytes? Explain morphological andphysiological adaptations in hydrophytes.
5. What are synthetic characters of the community? Explain any two synthetic characters you have studied.
6. What are analytical characters of the plant community? Explain any two qualitative and any two quantitative characters of the plant community.
7. What is ecosystem? Enlist biotic and abiotic components of an ecosystem and comment on any two biotic and any one abiotic components of ecosystem.
8. What is plant succession? Describe various stages of hydrosere?
9. What is plant succession? Describe various stages of xerosere?
10. Write an account of process of plant succession.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc. Part-I (Semester- II) CBCS Examination

BOTANY

Paper IV- Taxonomy of Angiosperms

Question Bank

Q. 2) Answer the following.

1. Define taxonomy.
2. What is classification?
3. What is mean by Empirical approach?
4. What is mean by Interpretative approach?
5. Define nomenclature.
6. Define natural classification.
7. Define artificial classification.
8. Define phylogenetic classification.
9. Enlist the series of sub-class Polypetalae.
10. Enlist the series of sub-class Gamopetalae.
11. Define identification.
12. What is binomial nomenclature?
13. What is Expert Determination?
14. What is Recognition?
15. What is Comparison?
16. Define Herbarium.
17. Draw format of Herbaria label.
18. What is Collection trip?
19. What is mean by Exploration?
20. Define poisoning of plants.
21. Enlist the characters of sub-division Angiospermae.
22. Enlist the characters of class Dicotyledonae.
23. Enlist the characters of class Monocotyledonae.

24. Enlist the characters of sub-class: Polypetalae & Gamopetalae.
25. Enlist the characters of orders: Polemoniales & Rosales.
26. Write habit and habitat of Liliaceae.
27. Enlist the plants of economic importance in Liliaceae.
28. Enlist the the plants of economic importance in Caesalpiiaceae.
29. Enlist the the plants of economic importance in Solanaceae.
30. Enlist the the plants of economic importance in Liliaceae.
31. Enlist the the plants of economic importance in Nyctaginaceae.
32. Enlist the the instruments required for collection of plant in the field.
33. Enlist steps of Herbarium method.
34. Write down correct botanical name of any plant species in ICBN format.
35. What is the full-form of ICBN?

Q. 3) Write short notes on the following.

1. Write short note on Empirical approach and Interpretative approach.
2. Explain in brief principles of Taxonomy.
3. Write in brief about 'Taxonomy and Systematics' in hands of different taxonomists.
4. Write a note on artifical cassification.
5. Write a note on natual cassification.
6. Write a note on phylogenetic cassification.
7. Write short note on Binomial nomenclature of plants.
8. Why scientific names are treated as Latin?
9. Write short note Need for Scientific Names.
10. Write a short note on significance of herbarium.
11. Functions of Lead Botanical Garden.
12. Write the systematic position of Solanaceae.
13. Write the systematic position of Caesalpiniaceae.
14. Write the systematic position of Nyctaginaceae.
15. Write the systematic position of Liliaceae.

Q. 4) Answer the following.

1. What are the principles of taxonomy?
2. What are the aims of taxonomy?

3. Write short note on Identification.
4. Write down the salient features of Bentham and Hooker's system of classification.
5. Write down the merits of Bentham and Hooker's System of classification.
6. Write down the demerits of Bentham and Hooker's System of classification.
7. Comment upon merits and demerits of Bentham and Hooker's system of classification.
8. Explain in brief need for 'scientific names' to plant species.
9. Which are the methods used for plant identification.
10. Enlist the correct steps in preparation of herbarium specimens.
11. Write a short note on collection of plant specimens for herbarium.
12. Write a short note on labeling and storage of plant specimen for herbarium.
13. Enlist the distinguishing characters of Solanaceae.
14. Enlist the distinguishing characters of Caesalpiniaceae.
15. Enlist the distinguishing characters of Nyctaginaceae.

Q. 5) Answer of the following.

1. Comment upon Identification, Nomenclature, and Classification in taxonomy.
2. Write an essay on introduction of taxnomy.
3. Comment upon aims of taxonomy.
4. Comment upon outline of the system of classification presented by Bentham and Hooker.
5. Comment up on characters considered before plant identification.
6. Write an essay on introduction and principles of ICBN.
7. Write an essay on Identification of plants.
8. What is Herbarium? Explain in detail method of preparation for herbarium specimens.
9. Write an essay on Lead Botanical Garden of Shivaji University Kolhapur.
10. Write systematic position, morphological characters & distinguishing characters and economic importance of Caesalpiniaceae.

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B.Sc. Entrepreneurship-III Examination Sem-VI w.e.f 2021

Title of the paper –Genetic Engineering Paper no-XVI

Subject--Genetic Engineering

Total marks- 80

(10 marks)

Q.1B) Fill in the blank/Definition/One sentence answer /one word answer /Give the name /predict the product ete. (6marks)

1) Define Liposomes

2) Explain DNA ligase

3) Use of linker

4) Use of adaptor

5) Define Agarose

6)Defineplasmid

7) Define Polymerase

8) Define Probe

9) Define Probe Vaccine

10) Define Bioreactor

11) Define Restriction Endonucleases

12) What is mean by PCR?

13)What is mean by c DNA?

14) Define Kinase

15) Define Transferase

16) What is mean by RAPD?

17) Define Molecular Marker

18) Principle of Gene gun method.

19)What is mean by AFLP?

20) Define Mutagenesis

21) Define Ligation.

22) Function of lac operon

23) Define antisense molecule

24) Principle of dot blot technique.

25) Define Phosphatases

26) Define YAC's Vector.

27) Principle of Southern blotting.

28) DNA Fingerprinting

29) Define Electrophoresis

30) Example edible vaccine.

Q.2) Solve any Eight of the following. (16 marks)

1) Write note on Microinjection.

2) Define Cloning vector of DNA .

3) Explain in brief Molecular Scissors.

4) Types Of Restriction enzyme.

5) Which type restriction enzyme is active?

6) Define Exonucleases.

7) Role Of DNA ligase

8) Explain in brief Bacteriophage lambda.

9) Write Types of DNA polymerase .

10) What is SV40.

11) Write note on DNA and RNA.

12) Write note on Denaturation of DNA.

13)Write note on Genomic library

14) Write note on Transformation

15) Define Gene Theorapy

16) Baculo virus based vector name.

17) What is transgenic crop.

18) Define Cosmid.

19) Protein engineering.

20) Uses of PCR.

21) What is Genomic library?

22) Preparation of c DNA Library.

23) Site directed mutagenesis.

24) Use of DNA polymerase

25) Define Transfection.

26) Uses of AFLP.

27) Principle of agarose gel electrophoresis.

28) RNA probes.

29) Principle of RAPD.

30) Uses of Bt Brinjal.

31) Biolistic method Principle.

32) Principle of SDS PAGE.

33) Two Properties M13 vector.

34) Synthetic oligonucleotide probes.

35) Principle of Western blotting.

36) Automated sequencing.

37) Traditional Sequencing.

38) Name of Molecular molecular

39) DNA microarray.

40) Screening of Genomic libraries.

Q.3) A) Attempt Any Two of the Following.(10 marks)

A) Explain Natural Selection.

B) Describe on Primate phylogeny.

C) Describe Briefly Mass extinctions.

Q.3) B) Short note/Solve.(6 marks)

1)Lamarckism with example.

Q.4) A) Attempt any Two of the following. (8 marks)

A) Write Protein synthesizing machinery.

B) Explain evolution of horse.

C) Write Heritable changes.

Q.4) B) Describe /Explain /Solve. (8 marks)

1)Synthetic theory of evolution of Eukaryotic cell.

Q.5) Attempt any Two of the following.(16 marks)

A) Describe in detail Theories of evolution.

B) Explain in detail Modes of speciation.

C) Describe in detail Origin of man.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc. Entrepreneurship I Sem I 2021-2022
(w. e. f. June. 2019)
Choice based credit system (CBCS) Semester Pattern I
Subject-: Fundamental of Microbiology Question Bank 40 marks

Q. No. 2) Answer any four of the following 08

1. Important Contribution A.V Leeuwenhoek
2. Important Contribution Louis Pasteur
3. Important Contribution Robert Koch
4. Important Contribution Alexander Fleming
5. Important Contribution John Tyndall
6. Important Contribution Winogradsky
7. What is Agriculture Microbiology?
8. What is food Microbiology?
9. What is dairy microbiology?
10. What is medical microbiology
11. What is environmental microbiology
12. Write note on bacteria
13. Write note on algae
14. Write note on fungi
15. Write note on virus
16. What is capsule
17. What is ribosome
18. What is cell membrane
19. Define sterilization
20. Define disinfectant

Q.No.3 Write short notes on any two of the following 08

1. Important contribution of A.V. Leeuwenhoek and Louis Pasteur
2. Important contribution of Robert Koch and alexander Fleming
3. Important contribution of John Tyndall and winograsky
4. Write a short note on agriculture microbiology
5. Write a short note on environmental microbiology
6. Write a short note on food microbiology
7. Write a short note on bacteria and protozoa
8. What is algae? give its character
9. What is fungi? give its character
10. Write short note on actinomycets

Q. No.4) Answer any Two of the following 08

1. Difference between prokaryotic and eukaryotic cell
2. Give the structure and function of cell wall
3. Give the structure and function of flagella
4. Give the structure and function of ribosome

5. Give the structure and chemical composition of cell membrane
6. Write a short note on antiseptic gives its examples
7. Write a short note on viruses gives its examples
8. Write a short note on food & Dairy Microbiology
9. Describes Control of Micro organism
10. Write a short note on sterilization

Q.No.5) Answer any one of the following **08**

1. Describes applied branches of Microbiology
2. Describes any four Microbiologist
3. Write difference between prokaryotic & eukaryotic cell
4. Write on general principal of classification of microbes
5. Describes in briefly bacterial classification
6. Describes sterilization gives its types with suitable examples
7. Write a note on chemical agents of sterilization
8. Write on structure chemical composition & function of cell wall with suitable diagram
9. Describes in briefly fungal classification
10. Describes in briefly algal classification

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc. Entrepreneurship I Sem II 2021-2022
(w. e. f. June. 2019)
Choice based credit system (CBCS) Semester Pattern
Subject-: Fundamental of Industrial Microbiology Question Bank 40 mark's

Q. No. 2) Answer any four of the following

1. What is primary screening in microbiology ?
2. What is microbiology?
3. What is father of microbiology?
4. What is Secondary screening in microbiology?
5. Define Fermentation
6. Note on fermenter
7. Enlist types of fermenter
8. Draw neat labelled diagram of fermenter
9. Application of fermenter
10. Factor affecting fermentation process
11. Scope of microbiology
12. What is design of fermenter?
13. Enlist of branches of microbiology
14. What is soil microbiology ?
15. What is wine?
16. What is role of yeast ?
17. What is serial dilution?
18. What if fermentation media ?
19. What is antifoaming agent?
20. What is preservation ?

Q.No.3 Write short notes on any two of the following

1. Write short notes on primary screening
2. Write short notes on secondary screening
3. Write short notes on industrial Microbiology
4. Write short notes on history of industrial Microbiology
5. Write short notes on fermenter
6. Explain working working of fermenter
7. Explain application fermenter
8. Explain importance of micro organism
9. Write a note on carbon & nitrogen sources of used in fermentation media
10. Write a note on sterilization techniques in fermentation

Q. No.4) Answer any Two of the following

1. Write a note on types of microbiology

2. Write a note on factors involve in fermenter design
3. Write a note on wine barrel making
4. What is wine ageing & describes wine technology
5. Write a note on importance of fermentation media
6. Write a note on sterilization techniques in fermentation
7. Write a note on serial dilution
8. Write a note on preservation of micro organism
9. Write a note on fermentation media
10. Write a note on antifoaming agents

Q.No.5) Answer any one of the following

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc. Entrepreneurship II Sem III 2021-2022
(w. e. f. June. 2019)
Choice based credit system (CBCS) Semester Pattern
Subject-: Fermentation Technology Question Bank 40 marks

Q. No. 2) Answer any four of the following 08

1. What is Antibiotics?
2. Penicillin?
3. Streptomycin?
4. Types of antibiotics?
5. Which antibiotic discovered first?
6. Define alcoholic beverages?
7. What is beer?
8. What is wine?
9. Which crops used in beer production?
10. What is malting?
11. Which flowers used in production of beer aroma and taste?
12. Hops flower
13. Botanical names of Hops flower?
14. Role of Hops flower
15. What is beer ageing
16. Define Bio fertilizers
17. Use of Bio fertilizers
18. Role of citric acid
19. Define Vitamin
20. Benefits of Vitamin B_{12}

Q.No.3 A) Write short notes on any two of the following 08

1. Write a note on Biogas production?
2. Write a note on Biofuel production?
3. Describe in detail fermentation process?
4. Describe in detail types of antibiotics?
5. Explain beer production from Barley malt?
6. Explain wine production from grapes?
7. Write a note on production of citric acid?
8. Write a note on PHB?
9. Write a note on production of Bio insecticides?
10. Write a note on barrel making of Oakwood for ageing of alcoholic beverages?
11. Importance of grapes in wine production?
12. Write a note on status of Indian brewing?
13. Benefits of Bio fertilizers?
14. Explain in details of BT cotton?
15. Explain plant varieties used in Biofuel production?

Q. No.4) Answer any Two of the following **08**

1. Write a note on PHB?
2. Write a note on PHA?
3. Write a note on single cell protein?
4. Write a note on production of Bio insecticides?
5. Write a note on Penicillin?
6. Write a note on streptomycin?
7. Write a note on uses of Amylase?
8. Describe in details alcohol production from molasses?
9. Explain wine production from grapes?
10. Explain Azatobacter as Bio fertilizer?

Q.No.5) Answer any one of the following **08**

1. What is Antibiotics? Write a note on classification and types of Antibiotics?
2. What is Antibiotics? Explain briefly production of penicillin?
3. What is Alcohol? Explain briefly production of Alcohol from molasses?
4. What is Beer? Explain briefly production of Beer from barley malt?
5. What is Wine? Explain briefly production of Winefrom grapes?
6. What is Biofertilizer? Explain briefly Azatobacter as Bio fertilizer?
7. Explain briefly Biogas production?
8. Explain briefly Biofuel production?
9. What is Biofertilizer? Explain briefly Rhizobium as Bio fertilizer?
10. Describe in detail working of fermenter?

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B. Sc. (Part –II) (Semester –III) (Choice Based Credit System Pattern)

Geography- Climatology (Paper-V)

Question Bank

Q.No.1) Answer any four of the following

1. Define the concept of weather
2. What is doldrum?
3. Define the Air Pressure
4. Define the concept of Climate
5. Define the concept of Monsoon
6. Define the concept of Cyclone
7. Define the Concept of Climatology
8. Define the concept of Applied Climatology
9. What is stratosphere
10. What is troposphere
11. What is ionosphere
12. What is mesosphere
13. What is exosphere
14. Define the concept of Arora
15. What is temperature
16. What is precipitation
17. Define the term of Insolation
18. Define the concept of Jet stream
19. Define the term of air pressure
20. Define the term of Monsoon
21. Define the term of cyclone
22. Define the term of Humidity
23. State the types of humidity
24. What is specific humidity
25. What is Relative humidity
26. What is wind
27. What is easterlies
28. What is westerlies
29. What is trade wind
30. What is condensation

Q.No.2) Write short notes on any two of the following

1. Indian Monsoon
2. Tropical cyclone
3. Jet Stream
4. Pressure belt of the world
5. Element of weather
6. Elements of climate
7. Atmospheric composition
8. Gases

9. Dust particles
10. Water vapor
11. Ozonosphere
12. Exosphere
13. Mixing layers
14. Heat budget
15. Precipitation

Q. No.3) Answer any Two of the following

1. Explain the types of humidity
2. Explain the composition of the atmosphere
3. Explain the terrestrial heat budget
4. Explain the structure of the Atmosphere.
5. Explain the factors affecting on insolation
6. Explain the temperature distribution
7. Explain the factors affecting on temperature distribution
8. Explain the temperature inversion
9. Explain the factors affecting on wind
10. Explain the planetary wind
11. Explain the climatic region
12. Explain the mechanism of Monsoon
13. Explain the Local wind
14. Explain the factors affecting on the Monsoon
15. Explain the North East Monsoon of India

Q.No.4) Answer any one of the following

1. Define the climate and explain the Stratosphere
2. Explain the Importance of Oxone layers
3. Describe the monsoon depression
4. Describe the Kopens climatic classification
5. Describe the difference between Weather and climate
6. Describe the tropical cyclone
7. Describe the types of tropical cyclone.
8. Describe the high-pressure belt of the world
9. Describe the low-pressure belt of the world
10. Describe the effects of jet stream on Indian monsoon

B.Sc . (Semester – VI) (New) (CBCS) Examination Mar / Apr - 2022

Chemistry (Special Paper – XIV)

INORGANIC CHEMISTRY

A) Two Marks Questions.

1) What is (3 c- 2e) bond ?

2) what is (4 c- 2e) bond ?

3) Define a) mononuclear carbonyl b) metal carbonyl.

4) Give any two rules used to name the organometallie compounds,

5) write the formula the Big (cyclopentadienyl) beryllium.

6) Define the terms a) Atmospheric corrosion. B) Immersed coroosion.

7) Define the terms passivity and passivators.

8) Besides electoplations which methods for coating the metal surfaces are used.

9) Give the two applications for passivity.

10) what are the types of passirity.

11) Difine trans uranic (TU) elements

12) Write note super heavy elements which sutaible Examplas

13) write the names of methods of separation of Lanthanons .

14) Explain + lll and + IV stables oxidation states of lanthanides.

15) write the formula of Gadolinite and xenotime .

16) Write the advantages of Ion exchange method.

17) Define paramagnetism of f – block elements.

18) Write the farmoula of theoretical measuremeen of paramagnetisn. a) spin only formula b) both Spin and orbital contribution.

19) Write note on crystalime solids .

20) Writ on propertius of metallic solids.

21) Define n – type semi conductors.

22) Define p – type semi conductors.

23) Write any two applications of semi conductors.

24) Draw the structure of diborane.

25) Write on physical properties of borzine .

26) Explain similarities in structure between borzine and benzene.

27) Draw the structure of XeF_2.

28) Define borane and Fluoride.

29) What is the hybridization.

30) Write any four noble gas compounds.

31) What is borazine .

B) Four mark question

1) Difine organometallic compound , Explain the nomenelature system of organometallic Compounds,

2) Discuss the nature of bonding in simple metal carbonyls.

3) Define mononuclear carbonyls . E explan the structures of $Ni(CO)_4$, $Fe(CO)_5$ of $Cr(CO)_6$.

4) Difine passivity.Explain oxide flim theory of passivity.

5) Explain factors affecting corrosion a) Effect and moisture b) Effect of oxygen.

6) Explain the bulk separation method for lanthanides.

7) What is TU elements ? Explain heavy ion bombardment method for preparation of TU elements.

8) Explain why most of the lanthanides are paramagnetic.

9) What are actinides ? Why actinides are called F – elements .

10) Write short note on entrinsic semiconductors.

11) Explain free electron theory of metals.

12) Draw and explain structure of XeO_4.

13) Describe the structure of Diborane.

14) Explain the structure of Borazine.

15) Explain electrical and thermal conductivity of metals.

8 Marks questions

1) What is corrosion ? Explain the corrosion of metal on the basis of electrochemical theory.

2) What is corrosion ? Explain giving suitable example, the role of purity of metal on corrosion.

3) Discuss the structure of alkyl and aryl compounds of Lithium and Beryllium.

4) Explain the electronic configuration of lanthanides in brief.

5) Explain the electronic configuration of actinides in brief.

6) Discuss the separation of lanthanide by ion – exchange method .

7) Explain the perpetration of TU elements by neutron – capture fallowed by β – decay .

8) Discuss the proprieties of metals.

9) Define semiconductor , Explain P – type and n – type semiconductors.

10) What is superconductor ? Explain preparation and structure of superconductor.

11) Explain the structure of XeF_2 and XeF_6.

12) Explain the structure of P_4O_6 and P_4O_{10}.

13) Discuss the structure of Diborane in detail

14) Discuss the structure of Borazine in detail.

15) Explain in detail band theory of metals.

Punyashlok Ahilyadevi Holkar Solapur University,Solapur
Exam
B.Sc. (ECS)-II (Sem-III) (CBCS)(w.e.f. June 2020)
Subject: - Introduction to Python programming

QUESTION BANK

Q. No.2) **Answer any four of the following**

1 What is variable? Differentiate Local & Global variable.
2 Define Characteristics of Lists.
3 Define array in python.
4 Define module in python.
5 What is Identifiers?
6 What is Advantage of Functions in Python?
7 Write down syntax of Creating a Function.
8 What is class variable and instance variable?
9 How to Create class in Python?
10 What is constructor?
11 Write down syntax and example of center () Method.
12 Define Default Constructor.
13 Define Lambda function
14 Define Instance Method
15 What is Inheritance?
16 What is File? List Different modes of file.
17 What is interface?
18 What are Actual parameters?
19 Define Method Overloading.
20 Define return statement.
21 What is Regular Expression?
22 What is use of super () method?
23 Define search () Function.
24 Define Static Method.
25 What are Formal parameters?
26 Define try- except statement.
27 What is module?
28 Define import statement.
29 Define method overriding.
30 What is use of break and continue?

Q. No.3) **Write short notes on any two of the following**

1. What is Tuple? Explain any 4 methods of Tuple with example.
2. Explain Looping statement with example.
3. Explain Difference between a Function and a Method.
4. Write a program to check given number is Armstrong or not.
5. Explain Math Module in detail.
6. Explain try- except statement with example.
7. Explain Characteristics of Python.
8. What is Operator Overloading? Explain Overloading binary + operator in Python.
9. What is String? Explain any 4 methods of String with example
10. Explain Types of Inheritance with example.

Q. No.4) **Answer any Two of the following**

1. What is exception? Explain at least 4 Built-in Exception with example
2. Explain Bit wise operators and Membership operators.
3. Explain types of methods in python.
4. Explain try...finally block with example.
5. Explain all numeric data types used in python.
6. What is Dictionaries? Explain any 4 methods of Dictionaries with example.
7. What is a Namespace in Python? Explain in detail.
8. What is function? Write a program to confirm entered no. is odd/even using function.
9. Explain Time module in detail.
10. What is List? Explain any 8 methods of List with example.

Q. No.5) **Answer any one of the following**

1. Explain different type conversion technique used in python.
2. Explain Types of functions in detail.
3. What are the Types of File? WAP to write data into file and read data from file.
4. Explain Abstract classes & Interfaces with Example.
5. Explain Operator precedence and associativity.

Punyashlok Ahilyadevi Holkar Solapur University,Solapur
Exam
B.Sc.(ECS)-II (Sem-IV) (New CBCS)(w.e.f. June 2020)
Subject: - MYSQL

QUESTION BANK

Q. No.2) Answer any four of the following

1 Write syntax and example of group by clause.
2 Define TRUNCATE command
3 Define DDL.
4 Define deleting data from table with example.
5 Use of DISTINCT clause.
6 Write syntax and example of create database.
7 Define WHERE Clause in MySQL.
8 Write syntax and example of INSERT INTO command.
9 Define CASE statement.
10 What is subquery in MySQL?
11 Write syntax and example of IF() function.
12 Write syntax and example of ORDER BY clause.
13 What is Table Level Constraints?
14 Define DML.
15 Write syntax and example of IFNULL()function
16 Explain Advantages and Disadvantages of Joins.
17 How to drop primary key constraint in MySQL?
18 Define CURDATE() Function.
19 What is view in MySQL?
20 Define CHAR_LENGTH() Function.
21 Write syntax and example of CHECK constraint in MySQL.
22 Define DCL.
23 Write syntax and example of CREATE NEW TABLE.
24 What is Column Level Constraints?
25 Write syntax and example of Index.
26 How to disable foreign key constraint in MySQL?
27 Define Stored Procedure Features.
28 Define DQL.
29 Write syntax and example of NOT NULL constraint.
30 Write syntax and example of between operator.

Q. No.3) **Write short notes on any two of the following**

1. Explain Math function with example.
2. Explain Trigger with example.
3. Explain Procedures with INOUT Parameter.
4. Explain DEFAULT constraint in MySQL with example.
5. Explain Import CSV File Into MySQL Table.
6. Explain Having clause with example.
7. Explain Numeric Data Type in MySQL.
8. Explain Procedures with IN Parameter.
9. Explain Primary key and Foreign key constraint with e.g.
10. Explain SAVEPOINT and ROLLBACK TO SAVEPOINT with example.

Q. No.4) **Answer any Two of the following**

1. Explain Inserting data into a table from another table.
2. Explain Procedures with OUT Parameter.
3. Explain Union, Union all, Minus and Intersect Set Operations with example.
4. What is Table Locking? Explain types of locks with example.
5. Explain String Data Types in MySQL.
6. Explain comparison functions in MySQL.
7. Explain ROLLUP in MySQL.
8. Explain Aggregate functions with example.
9. Explain Multi Row Subqueries with example.
10. Explain any 8 Date and Time function.

Q. No.5) **Answer any one of the following**

1. Explain CREATE, ALTER(ADD AND MODIFY), DROP on table with example.
2. Explain Import CSV File into MySQL Table and Export MySQL Table to CSV File with example.
3. What is Join? Explain types of Join with example.
4. Explain String functions with example.
5. Explain Stored Procedure with example.

Punyashlok Ahilyadevi Holkar Solapur University,Solapur
Exam
B.Sc. (ECS)-I (Sem-I) (CBCS)(w.e.f. June 2019)
Subject: - Fundamental of Computer System – I

QUESTION BANK

Q. No.2) Answer any four of the following

1 Define Information Technology.
2 What is System?
3 What are Advantages and Disadvantages of Information Technology?
4 What is Data?
5 Define Hardware.
6 Define UNIVAC.
7 Write short note on IT in Science and Engineering.
8 What is Information System?
9 What are the types of Computer- Based on Purpose?
10 Define Interpreter.
11 Write short note on Rule-based programming language.
12 Explain benefits of OOP.
13 Define Software.
14 What is Compiler?
15 Define Header File.
16 What is Assembler?
17 Define IT in Industry.
18 Define EDVAC.
19 What is Loader?
20 What are the types of information systems?
21 Define Editors.
22 List out characteristics of the computers.
23 What is Linker?
24 Define IT in Home.
25 Define Namespace.
26 Define The Atanasoff-Berry Computer.
27 Define Debuggers.
28 Define Computer.
29 What is Information?
30 What are Advantages and Disadvantages of First Generation Computers?

Q. No.3) **Write short notes on any two of the following**

1 Explain uses of IT in Education and Business.
2 Explain object-oriented programming.
3 Explain types of computer- based on size in detail.
4 Explain differences between Software and Hardware.
5 Explain any four types of Editors.
6 What are the advantages and disadvantages of Computer?
7 Explain Packages.
8 Explain evolution of computer.
9 Explain differences between Linker and Loader.
10 Write a Note on CLR and JVM.

Q. No.4) **Answer any Two of the following**

1 Write a Note on IDE and Assembler.
2 Explain differences between Imperative Programming and Declarative Programming.
3 Explain types of computer- based on purpose in detail.
4 Explain characteristics of computers.
5 Explain Header files used in C programming language in detail.
6 Explain differences between High-Level Language and Low-level language.
7 Explain any 2 generation of computer in detail.
8 Explain types of information systems in detail.
9 Explain differences between Data and Information.
10 Explain Namespace and packages.

Q. No.5) **Answer any one of the following**

1 Explain various types of Computers.
2 Explain Imperative and Declarative Programming Languages.
3 What are the capabilities of a Computer System?
4 Explain tools in software development kit.
5 Define Computer Language? Explain Types of Computer language.

Punyashlok Ahilyadevi Holkar Solapur University,Solapur
Exam
B.Sc. (ECS)-I (Sem-I) (CBCS)(w.e.f. June 2019)
Subject: - Fundamental of Computer System – II

QUESTION BANK

Q. No.2) Answer any four of the following

1 Define Control Unit.
2 What is mean by SMPS?
3 What is sequential access storage device and direct access storage device?
4 Define PCI SLOT.
5 What is Pointing input device?
6 Define Storage Unit.
7 Define Joystick.
8 What is application of MICR?
9 Define Fingerprint Scanner.
10 Definition of the Motherboard.
11 What is Audio input device?
12 What is meant by soft copy and hard copy output? Give examples of soft copy and hard copy output devices.
13 Define Video Input Device.
14 What is expansion slot?
15 Define Printer.
16 What is serial port?
17 Define Non-Impact Printer
18 Short note on laser printer.
19 Explain Advantages and Disadvantages of Plotters.
20 Define Arithmetic and Logical Unit.
21 Define LGA Sockets.
22 What is Parallel port?
23 Define Sensor Device.
24 Define DIMM slots.
25 Short note on inkjet printer.
26 Write down Applications of SMPS.
27 How data is stored on a CD-ROM?
28 Define CRT monitors
29 Define Optical Scanner.
30 Define CMOS battery.

Q. No.3) **Write short notes on any two of the following**

1 What is pointing device? Explain the types of mouse.
2 Explain Types of Sensor Device.
3 Explain Functions of the Motherboard.
4 Explain Motherboard Components in detail.
5 Explain Switched-Mode Power Supply (SMPS) in detail.
6 What is impact printer? Explain types of impact printer.
7 Explain the block diagram of computer.
8 What is Input Device? Explain types of keyboards.
9 What is the difference Between Virtual Reality and Augmented Reality?
10 What are different types of memory? Explain in details.

Q. No.4) **Answer any Two of the following**

1 What is printer? Explain Laser printer.
2 Explain Audio input device.
3 Explain difference between Serial and Parallel Port.
4 What is Primary Memory? Explain types of Primary Memory in detail.
5 Explain Advantages and Disadvantages of SMPS.
6 What is Secondary Memory? Explain types of Secondary Memory in detail.
7 Explain Bar- code readers.
8 Explain difference between Hard Copy and Soft Copy.
9 What is non-impact printer? Explain types of non-impact printer.
10 Explain Motherboard in detail.

Q. No.5) **Answer any one of the following**

1 Explain RAID and its levels 0, 1, 5, 6 and 10.
2 Explain different types of motherboard ports and their functions.
3 Explain different types of scanner in detail.
4 List the output device? Explain working of dot matrix printer.
5 Explain Soft Copy Output Devices in detail.

Punyashlok Ahilyadevi Holkar Solapur University,Solapur
Exam
B.Sc. (ECS)-II (Sem-III) (CBCS)(w.e.f. June 2020)
Subject: - Software Engineering

QUESTION BANK

Q. No.2) Answer any four of the following

1 What is System?
2 What are elements of system?
3 What are the guidelines for drawing DFD?
4 What is Deterministic system?
5 What is Probabilistic system?
6 What is Open system?
7 What is Closed system?
8 What is TPS?
9 What is System Analysis?
10 Who is System Analyst?
11 Definition of software engineering.
12 Write the difference between structured and unstructured interview.
13 What is model in SDLC?
14 What is Data Dictionary?
15 What are different fact finding techniques?
16 What is MIS?
17 Define Goals and Metrics.
18 Write down any four Advantages of Waterfall Model.
19 What are boundaries?
20 Write down four phases in Spiral Model.
21 Write down any four disadvantages of Spiral Model.
22 What is Environment?
23 Write down any four Disadvantages of Waterfall Model.
24 What is RAD model?
25 What is DSS?
26 Write down any four Advantages of Prototype model.
27 When Spiral Model should be followed?
28 Write down any four disadvantages of Prototype model.
29 Write down any four Advantages of Spiral Model.
30 What is Expert System?

Q. No.3) **Write short notes on any two of the following**

1. Explain System concepts.
2. Explain Deterministic system and Probabilistic system.
3. Explain Open system and Closed system.
4. Explain Waterfall Model of SDLC.
5. Explain V-shape model.
6. Explain RAD model.
7. Explain different stages of the Software Development Life Cycle.
8. Explain Characteristics of software.
9. Explain Prototyping Model in detail.
10. Explain role of system analyst in software development.

Q. No.4) **Answer any Two of the following**

1. What is System? Explain different elements of system
2. Explain Spiral Model in detail.
3. Explain skill required in system analyst.
4. What is Normalization? Explain up to 3NF.
5. Explain Software risk management in detail.
6. Explain qualities of software.
7. Explain questionnaires in detail.
8. Explain Waterfall model in detail.
9. What is Decision Tree? Explain with example.
10. Explain Record reviews in detail.

Q. No.5) **Answer any one of the following**

1. Explain interpersonal skills in system analyst.
2. What is Decision table? Explain its types with example
3. Explain any eight qualities of software.
4. Explain fact finding techniques.
5. Explain any four characteristics of software.

Question Bank

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Class: - B.Sc.-II (Sem-IV) Examination: May/June 2022
Subject: Geology
Paper Name – Stratigraphy Paper No – VII

Q.2: Answer any four of the following

i) Define Index fossil
ii) Give two names of Eons
iii) Give two names of formations of Vindhyan
iv) Define Bio-stratigraphy
v) Give the distribution of Dharwar
vi) Give the name of Era representing recent life?
vii) Give the names of periods of Mesozoic Era
viii) Give three names of Era
ix) Define Correlation
x) Define Stratigraphy
xi) Define Marker beds
xii) Give the name of Era representing moderately developed life?
xiii) Give two names of Formations of Cretaceous of Trichinopoly
xiv) Who proposed a Principle of Faunal succession?
xv) Give names of fossils of Jurassic of Kutch

Q.3: Write short notes on any two of the following

i) Classification of Cuddapah
ii) Lithology and Age of Deccan Trap
iii) Uttatur formation of Trichinopoly – Lithology and Fossils
iv) Classification of Cuddapah
v) Lithology and Age of Vindhyan
vi) Deccan Trap – Lithology and Distribution
vii) Ariyalur formation of Trichinopoly – Lithology and Fossils
viii) Economic importance of Delhi Supergroup
ix) Dharwar system – mineral deposits

Q.4: Answer any two of the following

i) Explain Himalaya – An Extra Peninsular Division
ii) Economic importance of Dharwar system
iii) Inter-trapean beds
iv) Explain Indo-Gangetic Plains of India
v) Umia series – Lithology and Life
vi) Economic importance of Vindhyan
vii) Describe Fossils of Siwalik
vii) Explain in brief sub-divisions of Phanerozoic Eon
ix) Describe Lithology of Cuddapah

Q.5: Answer any one of the following

i) Define Stratigraphy. Describe Principle of Faunal Succession in stratigraphy.
ii) Define Correlation. Describe any two Physical methods of stratigraphic correlation.
iii) Describe lithology, distribution, life, age and economic importance of Cuddapah system
iv) Define Stratigraphy. Describe a principle of stratigraphy - 'Uniformitarianism'
v) Define Stratigraphy. Describe a principle of stratigraphy - 'Order of Superposition'
vi) Describe lithology, distribution, life, age of Deccan Trap

B.Sc. (Part-III) (Semester-VI) CBCS Examination, 2022
Chemistry (Paper-XVI)
Analytical and Industrial Organic Chemistry
Question Bank

Q.1) B) Definition **(06)**

i) Hydrophobic

ii) Surfactant

iii) Micelle

iv) Detergent

v) Invert soap

vi) Polymer

vii) Vulcanisation

viii) Addition polymer

ix) Thermoplastics

x) Ionic addition polymerisation

xi) Massecuite

xii) Molasses

xiii) Denatured spirit

xiv) Absolute alcohol

xv) Power alcohol

xvi) Dithianes

xvii) Umpolung

xviii) Catalyst

xix) Green Chemistry

xx) Biocatalytic reactions

xxi) Ionic liquids

xxii) PTC

xxiii) Microwave assisted reactions

xxiv) Chromatography

xxv) R_f value

Q.2) Solve any **Eight** of the following. **(16)**

a) What is salting out of soap

b) Explain co-polymerisation with suitable example

c) What are the conditions necessary for successful fermentation?

d) Give the uses of Deriphat

e) Write the advantages of vaccum evaporator in concentration of sugar juice

f) Mention byproducts of alcohol industry

g) How are TLC plates prepared?

h) Draw a neat labelled diagram of the apparatus used in column chromatography

i) Give preparation and uses of polystyrene

j) Why is rubber vulcanised?

k) Why sugarcane milled immediately after its cutting?

l) Give the preparation of Deriphat

m) Explain saponification with reaction

n) Give the preparation of Teepol

o) Give the preparation and PVC

p) Draw a neat labelled diagram of clarifier

q) Give the uses of molasses

r) How is fermentation medium or wort prepared?

s) What are the types of alcohols

t) Give the synthesis of LAH

u) Write any two reactions catalysed by SeO_2

v) Predict the product i) CH_3-CH=CH-CHO $\xrightarrow[2.\ H_3O]{1.\text{LAH/ Ether}}$?

ii) CH_3-CO-CH_3 $\xrightarrow[\text{aq.dioxime}]{\text{Seo2}}$?

w) Give the name of following ionic liquids i) [emim] $AlCl_4$ ii) [bpy] $AlCl_4$

x) Give any four principles of green chemistry

y) Write name of any four solvents used for TLC

z) Define isotactic and syndiotactic

Q.3) A) Attempt any **Two** of the following. **(10)**

a) Explain the process of centrifugal separaration of sugar crystals from massecuite.

b) Explain the methodology used in column chromatography.

c) Write a note on principles of green chemistry.

d) Explain 1,2 polymerisation and 1,4 polymerisation processes in diene polymerisation.

e) What are Buna rubbers? How is Buna-N rubber prepared?

f) Explain the cleansing action of soaps.

g) Use of $NaBH_4$ in reduction of aldehydes and ketones.

Q.3) B) a) Explain multiple effect evaporator process with diagram **(06)**

b) What are the raw materials used in the preparation of soaps? Explain in brief.

Q.4) A) Attempt any **Two** of the following.

a) How is Buna-S rubber synthesized? **(08)**

b) How allylic oxidation happens using selenium dioxide.

c) Explain preparation and uses of polyurethane.

d) Write note on ionic liquids.

e) Write a note on microwave assisted reactions with suitable examples.

f) Define the term detergents. How is Deriphat prepared? Give its uses.

g) Give the preparation of fermentation medium from molasses.

Q.4) B) a) Explain principle, experimental process and applications of paper chromatography **(08)**

b) Explain in detail refining of raw sugar.

c) Explain the method of preparation and uses of i) polyethene ii) PVC

Q.5) Attempt any **Two** of the following. **(16)**

a) Discuss the experimental techniques of gas chromatography.

b) Explain the process and uses of vulcanisation of rubber.

c) With a neat sketch of mill house, discuss the process of extraction of cane juice.

d) Explain types of detergents.

e) With a neat sketch, explain the role of juice heater in the clarification of sugar juice. Add a note on the by-products of sugar industry.

f) Explain reactions of 1,3- dithiane with alkyl halide and acyl halide.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

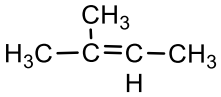
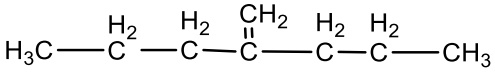
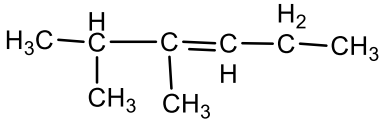
Nature of Question Paper for choice based credit system (CBCS) Semester Pattern

• Faculty of Science • (w. e. f. June 2019)

Organic chemistry Paper III

Question Bank

Questions for 2 marks

1) What are carbocations? Give any two methods of formation of carbocations?
2) What are electrophiles and nucleophiles?
3) Write down short notes on Addition reaction.
4) What do you mean by the terms?
   a) Substrate b) Attacking agent c) intermediate
5) What are carbanions? Give method of formation of carbocations?
6) Define the term hybridization?
7) Define the term hybridization. Give type of the hybridization and shapes of the following compounds.
   a) CH_4 b) C_2H_4 c) C_2H_2
8) Explain sp hybridization with respect to acetylene.
9) Describe the formation and shape of an sp^3 hybridized orbital.
10) Explain hyperconjugation effect with respect to toluene.
11) What are cycloalkanes? give general formula of cycloalkanes?
12) How can cyclopropane be prepared?
13) Explain the internal wurtz reaction for the formation of cyclopropane?
14) Give IUPAC names for the following
    i) CH_3-CH=CH-CH_2-CH_3
    ii)

    iii)

    iv)

15) What are alkenes? and why are they called as olefines?
16) What are alkenes? Give any one method of preparation of alkenes.
17) What are dienes? Give its general formula?
18) What happens when propanol is treated with 95% con. H_2SO_4.
19) What are alkynes? Give general formula of alkynes?

20) What are different types of stereoisomerism?
21) what is asymmetric carbon atom? Give one example.
22) Why are meso compounds optically inactive?
23) What is racemic modification? Why it is optically inactive?
24) What is optical activity? By which instrument it is measured?
25) What is aromaticity?
26) What are the conditions for aromatisity?
27) What are nonaromatic and antiaromatic compounds?
28) What is Huckels rule of aromaticity? Explain it with respect to pyrrole.
29) Benzene is highly unsaturated compound but it does not give usual addition reaction explain?
30) What are the limitations of Kekules structure of benzene?
31) How is the benzene ring represented?

Questions for 4 marks

1) Explain homolytic and heterolytic fission of an covalent bond?
2) What are the major types of organic reactions?
3) Explain SP hybridization with respect to acetylene.
4) Explain steric effect with respect to mesitoic acid.
5) What do you understand by the term hybridization? Explain the shapes of C_2H_4.
6) What are cycloalkanes? give any one method for the preparation of cycloalkanes.
7) How will you detect the presence of double bond in alkenes? Explain with example.
8) What are ozonides and how they are formed?
9) What are alkynes? Explain how hydrogen atoms in acetylene is acidic.
10) What is stereochemistry? What is mean by optical isomerism?
11) What is stereoisomerism? Discuss the types of stereoisomers?
12) What is optical activity? Explain optical isomers of tartaric acid?
13) Discuss in brief the concept of aromaticity with suitable examples.
14) Explain the structure of benzene on the basis of modern theories.
15) What is Friedel-Crafts reaction? Discuss the mechanism involved in Friedel-crafts alkylation.

Questions for 8marks

1) What are reagents? Discuss the different types of reagents with suitable examples.
2) What are intermediates? Discuss its different types with suitable example.
3) The bond angle in methane is 109°25' how can this value be explained in terms of modern concept?
4) How will you prepare cycloalkane by
   i) Internal Wurtz reaction and
   ii) distillation of Ca or Ba salts of dicarboxylic acid?
5) Explain the mechanism involved in the dehydration of lower alcohols/dehydrohalogenation of lower alkyl haides.
6) Explain the addition of hydrogen bromide to propene in accordance with :

a) Markownikoffs rule
b) Anti-Markownikoffs rule

7) Explain the structure of benzene on the basis of molecular orbital theory.
8) What is optical activity? Discus optical isomerism of 2,3-dihydroxy butanoic acid.
9) What is geometrical isomerism? What are the conditions necessary for exhibiting geometrical isomerism? Explain with the example of maleic acid and fumaric acid.
10) Explain the Huckels rule of aromaticity. How is it useful to explain the aromaticity of naphthalene?

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc.III Sem. V Examination March 2022

Chemistry Paper-XI (Organic Chemistry) (CBCS w.e.f. June 2021)

Question Bank

Q.2) Write any Eight of the following: (2 marks each)

1. Write principle of IR spectroscopy

2. Define stereoselective and stereospecific reactions.

3. Explain in short what is mean by locking of conformation.

4. What is chemical shift.

5. Predict NMR spectra of ethanol.

6. Draw chair and boat conformations of decalin.

7. Distinguish the following compounds by IR spectroscopy.

$H_3C\text{-}CO\text{-}CH_3$ and $H_3C\text{-}CH_2\text{-}OH$

8. Predict the NMR spectra of acetophenone.

9. What information is obtained from peak area in NMR spectroscopy.

10. An organic compound with molecular formula $C_2H_4O_2$ shows IR absorption band at 3400 cm^{-1} and 1700 cm^{-1}. Determine the structure of the compound.

11. Define magnetic and non magnetic nuclei with example.

12. Explain what is mean by spin- spin splitting.

13. How many NMR signals are expected for ethane and benzene

14. What is active methylene group? Write two examples of compound containing active methylene group.

15. What is mass spectra?

16. Define molecular ion. Show molecular ion peak of methanol.

17. Explain Mc. Lafferty rearrangement with example.

18. What is mean by M+1 and M+2 peak?

19. What is the action of urea in presence of sodium ethoxide on diethyl malonate at 110^0C.

20. Predict the product.

$C_6H_5CONH_2$ NaOBr , Heat ?

21. Calculate the angle strain for cyclopentane molecule.

22. Draw the half chair and twist boat conformation of cyclohexane.

23. Explain syn and anti-addition with example.

24. What is mean by ring flipping?

25. Give the splitting pattern of different types of protons in pure ethanol.

26. Write the reaction – acetophenone reacts with diethyl succinate in presence of NaH and C_2H_5OH.

27. How will you prepare diethyl malonate?

28. Write limitations of Baeyer strain theory.

29. How will you prepare butanoic acid from ethyl acetoacetate?

30. What is finger print region of IR spectrum?

31. Calculate fundamental modes of vibrations of methane.

33. Write advantages of TMS as an internal reference in NMR.

34. What is Stobbe condensation reaction?

35. Explain acidity of methyl hydrogens of ethyl acetoacetate.

36. Write mechanism of Hoffmann rearrangement reaction.

37. What is mean by tautomerism? Explain w.r.t. ethyl acetoacetate.

38. How Is diethyl malonate prepared?

39. Starting from diethyl malonate, how will you prepare barbituric acid?

40. What is Wittig reaction?

Q.3 A. Attempt any two of the following: (5 Marks each)

1. An organic compound has molecular formula C_8H_9Br. It gives following NMR data. Determine the structure of the compound.

2.7 δ Triplet (2H), 3.4 δ Triplet (2H), 7.22 δ Singlet (5H).

2. Describe shielding and deshielding effect with example.

3. An organic compound has molecular formula $C_{10}H_{13}Cl$. It gives following NMR data. Determine the structure of the compound.

1.57 δ Singlet (6H), 3.07 δ Singlet (2H), 7.27 δ Singlet (5H).

4. What is selection rule? Discuss IR active transitions and IR inactive transitions with suitable example.

5. Explain potential energy relationship between conformations of cyclohexane.

6. What is Wittig reaction? Explain with mechanism.

7. Explain Hoffmann rearrangement with mechanism.

8. Write the synthesis of ethyl 2- methyl 2- methyl malonate from diethyl malonate.

9. Describe stereochemistry involved in alkaline hydrolysis of 2- chlorobutane to 2- butanol

10. What is Hooks aw? Explain with suitable example.

Q.3B Write short note on following (6 Marks)

1. Types of vibrations in IR spectroscopy.

2. Finger print and functional group region in IR spectroscopy.

3. Stereoselective and stereospecific reactions.

4. TMS as reference in NMR

5. Wagner- Meerwein Rearrangement.

Q.4 A. Attempt any Two of the following: (4 Marks each)

1. Write the factors affecting on IR absorption frequency.

2. Explain equivalent and non- equivalent protons with example.

3. Draw the schematic diagram of mass spectrometer.

4. Describe applications of IR spectroscopy.

5. What is coupling constant? Write types of coupling constant with example.

6. Distinguish following pair of compounds by NMR spectroscopy.

1) $H_3C\text{-}CH_2\text{-}CHO$ and $H_3C\text{-}CO\text{-}CH_3$

2) $H_3C\text{-}CH_2\text{-}COOH$ and $H_3C\text{-}CH_2\text{-}CH_2\text{-}OH$

7. What is mass spectra? Explain mass spectra of methanol.

8. Explain theory of strainless rings.

9. Write the reaction and mechanism of Sobbe condensation.

10. Write the synthesis of ethyl acetoacetate by Claisen condensation with mechanism.

Q.4.B. Write the following (8 Marks)

1. Explain the following.

Use of mass spectroscopy in 1) determination of molecular formula 2) determination of structure of the compound.

2. Starting from ethyl acetoacetate, how will you synthesize succinic acid and glutaric acid.

3. How many sets of equivalent protons are present in following compound.

a) $H_3C\text{-}CO\text{-}CH_2\text{-}CH_3$ b) $H_3C\text{-}CO\text{-}CH_3$ c) C_6H_6 d) $H_3C\text{-}CH_2\text{-}CHO$

4. Draw four conformations of cyclohexane and explain their stability.

5. An aromatic aliphatic ketone A (C_8H_8O) on reaction with halo derivative of an ethyl ester B($C_4H_7O_2Br$) in the presence of metallic zinc and dry benzene forms C ($C_{12}H_{15}O3ZnBr$). Compound C on hydrolysis in the presence of HCl gives a β- hydroxyl ester D ($C_{12}H_{16}O_3$) which on further hydrolysis followed by dehydration gives α, β-unsaturated acid E ($C_{10}H_{10}O_2$). Identify A, B, C, D and E. Write the name and equations involved in the reaction.

Q.5. Attempt any Two of the following. (8 Marks each)

1. Starting from diethyl malonate hoe will you synthesize alanine and crotonic acid.

2. Explain Baeyer's strain theory and its limitations.

3. Starting from ethyl acetoacetate how will you synthesize 1) 2- methyl EAA 2) n- Butyric acid

3) Succinic acid 4) Glutaric acid

4. Describe in brief applications of IR spectroscopy

5. How will you distinguish following pair of compounds by NMR spectroscopy?

a) $H_3C\text{-}COO\text{-}CH_2\text{-}CH_3$ and $H_3C\text{-}CH_2\text{-}OH$

b) $Cl\text{-}H_2C\text{-}CH_3\text{-}Cl$ and $H_3C\text{-}CHCl_2$

6. Describe various types of ions involved in mass spectroscopy.

7. An organic compound A [C_3H_6O] which is a ketone reacts with another compound B [$C_4H_7O_2Br$] and metallic zinc and dry ether to give the compound C[$C_7H_{13}O_3ZnBr$]. Compound C on hydrolysis with HCl gives a β- hydroxy ester D[$C_7H_{14}O_3$]. Compound D on further hydrolysis gives E [$C_5H_{10}O_3$] which is readily dehydrated on heating to form α, β- unsaturated acid. What are A, B, C, D and E? Write reactions and name of the reaction.

8. Explain the stability of methyl cyclohexane and tert. Butyl cyclohexane.

9. Describe stereoselective and stereospecific reactions with example. Explain why all stereospecific reactrions are stereoselective but all stereoselective reactions are not stereospecific.

10. An organic compound A [C_3HNO] on heating with evolves ammonia and forms potassium salt of carboxylic acid. When compound A is heated with Br_2/KOH then it forms compound B [C_2H_7N]. The compound B on reaction with nitrous acid yields primary alcohol C[C_2H_6O]. What are A, B and C? Write reactions and name of the reaction.

Chemistry (Special paper-I)
PHYSICAL CHEMISTRY

Q.2 Define the terms:

i) Rate of reaction.

ii) Specific reaction rate

iii) Molecularity of a reaction

iv) Order of reaction

v) Give the units of: i) First order reaction ii) Second order reaction

vi) Intercepts

vii) Differentiation

viii) Integration

ix) Graph

x) Graph paper

xi) Slope

xii) Ideal gas

xiii) Non-ideal gas

xiv) Critical Temperature

xv) Critical pressure

xvi) Critical volume

xvii) Isotherm

Q.3 Write a notes on: (Attempt the following)

i) Continuity of state

ii) Deviation from Boyle's law

iii) Joule- Thomson effect

iv) Liquefaction of gases

v) Different types of processes

vii) Spontaneous and non-spontaneous processes

viii) Heat engines and Carnot's theorem

ix) Derivative of composite function

x) Partial derivatives

xi) Definite integral

xii) Order and molecularity of reaction

xiii) Pseudo-unimolecular reactions

xiv) Reaction between $K_2S_2O_8$ and KI as a bimolecular reaction

Q.4 Attempt the following:

i) Mention various methods used for the determination of the order of reaction. Describe any one of them.

ii) Discuss in full, different forms of straight line equation.

iii) State and explain second law of thermodynamics. Give at least four statements.

iv) Hydrogen and helium gases near room temperature warm up on expansion. Explain.

v) Derive an expression for the efficiency of heat engine working between the temperatures T_1 and T_2

vi) How does the van der Waals equation explain the behaviour of gases at a) high pressure and b) low pressure.

vii) Mention different rules of differentiation without proof.

viii) Describe Ostwald's isolation method to find out the order of reaction.

ix) Mention the different rules of integration without proof.

x) State and explain Carnot's theorem.

xi) Spontaneous processes are thermodynamically irreversible processes. Discuss the statement.

xii) Define the term derivative. Give the characteristics of derivative.

xiii) Show that for a first order reaction, the half change time is independent of the initial concentration of the reactant.

xiv) Define origin of graph, Draw the Cartesian system of coordinates.

xv) Distinguish between the molecularity and order of a chemical reaction.

Q.5 Attempt the following:

i) What are unimolecular and pseudo-unimolecular reactions? Give examples.

ii) Derive the characteristic equation for a second order reaction in which reactants are at different concentrations.

iii) What is Carnot's cycle? Calculate percentage of a steam engine operating between 100 K and 50 K.

iv) Define critical temperature. The critical temperature and pressure of chlorine are 146^0C and 93.5 atmosphere respectively. Calculate the values of the van der Waals constants a and b.

v) Define order of reaction. A first reaction takes 30 minutes for 60% of the reaction to be completed. What is the rate constant of the reaction?

vi) Explain spontaneous process. An engine operating between 100^0C and 0^0C takes 453.6 kcal of heat. How much work can be done by it?

vii) Derive van der Waals reduced equation of state and explain the law of corresponding state.

viii) Prove that,

i) $Pc = a/27b^2$ ii) $Vc = 3b$ iii) $Tc = 8a/ 27Rb$

ix) What is mean by isotherm? Van der Waals constants for CO_2 are a = 0.3636 Nm^4mol^{-2} and

b = 4.28 x $10^{-5}m^3mol^{-1}$and R = 8.314 $Jk^{-1}mol^{-1}$, Calculate Pc and Vc.

x) What do you mean by pseudo-unimolecular reactions? Explain the reaction of hydrolysis of methyl acetate in the presence of an acid.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B. Sc. (Part-III) (Semester-V) Examination
(Paper-XI): Organic Chemistry

Question Bank

Q. 2) Solve any Eight of the following. (16)

1) How will you distinguish the following compounds by using IR spectroscopy

a) CH_3-CH_2-OH b) CH_3-CH_2-CHO

2) Predict the product and name the reaction.

3) Write the preparation of diethyl malonate.

4) Define shielding and deshielding effect with suitable example

5) Draw the Newman's projection formulae of chair and boat conformations of cyclohexane.

6) Define Molecular ion peak with example.

7) Define the following.

i) Equivalent proton ii) Non-equivalent proton

8) State nitrogen rule. Give its importance

9) Assign the structure of following compound by using IR data

Mol. formula: $C_4H_8O_2$

IR: 2950, 1740, 1250 cm^{-1}

10) Define coupling constant with suitable example

11) Calculate fundamental modes of vibrations of methane

12) Calculate fundamental modes of vibrations of benzene

13) Write types of fundamental modes of vibrations

14) Define IR active and IR inactive transitions with example.

15) What is finger print region in IR spectra? Give its uses.

16) Write the characteristic stretching vibrations for following molecule

a) C_6H_5-$CONH_2$ b) C_6H_5-NH_2

17) What are magnetic and non-magnetic nuclei? Give its examples.

18) Write are the advantages of TMS.

19) Define peak area with suitable example.

20) Define basic principle of mass spectroscopy.

21) State Nitrogen rule.

22) Write the synthesis of ethyl 2 , 2 - dimethyl malonate

23) How will you prepare β - amino pyridine from nicotinamide and β- alanine from succinimide?

24) Draw boat conformation of cyclohexane and label the hydrogen.

25) Explain the acidity of methylene hydrogen of ethyl acetoacetate

26) Explain why the chair conformation of cyclohexane is more stable conformation than boat conformation.

27) Give limitations of Baeyer's strain theory.

28) What is meant by ring flipping or ring inversion in case of cyclohexane?

29) Explain the acidity of methylene hydrogen of ethyl acetoacetate.

30) Write the characteristic stretching vibrations for following molecule

b) C_6H_5-CO**O**H b) C_6H_5-**CHO**

31) Describe the preparation of ethyl aceto acetate.

32) Define magnetic and non - magnetic nuclei.

33) Write two types of stretching vibrations.

34) Explain keto-enol tautomerism with respect to ethyl acetoacetate.

35) How will you differentiate between tautomerism and resonance?

36) Explain the acidity of methylene hydrogen of diethyl malonate.

37) **Explain the principle involved in PMR spectroscopy.**

38) **What is a functional group region? Write its uses.**

39) Draw structure of axial and equatorial conformation of methyl cyclohexane

40) State Hookes law and giveits equation.

Q. 3) A) Attempt any Two of the following. **(10)**

a) Explain Wittig reaction with mechanism

b) Explain the term locking of conformation with suitable example.

c) Discuss the applications of Mass spectroscopy.

d) What is meant by reactive methylene group? How will you prepare butanoic acid from ethyl acetoacetate?

e) Explain the use of mass spectroscopy in Determination of molecular formula and molecular weight.

f) What are conformers ? Name and draw the different conformers of cyclohexane.

g) Write a note on Oppenauer oxidation.

h) What are the different types of ions formed in mass spectroscopy?

i) Explain Claisen condensation with its mechanism.

j) How will you differentiate primary, secondary and tertiary amines with the help of IR spectroscopy.

Q. 3) B) Short note/Solve **(06)**

a) Write a note on Oppenauer oxidation reaction and give its application.

b) Explain the term locking of conformation with suitable example.

c) Write notes on MPV reduction.

d) Explain 1,3 - diaxial interactions effect in case of methyl cyclohexane.

e) Assign the structure for the following compound using spectral data:

Molecular formula: $C_9H_{10}O_2$

IR: 1740, 1240, 750, 695 cm^{-1}

PMR: 1.96 δ (3H, s), 5.1 δ (2H, s), 7.10 δ (5H, s)

Q. 4 A) Attempt any Two of the following. **(08)**

a) Explain equatorial methyl cyclohexane is more stable than the axial methyl cyclohexane.

b) Discuss the various types of fundamental modes of vibrations.

c) How will you prepare the following from Diethyl malonate

1. Alanine (α-amino acid)
2. Barbituric acid

d) Give limitations / drawbacks of Baeyer's strain theory.

e) Compound A (C_8H_8O) on treatment with B ($C_8H_4O_4$) in the presence of sodium hydride forms C ($C_{14}H_{16}O_2$), which is a γ-lactone. Which on ring opening followed by acidification gives D ($C_{14}H_{16}O_4$) which is a unsaturated ester - acid. Identify A, B, C and D. Write equations and name the reaction.

f) Describe various factors whichaffect the magnitude ofchemical shift withsuitable example.

g) Write a note on rearrangement ions.

h) Discuss applications of IR spectroscopy.

i) Sketch the mass spectrometer and explain its working.

j) Describe the conformation of methyl cyclohexanol.

Q. 4) B) Describe/Explain/Solve **(08)**

a) Explain the conformations of cyclohexane with energy profile diagram.

b) Write a note on applications of IR spectroscopy

c) Discuss Reformatsky reaction with its mechanism Give any two applications of Reformatsky reaction.

d) Discuss Hofmann's rearrangement reaction with its mechanism. Give any two applications.

e) What is tautomerism ? Explain in detail keto - enol tautomerism exhibited by ethyl acetoacetate. Give different reactions which confirm keto and enol forms. Discuss the mechanism of interconversion of keto - enol form.

f) Explain the use of mass spectroscopy in determination of molecular formula and molecular weight.

Q. 5) Attempt any Two of the following. **(16)**

a) What is reactive methylene group? How will you prepare the following from EAA?

1. Ethyl-2-ethyl acetoacetate
2. Crotonic acid
3. 4-Methyl uracil

b) An organic compound A [$C_6H_{14}O$] has a t-methyl group and absorbs at 3300 cm^{-1}. On oxidation it yields a ketone carrying the same number of carbon atoms. On heating with conc. HCl, it yields compound B [$C_6H_{13}Cl$] which on hydrolysis gives compound C [$C_6H_{14}O$]. Name the reaction and identify A, B and C.

c) Assign the structure of following compounds by using spectral data

1. MF: $C_9H_{10}O_2$; IR: 1745, 1225, 749,697 cm^{-1}; PMR: 1.96 δ (s, 3H), 5.0 δ (s, 2H), 7.22δ (s, 5H)
2. MF: $C_4H_7O_2Br$; PMR: 4.2 δ (1H, t), 1.1 δ (3H, t), 2.10 δ (2H, quintet),10.5 δ (1H, s)

d) Explain Stobbe condensation with the help of suitable example and mechanism Give any two applications of Stobbe condensation

e) Explain spin - spin coupling . Assign structure to the compound having following spectral data. Name the compound.
Molecular formula: C_7H_8O, IR - 3500, 1600, 1500 cm^{-1}, PMR - δ3.7 (singlet, 1H), δ 4.4 (singlet, 2H), δ7.2 (singlet, 5H)

f) Write any two advantages of TMS as an internal reference standard in NMR spectroscopy. Assign the structure to the compound having following spectral data. Name the compound. Molecular formula: C_4H_8O, m / e = 72, IR = 1720 cm^{-1}, PMR - δ 1.05 (triplet, 3H), δ1.10 (singlet, 3H), δ 2.50 (quartet, 2H).

g) How will you prepare the following from malonic ester

i) succinic acid , ii) cinnamic acid , iii) barbituric acid

h) What is reactive methylene group? Give the synthesis of ethyl acetoacetate. Give its importance in the synthesis of following with suitable example: (a) dibasic acid (b) α, β - unsaturated acid (c) heterocyclic compound .

i) Discuss in detail stereoselective and stereospecific reactions with suitable example.

j) What are ylides? Explain the Wittig reaction with mechanism. Give its synthetic importance.

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Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc.-II Sem-III

Question Bank

Statistics Paper-V: Probability Distribution –I

Short Answer

1. Define probability density function of a continuous r. v. X.
2. Define c. d. f. of a continuous random variable.
3. Define A. M. of a continuous r. v.
4. Define H.M. of a continuous r. v.
5. Define mathematical expectation of a continuous r. v. X.
6. Define mode of a continuous r. v.
7. Define r^{th} raw moment of a continuous r. v. X.
8. Define r^{th} central moment of a continuous r. v. X.
9. Define moment generating function of a continuous r. v. X.
10. Define cumulant generating function of a continuous random variable.
11. If the p. d. f. of a continuous r. v. X is

$$f(x)=\begin{cases}\frac{1}{4}; -2\le x\le 2\\ 0; otherwise\end{cases}$$

Find $P(X\le 1)$

12. If the p. d. f. of a random variable Y is

$$f(y)=\begin{cases}ky(2-y); 0\le x\le 2\\ 0; otherwise\end{cases}$$

Find the value of k

13. If F(x) is a c. d. f. of a continuous r. v. X, then what are the values of $F(-\infty)\wedge F(+\infty)$?
14. If a r. v. X has p. d. f.

$$f(x)=\begin{cases}2x; 1<x<3\\ 0; otherwise\end{cases}$$

Find mean of X.

15. If X is a continuous r. v. with p. d. f.

$$f(x)=\begin{cases}e^{-2x}+1.5e^{-3x}; x\ge 0\\ 0; otherwise\end{cases}$$

Find mean of X.

16. If X is a r. v. with p. d. f.

$$f(x)=\begin{cases}6x(1-x);\ 0<x<1\\ 0;\ otherwise\end{cases}$$

Find H.M. of X.

17. If X is a continuous r. v. with p. d. f.

$$f(x)=\begin{cases}\frac{x^2}{3};-1\le x\le 2\\ 0;\ otherwise\end{cases}$$

Find median of X.

18. If c. d. f. of a continuous r. v. X is

$$F(x)=\begin{cases}0;\ x\le 0\\ 1-\frac{(2-x)^3}{8};\ 0\le x<2\\ 1;\ x\ge 2\end{cases}$$

Find Q_1, the lower quartile of X.

19. Let X be a continuous r. v. and P(X<3) =0.25 and P(X>5) 0.25, then find quartile deviation.

20. If $E(X \mid Y = y) = \frac{1+y}{2}$ and $E(Y \mid X = x) = \frac{1+x}{2}$ then find $byx \& bxy$.

21. If joint p.d.f. of (X, Y) is

$f(x, y) = 4xy$; $0<x, y<1$

$= 0$; otherwise

Find $P(0 < X < 0.5,\ 0.5 < Y < 1)$

22. If (X, Y) is a bivariate r.v. with unit variances and covariance 0.5, find corr. $\left[\frac{X}{2}, \frac{Y}{2}\right]$

23. For a continuous bivariate r. v. (X, Y), define conditional distribution of X given Y = y .

24. Suppose that (X, Y) is a bivariate r.v. with joint p.d.f.

f(x,y) = C ; $5 \le x \le 10$, $4 \le y \le 6$

= 0 ; otherwise

Find the value of C .

25. Define covariance between two continuous r. v. (X, Y)

26. If a r.v. X has p.d.f. $f(x) = \frac{c}{x}$; $1 < x < 3$ find the value of c .

27. If $f(x) = 3/2\ x^2$; $-1 < x < 1$

= 0 ; otherwise is p.d.f. of r.v. X then find p.d.f. of 2X.

28. If $F(x, y)$ is a joint c.d.f. of a bivariate continuous r.v. (X, Y) then what $F(x, \infty)$ gives ?

29. Define independence of continuous r.v.s X& Y.

30. Let X and Y be random variables with Var(X) = 4, Var (Y) = 9 & Var (X – Y) = 9

then find correlation coefficient between (X, Y).

31. Define conditional expectation of X given Y =y.

32. Define median of a continuous random variable.

33. Find mean of Poisson distribution with parameter λ.

34. Find probability generating function of negative Binomial distribution.

35. Obtain moment generating function of amultinomial distribution.

36. Find distribution function of geometric distribution.

37. Define multinomial distribution.

38. Obtain the probability generating function of waiting time distribution.

39. Define Poisson distribution, State its mean and variance.

40. Let X be geometric variate with parameter p, then show that $P[X \geq x] = (1-p)^x$

41. Define moment generating function (m.g.f.) of a continuous r.v. X. ,prove that $M_X(0) = 1$ and state uniqueness property of m.g.f.

42. Find the values of *k* such that the following functions are p.d.f. of a continuous r.v. X.

(a) $f(x) = k(x-1)^2 \quad ; \ 1 \leq x \leq 3$

(b) $f(x) = \dfrac{k}{1+x^2} \quad ; \quad -\infty < x < \infty$

43. The joint p.d.f. of a bivariate r.v. (X, Y) is

$f(x,y) = 2 \ ; \quad 0 < x < y < 1$

$= 0 \quad ; \quad$ otherwise

then find the conditional distribution of Y given X = *x*.

44. If $f(x,y) = 21\,x^2 y^3 \ ; \quad 0 < x < y < 1$

$= 0 \quad ; \quad$ otherwise

is a joint p.d.f. of (X, Y) find(a) marginal p.d.fs of X and Y (b) conditional distribution of X given Y = *y*.

45. Define C.D.F. of a continuous r.v. and state its four properties .

46. Let X and Y be continuous r.v.s with joint p.d.f.,

$f(x,y) = 12xy(1-y) \ ; 0 < x < 1 \ , \ 0 < y < 1$

$= 0 \ ;$ otherwise

Show that X and Y are independent r.v.s

47. A continuous r.v. X has pdf

$f(x) = \begin{cases} 2x, \wedge 0 < x < 1 \\ 0, otherwise \end{cases}$, Obtain probability distribution of Y = 2X+3

48. If X and Y are two r.vs. of continuous type, prove that

E[E(Y|X)] = E(Y)

49. If a continuous bivariate r.v. (X, Y) has the joint density function

$f(x,y)$ $= 4x$; $0<x<\sqrt{y}<1$

$= 0$; otherwise

Find marginal density of Y

50. Define marginal p.d.fs. of X and Y.

51. If X is a r.v. with c.d.f.

$= 0$; $x < -1 \quad x < -1$

F(x) $= \frac{x+1}{2}\frac{x+1}{2}$; $-1 \le x < 1 - 1 \le x < 1$

$= 1$; $x \ge 1 \quad x \ge 1$

Find (1) P(2 < X < 3) (2) $P\left(\frac{1}{2} < X < \frac{3}{4} \mid X > \frac{1}{4}\right) P\left(\frac{1}{2} < X < \frac{3}{4} \mid X > \frac{1}{4}\right)$

52. Define mode of a continuous r.v.and obtain mode of the r.v.havingp.d.f.

$f(x)f(x) = 0.5\, x^2 e^{-x} e^{-x}$; $x > 0 x > 0$

$= 0$; otherwise

53. Let (X,Y) be a continuous bivariate r.v. with joint p.d.f.

f(x,y) = 4 x (1 – y) ; 0 < x , y <1

= 0 ; otherwise

Calculate P (0 < X < 0.5 , Y < 0.25)

54. Prove that E(X+Y) = E(X) + E(Y)

55. For two independent random variables X and Y prove that,E(XY) = E(X) E(Y)

56. Verify whether the function

f(x) = x ; $0 \le x \le 1$

= 2 – x ; $1 \le x \le 2$

Is a p.d.f.of a continuous r.v. X.

57. If X is a r.v. with p.d.f.

f(x) = 3 x^2 / 2 ; - 1 ≤ x ≤ 1 the find p.d.f. of $Y = X^2$

58. A continuous r.v. X has the p.d.f.

$f(x)f(x) = A + B x$; $0 \le x \le 1$, A > 0 ,B ≥ 0 $x > 0$

= 0 ; otherwise

If the mean of X is 0.5 , find the values of A and B.

59. Let (X,Y) be a continuous bivariate r.v. with joint p.d.f.

f(x,y) = C ; $5 \le x \le 10$, $4 \le y \le 9$

= 0 ; otherwise

Determine the value of C.

60. Prove that E(X - Y) = E(X) - E(Y)

61. Explain how to find mode of a continuous random variable.

62. Verify whether the function given below is a p.d.f.of a continuous r.v.X

$$f(x) = 1 - |1-X||1-X| \quad ; 0 \le x \le 2$$

63. Suppose the joint p.d.f. of X and Y is

$$f(x,y) = \frac{33}{22} y^2 ; 0 \le x \le 2 \quad , 0 \le y \le 1$$

Find P (X ≤ Y).

64. Given joint p.d.f.of (X,Y),

f(x,y) = 8 xy , $0 \le x \le y \le 1$,find the marginal p.d.f.of X.

65. Derive Poisson distribution as a limiting case of a binomial distribution.

66. State and prove the lack of memory property of geometric distribution withparameter p

67. Find the recurrence relation for Poisson distribution.

68. Define negative binomial distribution with parameters r and p. Find its mean.

69. If X and Y are two independent Poisson variates, then show that the conditional distribution of X given $(X+Y)=n$ is a Binomial.

70. Define Geometric distribution with parameter p and obtain its mean and distribution function.

71. State and prove the additive property of negative binomial distribution.

72. Define negative binomial distribution with parameters r and p. Find its mean.

73. If X and Y are independent Poisson variates with means 2 and 4 respectively, then find $P\left(\frac{X+Y}{2}<1\right)$

74. Find Mean and variance of waiting time distribution.

75. State and prove the recurrence relation for probability of negative binomial distribution.

76. For a Poisson distribution $P(X=1)=0.03 \wedge P(X=2)=0.2$, find $P(X=0) \wedge P(X=3)$

77. Let X be Poisson variate with parameter λ If $P(X=5)=\frac{3}{10}P(X=4), find\ P(X>3)$

78. If $X \quad P(\lambda) such\ that\ P(X=x)=\frac{4}{x}P(X=x-1)$, find the probability mass function of X.

79. If $X \quad P(\lambda) such\ that\ P(X=0)=\frac{1}{2}, find\ E(X) \wedge V(X)$

80. If X follows Poisson distribution with parameter λ such that $P(X=1)=2P(X=2)$, find the probability mass function of X.

81. If $X \quad P(\lambda) such\ that\ P(X=2)=P(X=1), find\ P(X \ge 4)$

82. If $X \quad P(\lambda) such\ that\ P(X=2)=\frac{3}{4}P(X=1), P(X=0)$

83. The density function of X is

$$f(x)=\begin{cases} a+b\,x^2 ; 0 \le x \le 1 \\ 0 ; otherwise \end{cases}$$

If $E(X)=\frac{1}{5}$, find a and b

84. A system consisting of one original unit plus a spare can function for a random amount of time X. If the density function of X is given by

$$f(x)=\begin{cases} C x e^{\frac{-x}{2}}; x>0 \\ 0; otherwise \end{cases}$$

What is the probability that the system functions for at least 5 months?

85. Consider the function

$$f(x)=\begin{cases} C(2x-x^2); 0<x<\frac{5}{2} \\ 0; otherwise \end{cases}$$

Find the value of C.

86. A filling station is supplied with gasoline once a week. If its weekly volume of sales in thousands of gallons is a random variable with probability density function

$$f(x)=\begin{cases} 5(1-x)^4; 0\le x\le 1 \\ 0; otherwise \end{cases}$$

What must the capacity of the tank be so that the probability of the supply's being exhausted in a given week is 0.1?

87. Compute E(X) if X has density function given by

$$f(x)=\begin{cases} \frac{1}{4} x e^{\frac{-x}{2}}; X>0 \\ 0; otherwise \end{cases}$$

88. Compute E(X) if X has density function given by

$$f(x)=\begin{cases} \frac{5}{x^2}; x>5 \\ 0; x\le 5 \end{cases}$$

89. For some constant c, the random variable X has the probability density function

$$f(x)=\begin{cases} c x^n; 0<x<1 \\ 0; otherwise \end{cases}$$

Find (a) c and (b) $P[X>x], 0<x<1$

90. Suppose X is a continuous random variable with p.d.f. $f(x)=c(1-x^2)$ *for* $0<x<1$

Determine c and the distribution function.

91. Are we justified in considering?

$$f(x,y)=\begin{cases} x^2+\frac{xy}{3}; 0\le x\le 1, 0\le y\le 2 \\ 0; otherwise \end{cases}$$

to be the joint p. d. f. of the two dimensional continuous random variable (X, Y)?

92. Let X and Y be two random variables. Then for

$$f(x,y)=\begin{cases} k(2x+y); 0<x<1, 0<y<2 \\ 0; otherwise \end{cases}$$

to be a joint density function , what must be the value of k?

93. Let (X, Y) have the joint density function

$$f(x,y)=\begin{cases} 4xy; 0<x<1, 0<y<1 \\ 0; otherwise \end{cases}$$

Verify whether X and Y are independent

94. Let (X, Y) have the joint density function

$$f(x,y)=\begin{cases} \frac{2}{3}; 0<x<1, x<y<2 \\ 0; otherwise \end{cases}$$

Verify whether X and Y are independent.

Long Answer

1. Find p.d.f. and median of X if its distribution function is

$$F(x) = \begin{cases} 0 & ; \quad x<0 \\ \frac{x^2}{2}; & 0 \le x<1 \\ 2x-\frac{x^2}{2}-1 & ; \quad 1 \le x<2 \\ 1 & ; \quad x \ge 2 \end{cases}$$

2. If (X,Y) has joint p.d.f. $f(x,y) = 4xe^{-2y}$; $0 < x < 1$, $y > 0$

$= 0$; otherwise

Obtain i)the conditional distribution of Y given X ii) $E(Y/X)$

3. The p.d.f. of a r.v. X is given by

$f(x) = 2x$; $0<x<1$

$= 0$; otherwise

Show that A.M .> H.M.

4. If r.v. X has p.d.f. $f(x) = \begin{cases} 3x^2, & 0 < x < 1 \\ 0, & otherwise \end{cases}$ $f(x) = \begin{cases} 3x^2, & 0 < x < 1 \\ 0, & otherwise \end{cases}$

Find mean, variance and third quartile of X.

5. The joint p.d.f. of (X,Y) is given by

$f(x,y) = \begin{cases} kxy, & 0 \le x \le 1, \quad 0 \le y \le 1 \\ 0, & otherwise \end{cases}$ $f(x,y) = \begin{cases} kxy, & 0 \le x \le 1, \quad 0 \le y \le 1 \\ 0, & otherwise \end{cases}$

Find i) k ii) marginal p.d.f. of X and Y

6. If (X,Y) is a continuous bivariate r.v. with joint p.d.f.

$f(x,y) = 2-x-y$; $0<x<1, 0<y<1$

$= 0$; otherwise

find (1) marginal distribution of X and that of Y

(2) conditional distribution of X given $Y = y$

7. The p.d.f. of a r.v. X is given by

$f(x) = 2x$; $0<x<1$

$= 0$; otherwise

Find i) $P(-2 < X < 0.15)$ ii) Distribution function of X, hence find its median

8. Define conditional mean of X given $Y = y$ and prove that $E[E(X \mid Y = y)] = E(X)$

9. The joint p.d.f. of two dimensional continuous r.v.(X,Y) is

$f(x,y)f(x,y) = 2$; $0 < x < y < 1$

$= 0$; otherwise

Find i) marginal distributions of X and Y

ii) conditional distribution of X given $Y = y$

10. Let X and Y be continuous random variables having joint p.d.f.

$f(x,y) = 12\,xy\,(1 - y);\ 0 < x < 1,\ 0 < y < 1$

$= 0$; otherwise

Show that X and Y are independent.

11. The joint p.d.f. of two dimensional continuous r.v.(X,Y) is

$f(x,y)f(x,y) = x + y$; $0 \le x, y \le 1$

$= 0$; elsewhere

Find means and variances of X and Y.

12. The joint p.d.f. of a bivariate continuous r.v. (X,Y) is

$f(X,Y) = x + y$; $0 \le x \le 1$, $0 \le y \le 1$

$= 0$; otherwise

Obtain E (Y| X = x) and Var (Y | X = x)

13. The joint p.d.f of (X,Y) is

$f(x,y) = 4x^2 y^3$; $0 < x < y < 1$

$= 0$; otherwisw .

Find i) conditional distribution of X given Y = y

ii) conditional mean of x given Y = 0.5

iii) conditional variance of X given Y = 0.5

24. Define M.G.F. of a continuous r.v.and explain how to find r th raw moment using it.

25. If X and Y are two independent Poisson variates, then show that the conditionaldistribution of X given $(X+Y)=n$ is a Binomial. Also obtain p.g.f. ofPoisson distribution.

26. State and prove the additive property of negative binomial distribution. Also state and prove the recurrence relation for probabilities of negative binomial distribution.

27. If X and Y are independent Poisson variates, such that P[X =1] = P[X =2] and P[Y =2] = P[Y =3], then find

i) $P\left(\frac{X+Y}{2}<1\right)$ ii) Mean of (X+Y) iii) Variance of (X-2Y)

28. Define Geometric distribution with parameter p and obtain its mean and variance.

29. If X and Y are two independent Poisson variates such that X~P(1) and Y~P(2) then find

$(i)P\left(\frac{X+Y}{2}<1\right)(ii)P(2(X+Y)>4)(iii)P(X+Y>3)(iv)E(X+Y)(v)V(X+Y)$

30. If X and Y are independent Poisson variates such that $Var(X+Y)=3\wedge¿$

$P(X=1/X+Y=2)=\frac{4}{9}$, find the means of X and Y

31. If X and Y are independent Poisson variates such that $Var(X+Y)=9 \wedge ¿$

$P(X=3/X+Y=6)=\frac{160}{729}$, find the means of X and Y

32. If X and Y are independent Poisson variates such that $Var(X+Y)=9 \wedge ¿$

$P(X=3/X+Y=6)=\frac{5}{54}$, find the means of X and Y

33. If X and Y are independent Poisson variates such that $Var(X+Y)=3 \wedge ¿$

$P(X=2/X+Y=6)=\frac{80}{243}$, find the means of X and Y

34. Let X and Y be two independent Poisson random variates with means 4 and 5 respectively.

Find i) standard deviation of X+Y ii) $P(Y=3/X+Y=4)$

35. If X and Y are independent Poisson variates with $P(X=1)=P(X=2) \wedge P(Y=2)=P(Y=3)$ then, find i) $E(2X+Y) ii ¿ V(X-2Y)$

36. Let X be a random variable with probability density function

$$f(x)=\begin{cases} c(1-x^2); -1 \le x \le 1 \\ 0; otherwise \end{cases}$$

a) What is the value of c?

b) What is the cumulative distribution function of X?

C) Compute E(X) and V(X)

37. The probability density function of X, the life time of a certain type of electronic device (measured in hours) is given by

$$f(x)=\begin{cases} \frac{10}{x^2}; x>10 \\ 0; x \le 10 \end{cases}$$

a) Find $P(X>20)$

b) What is the cumulative distribution function of X?

c) What is the probability that, of 6 such types of device, at least 3 will function for at least 15 hours? What assumptions are you making?

38. For some constant c, the random variable X has the probability density function

$$f(x)=\begin{cases} ax+bx^2; 0 \le x \le 1 \\ 0; otherwise \end{cases}$$

i) If $E(X)=0.6$, find a and b

ii) $P\left(X<\frac{1}{2}\right)$

iii) Var(X)

39. Suppose the random variables X and Y have the joint density function defined by

$$f(x,y)=\begin{cases} k(2x+y); 2<x<6, 0<y<5 \\ 0; otherwise \end{cases}$$

Find a¿k b¿ $P(X>3, Y>2)$ c¿ $P(X>3)$ d¿ $P(X+Y<4)$

40. If X and Y have joint probability density function

$$f(x,y)=\begin{cases} \frac{3}{4}+xy; 0<x<1, 0<y<1 \\ 0; otherwise \end{cases}$$

Find a) Marginal density function of X.

b) Marginal density function of Y.

c) Conditional density function of X given $Y=y$.

d) Conditional density function of Y given $X=x$.

41. Let (X, Y) have the joint density function

$$f(x,y)=\begin{cases} 24xy; 0<x<1, 0<y<1, x+y<1 \\ 0; otherwise \end{cases}$$

Find a) Marginal density function of X.

b) Marginal density function of Y.

c) Conditional density function of X given $Y=y$.

d) Conditional density function of Y given $X=x$.

42. Let X and Y be bivariate random variables having joint density function

$$f(x,y)=\begin{cases} \frac{3}{5}x(x+y); 0\le x\le 1, 0\le y\le 2 \\ 0; otherwise \end{cases}$$

Find a) E(X) b) E(Y) c) E(X+Y) d) E(XY)

43. The joint p.d.f. of (X, Y) is given by

$$f(x,y)=\begin{cases} xe^{-x(y+1)}; x\ge 0, y\ge 0 \\ 0; otherwise \end{cases}$$

Find Cov(X, Y)

44. Let X and Y have joint probability density function

$$f(x,y)=\begin{cases} 1; 0<y<2x<2 \\ 0; otherwise \end{cases}$$

Find a¿ $E[X/Y=y]$ b) $V[X/Y=y]$

45. Let X and Y have joint probability density function

$$f(x,y)=\begin{cases} k(x+y+xy); 0<x<1, 0<y<1 \\ 0; otherwise \end{cases}$$

Find a¿k b¿ $E[X/Y=y]$

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc.-II Sem-III

Question Bank

Statistics Paper-VI: Statistical Methods

Short Answer

1. State the equation of plane of regression of X_1 on X_2 and X_3.
2. Define the partial regression coefficients $b_{13.2}, b_{21.3}$
3. Define the residual.
4. Find mean of residual.
5. State two properties of residual.
6. Define the residual $X_{1.23}$, show that
$$\sum X_{1.23}^2 = \sum X_1 X_{1.23}$$
7. Derive the expression for the variance of the residual $X_{1.23}$.
8. Define the residual $X_{1.23}$, show that
$\sum X_{1.23}^2 = \sum X_1 X_{1.23}$
9. Define multiple correlation coefficient.
10. Define Partial correlation coefficient.
11. If $r_{23} = 0$, then prove that $R_{1.23}^2 = r_{12}^2 + r_{13}^2$
12. Prove that $X_{1.23}$ is uncorrelated with X_2.
13. If $X_{1.23}$ is the error of the estimate of $X_1 on X_2 \wedge X_3$ and $e_{1.23}$ is the estimate of X_1 for given $X_2 \wedge X_3$, then show that $Cov(X_1; e_{1.23}) = V(X_1 - X_{1.23})$
14. If r_{12}, r_{13}, r_{23} are the simple correlation coefficient between $(X_1; X_2), (X_1; X_3) \wedge (X_2; X_3)$ respectively show that $r_{12}^2 + r_{13}^2 \geq 2 r_{12} r_{13} r_{23}$
15. State the relation of $r_{13.2} with b_{13.2} \wedge b_{31.2}$.
16. If $r_{12} = r_{13} = r_{23} = \rho$ then prove that $1 - R_{1.23}^2 = \frac{(1-\rho)(1+2\rho)}{1+\rho}$
17. If $r_{12} = \rho^3, r_{13} = \rho^2, r_{23} = \rho$ *Find* $R_{1.23}$
18. If $r_{12} = r_{13} = r_{23} = r$ then prove that $r_{12.3} = \frac{r}{1+r}$
19. If mean and S.D. of variate $X_i (i = 1,2,3)$ are zero and one respectively. If r_{ij} is the coefficient of correlation between $X_i \wedge X_j$ prove that $r_{12} + r_{32} + r_{31} \geq -\frac{3}{2}$
20. If $R_{1.23} = 1$ then show that $R_{2.13} = 1$. If $R_{1.23} = 0$ does it necessary that $R_{2.13} = 0$
21. *If* $r_{12} = r_{13} = r_{23} = \rho$, *then show that*

$$1-R^2_{1.23}=\frac{(1-\rho)(1+2\rho)}{(1+\rho)}$$

22. Show that a multiple correlation coefficient cannot be negative.
23. Define the partial regression coefficients $b_{13.2}$ ad $b_{12.3}$. Write the equation of regression plane of X_1 on X_2 and X_3.
24. Define the term statistic
25. Define a statistic giving two examples.
26. Explain with illustration 'population'.
27. Explain with illustration 'census survey'
28. Describe Sample survey.
29. State advantages of sampling method over census method.
30. Show that in case of SRSWOR expected value of the sample mean is population mean.
31. Explain the methods of sampling.
32. Show that in SRSWOR the probability of selecting a specified unit of the population at any given draw is equal to the probability of selecting it at the first draw.
33. Distinguish between SRSWR and SRSWOR.
34. In SRSWR show that $E(\overline{X})=\mu$
35. Explain the meaning and purpose of statistical quality control (S.Q.C.).
36. Explain the criteria of detecting lack of control in $\overline{X}$ and R charts
37. Explain the term defect.
38. Explain the term defectives.
39. Explain the term fraction defective
40. Define the terms :

    a) Defect b) Defective c) Fraction defective
41. What is process control?
42. What is product control ?
43. Explain the term assignable causes.
44. Explain the term chance causes.
45. Distinguish between process control and product control.
46. Distinguish between chance causes and assignable causes of variation.
47. Explain meaning of statistical quality control.
48. What is the theoretical basis of control chart?
49. Discuss the criteria for detecting lack of control
50. Explain the construction of control chart for number of defects when standards are not given.
51. Explain the construction of R chart when standards are given.
52. Explain the construction of $\overline{X}$ chart when standards are given.
53. Give the 3σ control limits for p-chart when standards are not given.

Long Answer

1. With usual notation, prove that

$$1-R^2_{1.23}=\left(1-r^2_{12}\right)\left(1-r^2_{13.2}\right)$$

2. Show that the necessary and sufficient condition that the three planes in case of trivariate distribution coincide is $r^2_{12}+r^2_{13}+r^2_{23}-2r_{12}r_{13}r_{23}=1$

3. If $X_1=Y_1+Y_2, X_2=Y_2+Y_3, X_3=Y_3+Y_1$ where Y_1, Y_2, Y_3 are uncorrelated variables each of which has zero mean and unit variance. Find multiple correlation coefficients between $X_1 \wedge (X_2, X_3)$

4. Derive the equation of regression plane of $X_1 on X_2 \wedge X_3$ by method of least square.

5. Explain the concept of partial correlation. If simple correlation coefficients are equal, show that partial correlation coefficients are also equal.

6. If $Z_1=X_1+X_2, Z_2=X_2+X_3, Z_3=X_3+X_1$ where X_1, X_2, X_3 are uncorrelated variables each of which has zero mean and unit variance. Obtain partial correlation coefficient between $Z_1 on Z_2 with respect ¿ Z_3$.

7. State the properties of residual and verify any one of them.

8. Obtain partial correlation coefficient of X_1 on X_2 when the effect of X_3 is eliminated in terms of simple correlation coefficients.

9. If $r_{12} \wedge r_{13}$ are given. Show that r_{23} must lie in the range $r_{12}r_{13} \pm \sqrt{\left(1-r^2_{12}-r^2_{13}+r^2_{12}r^2_{13}\right)}$ Further if $r_{12}=k \wedge r_{23}=-k$ show that r_{13} will be lie between $-1 \wedge 1-2k^2$

10. If X and Y are two independent variables with unit variances, then find the multiple correlation coefficient between $X \wedge X+Y, X-Y$

11. With usual notations prove that

$$b_{12.3}=\frac{-\sigma_1}{\sigma_2}.\frac{\omega_{12}}{\omega_{11}}$$

12. Obtain multiple correlation coefficient of $X_1 on X_2 \wedge X_3$ in terms of simple correlation coefficients.

13. State and prove the necessary and sufficient condition for coincidence of three regression planes.

14. With usual notation, prove that

$$R^2_{1.23}=b_{12.3}r_{12}\frac{\sigma_2}{\sigma_1}+b_{13.2}r_{13}\frac{\sigma_3}{\sigma_1}$$

15. If $R^2_{1.23}$ = 0 the prove that $|r_{23}| \geq \max [\ |r_{12}|, |r_{13}|$

16. If $X_1 = Y_1+Y_2$, $X_2 = Y_2+Y_3$, $X_3 = Y_3+Y_1$ where Y_1, Y_2 , Y_3 are mutually uncorrelated variables with mean zero and unit standard deviation, find $r_{12.3}$.

17. Define partial correlation coefficient. If the relation aX1+bX2+cX3 = 0 holds for all sets of values X1, X2 and X3 find $r_{12.3}$

18. Explain the concept of partial correlation. If simple correlation coefficients are equal, show that patial correlation coefficients are also equal.

19. If X and Y are two independent variables with unit variances, then find the multiple correlation coefficient between X and $X+Y$, $X-Y$

20. Obtain partial correlation coefficient of X_1 on X_2 when the effect of X_3 is eliminated in terms of simple correlation coefficients.

21. With usual notations, prove that

$$V\left(\bar{y}_n\right)=\frac{N-n}{Nn}S^2$$

22. Prove that in a simple random sampling without replacement sample mean square is an unbiased estimate of population mean square.

23. Give the 3σ control limits for p-chart when standard are not given. Also explain the working of p-chart.

24. With usual notations, prove that for SRSWR

$$V\left(\overline{Y}_n\right)=\frac{N-1}{Nn}S^2$$

25. Give the procedure of $\overline{X}$ chart and R chart when standards are not given.

26. Explain clearly the control limits of R- chart when standards are not given.

27. Explain the construction of $\overline{X}$ chart when standards are not given.

28. Explain the construction control chart for number of defects when standards are not given.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc.-II Sem-IV

Question Bank

Statistics Paper-VII : Probability Distributions-II

Short Answer

1. Define continuous uniform distribution.
2. If $X \quad U(-1/2, 1/2)$ then, state mean and variance of X.
3. If $X \sim U(-3, 2)$ then find $P(|X| \leq 2)$
4. If X U(0 , 1) state mean and variance of X.
5. Define exponential distribution with parameter θ, also find its m. g. f.
6. State the forgetfulness property of an exponential distribution.
7. State c. d. f. of an exponential distribution with parameter $\theta = 2$.
8. State three quartiles of exponential variate with parameter 1
9. State the distribution of $\frac{X}{X+Y}$,where X and Y are independent gamma variates.
10. If $X \quad G(8, \lambda)$ then state the distribution of 2X.
11. If X G(α , λ) then what is the distribution of CX,if C is a positive constant?
12. If X is a G (1/2 ,n/2) variate then what is Var(X)?.
13. State additive property of a gamma distribution.
14. Define gamma distribution with two parameters.
15. State m.g.f. of G (α , λ).
16. Find harmonic mean of a beta variate of first kind.
17. State the distribution of $\frac{X}{1+X}$,if X is a beta variate of second kind.
18. Define beta distribution of 2nd kind.
19. State the relation between beta distributions of first and second kind .
20. Define beta distribution of first kind
21. Show that uniform distribution is a particular case of beta distribution of first kind.
22. Define beta distribution of second kind.
23. State mean of β_1 (m ,n) .
24. State H.M. of β_2 (3 , 4).
25. If X_1 N(0 , 1) , $X_2 \quad N\left(0, \frac{1}{2}\right)$ and are independent then state the distribution of $Y = X_1^2 + 2X_2^2$.
26. If $N(0,1)$, then state its mean and variance .

27. Define normal distribution.

28. State mean and variance of X if f(x) = $\frac{1}{\sqrt{2\prod}}$ exp ($-½(x-5)^2$¿ ; - ∞ < x < ∞

29. If X N(1 , 4) , Y N (2 , 4) are independent variates then state p.d.f. of Z = X + 2 Y

30. Define standard normal variate.

31. State any four properties of normal distribution

32. State the relation between S.N.V. and χ^2 variate with n d.f.

33. Define χ^2 variate with n d.f.

34. Write m.g.f. of a chi square variate with n d.f.

35. Define chi square distribution with nd.f.

36. Define the p.d.f. of a chi square variate with 1 d.f.

37. Give the mean and variance of chi square variate with 10 d.f.

38. State the m.g.f. of a chi square variate with n d.f.

39. What is the mode of a chi square variate with nd.f.?

40. State mean and variance of a square of an S.N.V.

41. State m.g.f. of chi-square variate.

42. State additive property of Chi square distribution with n d.f.

43. Show that all odd order central moments of t distribution are zero.

44. Define t statistic.

45. Define t-variate with n d.f.

46. State mean and variance of t distribution with n d.f..

47. State relation between F and χ^2variates.

48. What is the distribution of ratio of two independent chi square variates?

49. What are the ranges of F, χ^2 and t variates.

50. Define an F variate with n_1 , n_2 d.f.

51. State relation between F and *t* variates.

52. State mode of F (n_1 , n_2) .

53. If X is a r. v. with p.d.f. f(x) = θ $e^{-\theta x}$; x > 0 , θ > 0

= 0 ; otherwise

find the distribution of Y = θX.

54. Find the distribution function of a r.v. X if its p.d.f. is

f(x) = $\frac{1}{2}$ $e^{-|x-5|}$; - ∞ < x < +∞

55. Find m.g.f. of gamma distribution with parameter (α, λ)

56. State and additive property of gamma variate

57. Define gamma distribution with two parameters and state its mean.

58. Define beta distribution of second kind and find its mean.

59. If $X \sim \beta_1(m,n)$, then find the distribution of $(1-X)$

60. Define beta distribution of 1st kind and state its mean.

61. If $X \sim \beta_1(m,n)$ then find distribution of (1 – X)

62. If X and Y are i.i.d, N(3,9) random variables, then obtain the distribution of $Z=2X+3Y$

63. If $X \sim N(0,1), Y \sim N\left(0,\frac{1}{2}\right)$ and are independent, then find the distribution of X^2+2Y^2

64. If $X_1 \sim$ N(0 , 1), $X_2 \sim N\left(0,\frac{1}{2}\right)$ and are independent then find the distribution of ($X_1^2 + 2X_2^2$)

65. ii) If $X \sim N(0,1)$, then find the distribution of X^2

66. Find moment generating function of Chi-square distribution with n. d.f.

67. Find mode of chi-square distribution with n d.f.

68. Define student t distribution with n d.f. and find its mean

69. Find mean of t variate with n d.f.

70. Find mode of student t- distribution with n d.f.

71. Show that all odd order central moments for t distribution vanish

72. Define Snedecor's F distribution and state its mean with n_1, n_2 d.f.

73. If $F \sim F(n_1,n_2)$ distribution, then find the distribution of $\frac{1}{F}$

74. If X is a t – variate with n d.f. , show that $Y = X^2$ follows F distribution with (1 , n) d.f.

75. If $X \sim \beta_2(m,n)$, find the distribution of $\frac{X}{X+1}$

76. If X ~G(α, λ), find the distribution CX,where C is a positive constant.

77. Find m.g.f. of X if X ~ N(0 , 1)

78. If X ~ $\beta_2(m,n)$ distribution of X / (1 + X)

Long Answer

1. Define exponential distribution with parameter θ and find its mean and variance.

2. If X is a r.v. with p.d.f.

$$f(x) = 2e^{-2x} \quad ; \quad x>0$$
$$= 0 \quad ; \quad \text{otherwise}$$

find m.g.f. hence or otherwise find first 4 central moments X.

3. If $X \sim$ U(1 , 2) , find mean of X and also find K such that P[X >(K + μ_1')] = 1/4 .

4. If X ~ U(a, b) obtain the distribution of (a) $Y = \frac{X-a}{b-a}$ (b) $Y = \frac{b-X}{b-a}$

5. If X is a continuous r. v. with c.d.f.$F_x(X)$ then prove that $Y=F_x(.)$ has uniform distribution. Hence find $P[a \le F_x(X) \le b]$ where $0 \le a \le b \le 1$

6. Define continuous uniform distribution. Find its mean, variance.

7. Obtain the distribution of $Y = \frac{-1}{\theta}\log_e X$, $\theta > 0$ where X is U(0, 1) r.v. Also define the exponential distribution with scale and location parameters.

8. Define beta distribution of first kind with parameters m and n. Find its mean and variance.

9. Find median and mode of Normal distribution.

10. State and prove relation between t and F distribution.

11. Obtain the distribution of sum of i.i.d. exponential variates with parameter θ.

12. State and prove additive property of normal distribution.

13. Find mode of F variate with (n_1, n_2) d. f.

14. If $X \quad G(\alpha, \lambda_1), Y \quad G(\alpha, \lambda_2)$ are independent random variables, then find the distribution of $\frac{X}{Y}$

15. State m.g.f.of a N(0,1) and determine the values of the coefficients of skewness and kurtosis Γ_1 , Γ_2.

.16. Derive the p.d.f. of Chi-square variate with n d.f.

17. Let the p.d.f. of Normal variate be

$$f(x) = k\, e^{\frac{-1}{50}(x^2-20x+100)} \quad -\infty < X < \infty$$

Find value of K, mean and variance of X.

18. Find mean and variance of beta distribution of second kind.

19. State and prove relation between F and χ^2 distribution.

20. Define Chi-square distribution with n d.f. Obtain its mean and variance.

21. If $X \quad N(\mu_1, \sigma_1^2) Y \quad N(\mu_2, \sigma_2^2)$ and are independent, then find distribution of $Z = AX + BY + C$ where A,B and C are independent.

22. Prove that sum of i.i.d exponential variates is a gamma variate.

23. Find mean and variance of $G(\alpha, \lambda)$

24. Define F variate with (n_1, n_2) d.f. and find its mean.

25. If X ~G(α, λ_1), Y ~ G(α, λ_2) are independent r. v.s then find the distribution of $\frac{X}{Y}$

26. If $X \quad N(\mu, \sigma^2)$, then state its m. g. f. , hence or otherwise show that coefficient of skewness $\beta_1 = 0$

27. If $F \quad F(n_1, n_2)$ variate, then find its mode.

28. Show that all odd order central moments of student's t distribution are zero.

29. Find the mean and H.M. of beta variate of second kind.

30. Define F distribution with n_1 , n_2 d.f.and obtain its mean.

31. Let the p.d.f. of a normal variate be

$$f(x) = K \exp(-1/18 (x^2 - 10x + 25)] ; \ K > 0, \ -\infty < x < \infty$$

Find the values of K , mean and variance of X.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc.-II Sem-IV

Question Bank

Statistics Paper-VIII : Applied Statistics

Short Answer

1. Define Alternative Hypothesis
2. Define Type-I error
3. Define Composite Hypothesis
4. Define Critical Region
5. Explain One-tailed test.
6. Define Simple hypothesis
7. Explain Two-tailed test.
8. Define Null hypothesis.
9. Define Level of significance
10. Explain what is a simple hypothesis. Give an example.
11. Define Type I error and Type II error.
12. Define level of significance and critical region.
13. State Central limit theorem
14. Define CDR
15. Explain the need of vital statistics.
16. Define GRR.
17. Define TFR.
18. Define Crude Death Rate (CDR) and Crude Birth Rate (CBR).
19. State various measures of fertility and compare them.
20. Distinguish between Total Fertility Rate (TFR) and Gross Reproduction Rate (GRR)
21. Define General Fertility Rate (GFR). Also state the merits and demerits of GFR.
22. Define Crude Birth Rate (CBR). State the merits and demerits of CBR.
23. Define Crude Death Rate (CDR). State the merits and demerits of CDR.
24. Describe the procedure to test for testing population mean $\mu = \mu_0$ based on t- distribution.
25. State the procedure to test the equality of means for paired observations by using t- test.
26. How can one test the hypothesis of equality of two population correlation coefficients by using Fisher Z- transformation
27. Describe the test procedure (based on Normal distribution) for testing the specific value of population proportion $P = P_0$.

28. Describe the large sample test for testing the equality of means $\mu_1 = \mu_2$.

29. Explain the test procedure for testing the goodness of fit.

30. A symmetric dice is thrown 600 times. Find the lower bound for the probability of getting 80 to 120 sixes.

31. For the distribution with pmf $p(x) = 2^{-x}$ $x = 1, 2, 3, \ldots$; prove that Chebycheve's inequality gives $P(|X - 2| \leq 2) \geq \frac{1}{2}$, while the actual probability is $\frac{15}{16}$.

32. Suppose for a r.v. X , $E(X) = \mu$ and $S.D.(X) = \sigma$. Is it logical to say that

    $P(\mu - 2\sigma < X < \mu + 2\sigma) = 0.60$.

33. Use Chebyshev's inequality to determine how many times a fair coin must be tossed in order that the probability will be at least 95% that the ratio of number of heads to number of tosses will be between 0.45 to 0.55 .

34. State and prove Chebychev's inequality. Use it to prove that in 2000 throws with a coin the probability that the number of heads lies between 900 and 1100 is at least $\frac{19}{20}$.

35. If X is a Uniform $(-\sqrt{3}, \sqrt{3})$ r.v. Find the upper bound for $P(|X - \mu| \geq \frac{3}{2}\sigma)$.

36. What is a time series? Give four illustrations of time series in different fields.

37. Define 'Time series' and give illustrations of time series from various fields.

38. Discuss the importance and utility of time series analysis in various fields.

39. Discuss the four components of time series.

40. What do you mean by 'Secular trend '? Give two illustrations.

Short Answer

1. Define Gross Reproduction Rate (GRR) and Net Reproductive Rate (NRR). Also state the limitations of GRR.

2. Explain Age- specific fertility rate and Total Fertility Rate (TFR). Also state the limitations of TFR.

3. Define the age-specific death rate and age- specific fertility rate. Also give an interpretation of total fertility rate.

4. Describe the procedure for testing $H_0 : \mu = \mu_0$ and $H_0 : \mu_1 = \mu_2$ based on normal distribution.

5. Describe the procedure for testing

   a) $H_0 : P = P_0$ against $H_1 : P \neq P_0$ and

   b) $H_0 : P_1 = P_2$ against $H_1 : P_1 \neq P_2$ based on normal distribution

6. Explain the test procedure for testing

   a) the goodness of fit

   b) the independence of attributes in case of m×n contingency table.

7. For the 2×2 contingency table, prove that the chi-square test for independence given

$$\chi^2 = \frac{N(ad-bc)^2}{(a+c)(b+d)(a+b)(c+d)}$$

8. A r.v. X is such that E(X) = 3 and E(X^2) = 13.
   i) Find least value for P($|X-3| < 4$)
   ii) Determine lower bound for P($-2 < X < 8$)
   iii) Find the upper bound for P($|X-3| > 8$) iv) find the value of 'C' such that P($|X-3| < C$) > 0.99
   iv) find the value of 'C' such that P($|X-3| < C$) > 0.99

9. Illustrate with examples the following terms: i. Secular trend ii. Seasonal variations iii. Cyclical variations iv. Irregular variations

10. Explain the different components of a time series with illustrations.

11. Discuss the merits and demerits of i. moving average method ii. least square method used for the estimation of trend

12. Explain when the least square method of estimation of trend is suitable as compared to moving average method

13. Explain the method of simple averages for obtaining indices of seasonal varitions. Discuss its merits, demerits.

PAH Solaur University, Solapur
Biochemistry

B.Sc. II Sem III Paper-I (Biomolecules)
Question Bank

Que – 2. **2 marks each**

1) What are oligosaccharides?
2) Write the structures of glyceraldehyde and dihydroxy acetone.
3) Write the any two structures of pentose carbohydrate.
4) Write the structures of maltose and isomaltose.
5) Write the reaction of monosaccharide.
6) Define aldoses and ketoses.
7) Write the functions of non-protein amino acids.
8) Write two physical properties of amino acids.
9) Define complex protein and derived protein.
10) Define apoenzyme and holoenzyme.
11) Define coenzyme and prosthetic group.
12) Write ninhydrin reaction.
13) What are the components of nucleic acids?
14) Define nucleoside and nucleotide.
15) Write the functions of mRNA.
16) Write the functions of tRNA.
17) What is phosphodiester linkage?
18) Write the structure of mRNA and rRNA.
19) What is biochemical role of retinol?
20) Write the deficiency disorders of thiamine.
21) Write the structures of niacin and riboflavin.
22) What are vitamins? Write examples.
23) What are the sources of pantothenic acid?
24) What is biochemical role of riboflavin?
25) What is fluid mosaic model?
26) Define simple lipid and derived lipid.
27) Define spingo-lipid and phospholipid.
28) What are functions of cholesterol?
29) Write the structure of carotene.
30) Write the functions of fatty acids.

Que – 3. **4 Marks each**

1) Write note on fluid mosaic model of plasma membrane.
2) Write classification of lipids.
3) Write function and structure of fatty acid and triglyceride.
4) Write structure and function of terpenes and carotenes.

5) Write note on compound lipids.
6) Write note on derived lipids.
7) Write differences between water soluble and fat soluble vitamins.
8) Write biochemical role and deficiency disorder of pyridoxine.
9) Write biochemical role and deficiency disorder of thiamione.
10) Write the sources and biochemical role of retinol.
11) Write the sources of riboflavin and their coenzyme forms.
12) Write deficiency disorder of niacin and their coenzyme forms.
13) Write distinction between DNA and RNA.
14) Explain Watson-Crick model of DNA.
15) Write the structure and function of rRNA.

Que – 4. 4 Marks each

1) Explain two components of nucleic acid.
2) Write structure and function of mRNA.
3) Explain nucleotide and nucleoside.
4) Write the classification of amino acids.
5) Write the chemical properties of amino acids.
6) Write note on albumin and globulin.
7) Write the classification of enzymes.
8) Explain quaternary structure of protein.
9) Write the functions of nonprotein amino acids.
10) Write the structure and role of mannose.
11) Explain the role of any two hexoses.
12) Write the structure and role of sucrose and cellobiose.
13) Write structure and role of ribose and ribulose.
14) Write the note on derivatives of monosaccharides.
15) Explain polysaccharide with glycogen and cellulose.

Que – 5. 8 Marks each

1) Define pentose and hexose. Write structure and role of xylose, xylulose and fructose.
2) Define polysaccharide and write structure and role of starch and cellulose.
3) Define protein. How peptide bond is formed? Explain secondary structure of protein.
4) Write chemical properties of amino acids. Write note on Zwitterions and pI.
5) Write sources, biochemical role and deficiency disorder of retinol and thiamine.
6) Write sources, biochemical role and deficiency disorder of niacin and riboflavin.
7) Write distinction between DNA and RNA. Write structure and function of tRNA.
8) Explain Watson - Crick Model of DNA. Write note on representation primary structure of polynuceotide.
9) Explain Lipid bilayer- Fluid mosaic model of plasma membrane. Write structure and function of triglyceride.
10) Write classification with example of lipids. Explain simple lipids.

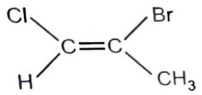
PAH Solaur University, Solapur

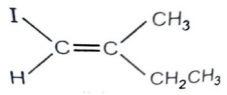
B.Sc. II Sem III Paper-V (Organic Chemistry)
Question Bank

Que – 2. **2 marks each**

1) What is diazotisation? Write one example.
2) Write one synthetic application of benzene diazonium chloride.
3) Write a note on azo coupling.
4) How benzene is prepared from benzene diazonium chloride?
5) What are unsaturated carboxylic acids? Write one example.
6) Write the synthesis of acrylic acid from acrolein.
7) Write the reaction involved in conversion of phthalic acid to phthalic anhydride.
8) What happens when citric acid reacts with acetic anhydride?
9) What are simple and mixed ethers?
10) How anisole is prepared from diazomethane?
11) Write reaction involved in ethylene oxide with C_2H_5OH/H^+.
12) What are epoxides? Write one example.
13) Define aldehydes and ketones.
14) What is Benzoin condensation?
15) Explain perkin reaction with one example.
16) Explain reactivity of carbonyl group.
17) Write one method of preparation of ethylene glycol.
18) Write the reaction involved when phenol reacts with C_2H_5I in the presence of aq. NaOH.
19) Write the preparation of glycerol.
20) What are trihydric alcohols? Write one example.
21) Explain acidic nature of glycerol.
22) Define configuration and conformations.
23) What are aldoximes. Write one example.
24) Explain conformational isomerism with example.
25) Assign E and Z nomenclature for following compounds.

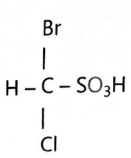
a) b)

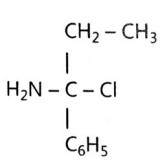




26) Assign R and S nomenclature for following compounds.

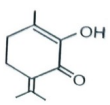
a) b)

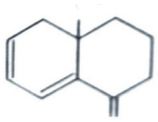




27) Calculate the λmax for following compounds.

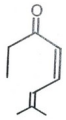
a) b)





28) Define the terms Hypochromic shift and Hypsochromic shift.
29) Explain chromophore with example.
30) Calculate the λmax for following compounds.

a) b)



Que – 3. **4 Marks each**

1) Write the synthesis of methyl orange and congo red.
2) Write two synthetic applications of benzene diazonium chloride.
3) Starting from benzene diazonium chloride how will you prepare phenyl hydrazine and bromobenzene.
4) Starting from benzene diazonium chloride how will you prepare benzene and iodobenzene.
5) Explain Hell-Volhard-Zelinsky reaction for preparation of haloacids.
6) Write preparation reaction of malic acid and its uses.
7) How phthalic acid is converted into phthalic anhydride and phthalamide?
8) Write the synthesis of acrylic acid from acrolein.
9) Write the reactions when citric reacted with acetic anhydride and HI.
10) Explain Williamson's synthesis.
11) What are epoxides? Explain base catalysed ring opening of ethylene oxide.
12) Write note on Cannizzaro's reaction.
13) Explain Benzoin condensation reaction with mechanism.
14) Write the general mechanism of nucleophilic additions to carbonyl group.
15) Write note on Perkin reaction.

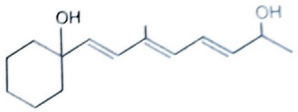
Que – 4. **4 Marks each**

1) Write two methods of preparation of ethylene glycol.
2) Write the reactions when glycerol reacts with HCl and $KHSO_4$.
3) Write note on Fries rearrangement.
4) Write note on Kolbe's reaction.
5) Write note on determination of configuration of aldoximes.
6) Write note on Beckmann transformation.
7) Write note on conformational analysis of ethane.
8) What is conformational isomerism? Draw n-butane structure using Saw-Horse, Fischer and Newmann's projection formulae.
9) Explain Beer-Lamberts law.
10) Write note on different types of electronic transitions.
11) Explain the terms auxochrome, bathochromic shift, hypochromic shift and chromophore.
12) Write the applications of UV spectroscopic method.

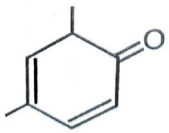
13) In Zeisel's method 1.09 x 10^{-5} kg of organic compound gives 1.26 x 10^{-5} kg dry AgI. Molecular formula of organic compound is $C_{11}H_9NO_3$. Calculate the percentage and number of $-OCH_3$ groups per molecule.

14) Calculate the λmax for following compounds.

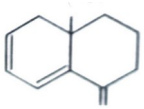
a)



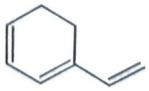
b)



c)



d)



15) In Zeisel's method 0.182 x 10^{-3} kg of an organic compound gave 0.470 x 10^{-3} kg of AgI. Calculate the percentage and number of $-OCH_3$ groups per molecule. (Molecular weight = 182).

Que – 5. **8 Marks each**

1) What is azo coupling? Write synthesis and uses of methyl orange and congo red.
2) What is diazotisation? Explain the reactions of benzene diazonium chloride when N_2 is lost.
3) What is dicarboxylic acid? Write the method of preparation and uses of succinic acid and phthalic acid.
4) What are unsaturated carboxylic acids? Write the methods of preparation and uses of acrylic acid and cinnamic acid.
5) Explain the estimation of methoxy group in an organic compound by Zeisel's method.
6) Explain with mechanism perkin reaction and benzoin condensation.
7) What are glycols? How ethylene glycol prepared? Write reactions of ethylene glycol with a) HCl b) sodium c) periodic acid d) lead acetate.
8) What is geometrical isomerism? Explain "E" and "Z" nomenclature system with example.
9) Explain different types of electronic transitions in UV spectroscopy. Write applications and advantages of UV spectroscopy.
10) Explain Willamson's synthesis for preparation of anisole. Write mechanism in reaction of anisole with HI.

P.A.H. Solapur University, Solapur

B.Sc. III Microbiology, Semester- VI

DSE -2-B Paper MIC- XIV: Environmental Microbiology

Question Bank

Questions 1 mark

1) Define Benthic zone
2) What is algal bloom?
3) Name the method by which DO can be determined.
4) Name the waste generated by distillery industry.
5) Which organism produces Xanthan gum?
6) Name the oxidising agent used in COD determination.
7) Long form of RDAC.
8) Andersen sampler is used for sampling of ____.
9) Name the important organism used for bioleaching.
10) Carbon capture is nothing but carbon____.
11) Name the important elements responsible for eutrophication.
12) Which method of sewage treatment produces Zoogleal film.
13) Define in situ leaching
14) What is bioleaching?
15) Example of oligotrophic lake.
16) Example of eutrophic lake.
17) What is MEOR?
18) Give meaning of Biosafety.
19) Name the ores of copper.
20) Aerated lagoon is method used for____.
21) Black liquor is the waste of ___ industry.
22) Use of Microbial surfactants.
23) Sulfolobus acidocaldarius is an example of which type of organism.
24) Which compound is tested in BOD test?
25) Name the indicator used in COD determination.
26) State the temperature and time of incubation for BOD test.
27) Define activated sludge.
28) Name the major gas produced in sludge digestion.
29) Which raw material is used in distillery industry?
30) Enlist two organisms involved in bioleaching.

Questions 2 marks

1. Define biosafety
2. Define bioaerosols
3. Significance of microorganisms in air
4. Define eutrophication
5. Role of Recombinant DNA Advisory committee

6. Define B.O.D
7. Define COD
8. Define Bioleaching
9. Examples of organisms involved in bioleaching
10. Carbon credit
11. Define carbon sequestration
12. Define fresh water bodies with examples
13. Define waste water and name different types of wastes
14. Explain different methods of commercial bioleaching
15. What is IBCC
16. Define bioremediation
17. Define primary oil recovery
18. Define extremophile
19. Define psychrophile
20. Define thermophile
21. Define ecosystem
22. Define Phytoplankton with example
23. Explain Zooplankton with example
24. Write a note on Oligotrophic lakes
25. Comment on Dystrophic lakes
26. What is slope leaching?
27. Enlist any two natural carbon sinks
28. Define One Carbon Credit
29. Enlist limiting factors for algal growth
30. What is NIH ?
31. Significance of BOD
32. Significance of COD
33. Bioremediation of mercury.
34. Bioaerosol control by filtration
35. What is impingement?
36. What is deposition of aerosols
37. Significance of aerosol.
38. Transport of aerosols
39. Explain phytoremediation and for what purpose it is used?
40. What is TS and TSS?

Questions - 4 marks-

1) Note on Barophiles with examples
2) Microorganisms in marine environment
3) Note on iron leaching
4) Characteristics of dairy industry waste
5) Characteristics of textile industry waste
6) Characteristics of distillery industry waste
7) Characteristics of Sugar industry waste
8) Define Eutrophication and explain classification of lakes on the basis of nutrition
9) Significance of microorganisms in air

10) Biochemistry of microbial leaching
11) Define eutrophication and explain sources of eutrophication
12) Definition and objectives of biosafety
13) Oxidation ponds and Aerated lagoons
14) Write a note on role of microorganisms in detection of oil reservoirs
15) Explain the significance of Carbon Credit in minimizing green-house effect

Questions 5 marks

1. Trickling filter
2. Activated sludge process
3. Effects of eutrophication
4. Control of Eutrophication
5. Characteristics of marine microorganisms
6. Define Bioleaching. Give in detail Copper leaching
7. Define Bioleaching. Give in detail Uranium leaching
8. General characteristics of thermophiles
9. General characteristics of psychrophiles
10. General characteristics of osmophiles.
11. Write a note on different methods of carbon sequestration?
12. Explain sugar industry as zero waste industry
13. Give significance of lead and mercury as pollutant.
14. Explain what is Institutional biosafety committee and its role

Questions 6 marks

1) Discuss sources of eutrophication? Enlist control measures for the same

2)Write in detail on physiochemical and biological consequences of eutrophication.

3) Comment on preventive and curative measures for eutrophication.

4) define oil recovery. Explain methods of EOR.

Questions 8 Marks

1) Define Biological waste water treatment and describe various methods used in the same.
2) Explain regulatory framework of biosafety in India
3) Define oil recovery and explain various methods used in MEOR.
4) Describe various methods of sampling of air.
5) General characteristics of Acidophiles and Alkaliphiles.
6) Characteristics and treatment of paper and pulp industry waste
7) Define Bioremediation and describe various methods of bioremediation of metals.
8) Biosafety in microbiology laboratory
9) What is Bioleaching? Describe bioleaching process for Uranium and copper
10) Explain primary and secondary methods of oil recovery

11) Define extremophiles. Describe general characteristics of thermophiles and psychrophiles.

12) Explain the methods to study aquatic microorganisms

13) Explain the significance of microorganisms in air & transport & deposition of aerosols.

14) Write different parameters used for characterization of industrial waste.

15) Write an essay on characteristics and treatment of waste water from Sugar and distillery industry.

PAH Solaur University, Solapur

Chemistry
B.Sc. III Sem V Paper-XI (Organic Chemistry)
Question Bank

Que - 2. **2 marks each**

1) Write the preparation of diethyl malonate.
2) What is reactive methylene compounds?
3) What is tautomerism?
4) How ethyl acetoacetate is prepared?
5) Explain keto-enol tautomerism.
6) How will you prepare ethyl-2-methyl acetoacetate from ethyl acetoacetate?
7) How will you prepare ethyl methyl malonate from diethyl malonate?
8) Write the conversion of diethyl malonate to barbituric acid.
9) Write the conversion of ethyl acetoacetate to 4-methyl uracil.
10) Write one synthetic application of Wittig reaction.
11) What is ylides. Write one example.
12) Write the reaction with crotonaldehyde using MPV reduction.
13) Write the statement of Reformatsky reaction.
14) Write one synthetic application of Oppenaur oxidation.
15) Write the statement of Oppenaur oxidation.
16) Write the statement of stobbe condensation.
17) Write the reaction of benzamide by using Hofmann rearrangement reaction.
18) What are the limitations of Baeyer's strain theory?
19) Explain locking of conformation with example.
20) What are stereoselective reactions?
21) Explain angle strain and steric strain.
22) What is conformational isomerism?
23) What are stereospecific reactions?
24) What are axial and equatorial bonds?
25) Draw Newman's projection formulae for chair and boat cyclohexane.
26) Write principle of mass spectroscopy.
27) What is mass spectrum?
28) What are molecular ions and isotope ions?
29) What are fragment ions and complex ions?
30) Write two applications of mass spectroscopy.
31) State nitrogen rule.
32) What is (M+2) peaks in mas spectroscopy?
33) What are metastable ions and isotope ions?
34) Write principle of PMR spectroscopy.
35) Define nuclear resonance.
36) What is deshielding effect?
37) What are magnetic nuclei?
38) What is splitting of signals?
39) What are equivalent protons?
40) What is chemical shift?
41) Define coupling constant.

42) What are non-magnetic nuclei?
43) Write the principle of IR spectroscopy.
44) What is selection rule?
45) Write characteristic absorption frequencies for $–NH_2$ and – C ≡ C -
46) What is Hooke's law?
47) What is functional group region?
48) Write characteristic absorption frequencies for – O- H of alcohol and –C ≡ N
49) Write advantages of finger print region.
50) Mention different types of fundamental modes of vibrations.

Que. 3 A) **5 Marks each**

1) A compound shows max at 217 nm in UV spectrum and the IR band at 1620 cm^{-1}, 990 cm^{-1}, 910 cm^{-1}.The molecular formula of the compound is C_4H_6. Find its structural formula.
2) Draw the schematic diagram of double beam IR spectrophotometer.
3) An organic compound has the molecular formula C3H6O. It shows bands at 1720 cm^{-1} and 2720 cm^{-1} in its IR spectra. Find the structural formula of the compound.
4) What is an internal standard in NMR spectroscopy? Why it is a good standard?
5) What Information is obtained from the peak area in NMR spectroscopy?
6) How many sets of equivalent protons are present in following compounds?
   a) CH_3CHBr_2 b) CH_3-O-CH_3 c) CH_3-CH_2-NO_2 d) Cl-CH_2-CH_2-Cl d) C_6H_6
7) Explain formation of ions in mass spectroscopy.
8) Explain the use of mass spectroscopy in determination of molecular weight.
9) Molecular formula $C_5H_{10}O$, spectral data UV = 285 nm (ϵ =20), IR = 1720 cm^{-1}, PMR = 1.05δ (t, J=6 Hz, 30nm), 2.4δ (q, J=6 Hz, 20nm). Assign the structure for the compound.
10) Write note on locking of conformation.
11) Write note on conformations of methyl cyclohexane.
12) Highly branched primary alkyl halide A ($C_5H_{11}Br$) on alkaline hydrolysis in the presence of AgOH forms tertiary alcohol B ($C_5H_{12}O$). It does not form expected primary alcohol C ($C_5H_{12}O$). Identify A, B and C Write reactions and name it.
13) Write note on Oppenaur oxidation.
14) Starting with ethyl acetoacetate how will prepare succinic acid and dimethyl succinic acid.
15) Starting with diethyl malonate how will prepare succinic acid and dimethyl succinic acid.

Que. 3 B) **6 Marks each**

1) Write note on finger print region.
2) Write note on equivalent and non-equivalent protons.
3) Write note on Wagner-Meerwein rearrangement.
4) Explain stereoselective and stereospecific reactions.
5) Explain Claisen condensation with mechanism.

Que. 4 A) **4 Marks each**

1) What is reactive methylene group? How ethyl acetoacetate is prepared?
2) What is tautomerism? Explain tautomerism with ethyl acetoacetate.
3) Write the mechanism of Claisen condensation.
4) Write note on Stobbe condensation.
5) Write note on Wittig reaction.
6) What are the limitations of Baeyer's strain theory?
7) Explain alkaline hydrolysis of 2-chlorobutane to 2-butanol.
8) Explain locking conformation in t-butyl cyclohexane.
9) The mass spectrum of a hydrocarbon displays molecular ion at m/e = 92 which gives base peak at m/e = 91. The NMR spectrum gives two singlets at 2.2δ and 7.1δ in the ratio 3:5. Assign the structure to the compound.
10) Write the applications and importance of mass spectroscopy.
11) Assign the structure by using NMR data Molecular formula $C_{10}H_{13}Cl$
    (a) S,1.57δ (3H), (b) S, 3.07 δ (2H), (c) S, 7.27 δ(5H)
12) Explain precessional motion of the nuclei and nuclear resonance.
13) How Hooke's law is useful to determine frequency of vibration?
14) Write note on types of vibrations.
15) An organic compound with molecular formula $C_2H_4O_2$ shows IR absorption bands at 3400 cm^{-1} (broad) and 1700 cm^{-1}. Assign the structure.

Que 4 B) **8 Marks each**

1) Draw the schematic diagram of NMR spectrometer. Explain shielding and deshielding effect.
2) Explain the measurement of chemical shift by delta and tau scale.
3) What are the rules to characterise spin-spin splitting.
4) Write note on molecular ions and fragment ions.
5) Explain applications of mass spectroscopy.

Que 5. **8 Marks each**

1) What are necessary conditions for a molecule to absorb IR radiations? Where the following groups absorb in the IR region i) alkyne ii) nitrile iii) amide iv) acid v) ester
2) Write note on functional group region and aromatic region.
3) Write note on hydrogen bonding and mesomeric effect in IR spectroscopy.
4) Draw the schematic diagram of mass spectrometer and explain its working.
5) Explain the stability of different conformers of cyclohexane with the help of energy profile diagram.
6) What are stereo selective and stereospecific reactions? Explain syn addition and anti-addition with respect to bromination of 2-butene.
7) Explain Baeyer's strain theory and Sachse and Mohr's theory of strain less theory.
8) What are ylides? Explain wittig reaction with mechanism. Write its synthetic importance.

9) Explain MPV reduction with mechanism. Write its synthetic importance.
10) Explain Wagner-Meerwein rearrangement with mechanism. Write its mechanism.
11) What is reactive methylene group? Write the preparation of ethyl acetoacetate. How will you synthesise dibasic acids from ethyl acetoacetate?
12) Write the reactions in conversion of ethyl acetoacetate to butanoic acid and glutaric acid.
13) What is reactive methylene group? Write the preparation of diethyl malonate. How will you synthesise dibasic acids from diethyl malonate?
14) What is reactive methylene group? How will you convert diethyl malonate to alanine and crotonic acid?
15) Define angle strain, torsional strain and steric strain. Explain stereoselective and stereospecific reactions with example.

Question Bank

B.Sc.-III (Semester – V) Examination, 2021

ELECTRONICS (Special Paper – X) (NEW CBCS)

FUNDAMENTALS OF MICROCONTROLLER

Q.1) (Number of Questions 50)

A) Select the correct alternative for the following MCQs: (each question one mark)

1) If Register Bank-2 is selected then the RAM address range of Bank-2 is --------.

a) 00 - 07 H b) 10 - 17 H

c)18 - 1F H d) 08 - 0F H

2) Which one of these SFRs is bit addressable?

a) DPTR b) TMOD

c) Stack Pointer d) Accumulator

3) --------- port in microcontroller 8051 is a multi-purpose (more than two functions) port.

a) PORT-0 b) PORT-1

c) PORT-2 d) PORT-3

4) When a piezoelectric crystal is connected to uC8051, the crystal oscillator frequency can be observed on pin ---------.

a) XTAL2 b) XTAL1

c) PSEN d) ALE

5) Select the incorrect instruction from the following.

a) INC DPTR b) MOV 50H,30H

c) PUSH R4 d) ADD A, @R1

6) The proper instruction to access internal ROM memory is --------.

a) MOV A,@R0 b) MOVX A, @DPTR

c) MOVC A, @(A+DPTR) d) MOVX @DPTR,A

7) If A=6A H, the result after executing the instruction RL A will be -------.

a) D4 H b) 35 H

c) D5 H d) B5

8) The Boolean (single bit) instruction to initialize port pin P1.1 as output, is ---------.

a) SETB P1.1 b) CLR P1.1

c) MOV C,P1.1 d) CPL P1.1

9) AJMP is a -------- byte instruction.

a) 1 b) 2

c) 3 d) 4

10) The address range of SJMP instruction is ----------.

a) 256 bytes b) 2 Kbyte

c) 32 Kbyte d) 64 Kbyte

11) The software level control instruction to START the Timer / Counter is -------.

a) CLR TRx b) CLR TFx

c) SETB TRx d) CPL TFx

12) The SFR bit used to double the baud rate of Timer-1 for serial communication is ---------.

a) SMOD b) REN

c) SM2 d) GATE

13) The important signal from µC8051 to latch the lower order address bus is --------.

a) ALE b) $\overline{RD}$

c) $\overline{WR}$ d) $\overline{PSEN}$

14) ---------- is used to enable the chip-select signal of memory and input/output devices..

a) address bus buffers b) data bus buffers
c) octal latch d) address decoder

15) The address of 1st bit in Bit Addressable RAM is ---------.

a) 20 H b) 00 H

c) FF H d) 7F H

16) The SFR used for serial communication is ----------.

a) Accumulator b) PSW

c) SCON d) TCON

17) -------- pin of µC8051 is used as an external code memory selection.

a) PSEN b) ALE c) EA d) RESET

18) If EA=1, the address range of external code memory for µC8051 is ----------.

a) 0000 H to FFFF H b) 00 H to 7F H
c) 0000 H to 0FFF H d) 1000 H to FFFF H

19) The result after executing the instruction SUBB A,#48 H, where A= 95 H, will be --------.

a) 47 H b) 4D H
c) 143 H d) none of these

20) Which one of the following instructions represent register addressing mode ?

a) MOV A,#52 H b) MOV R5,A c) MOV A,@R1 d) MOV 35 H,50 H

21) The result of XORing the data BD H and 8A H will be ----------.

a) 88 H b) BF H
c) C8 H
d) 37 H

22) Which one of the instructions is a Boolean (single bit) instruction ?

a) CLR C b) CPL A

c) DA A d) CLR A

23) If CALL instruction is written at address C270 H, then the RETURN address will be at --------.

a) C271 H b) C272 H

c) C273 H d) C274 H

24) The correct instruction to Turn-On eight LEDs connected to Port-1 is --------.

a) MOV P1,#0FF H b) MOV P1,#00H
c) CLR A d) CPL A

25) The control data to set-up Timer-0 in mode-2 and Timer-1 in Mode-1, without GATE control is ----------.

a) 21 H b) 12 H

c) 23 H d) 11 H

26) --------- mode in serial communication is 8-bit UART mode with variable baud rate.

a) Mode-0 b) Mode-1

c) Mode-2 d) Mode-3

27) ---------- Timer is used as Baud-Rate generator for serial communication.

a) Timer-2 b) Timer-0

c) Timer-1 d) all of these

28) The number of address lines required to address 8KBytes memory are ----------.

a) 10 b) 11

c) 12 d) 13

29) As far as computing power is concerned, Microcontrollers are --------- to microprocessor.

a) inferior b) superior

c) similar d) none of these

30) The last address of internal 4KB ROM or code memory of uC8051 is ----------.

a) 0FFF H b) 1FFF H

c) 7FFF H d) FFFF H

31) Which pin of 8051 is used for selecting external code memory, bypassing the internal code memory?

a) $\overline{EA}$ b) $\overline{PSEN}$

c) RESET d) ALE

32) If a piezoelectric crystal is connected to uC8051, then the clock frequency can be observed on pin ---------.

a) XTAL1 (Pin-18) b) XTAL2 (Pin-19)

c) ALE d) PSEN

33) Upon Reset, µC 8051 loads the address ---------- in the program counter.

a) FFFF H b) 0FFF H

c) 1000 H d) 0000 H

34) Which of these registers are bit addressable?

a) Accumulator b) Ports P0 to P3

c) TCON d) all of these

35) What does the symbol '@' represents in the instruction MOV A, @R0?

a) direct data type b) indirect data type

c) immediate data type d) register data type

36) The number of bits transmitted or received in one frame for Mode-2 serial communication is --------.

a) 8 b) 10

c) 11 d) 12

37) Which of the timer modes can produce variable time-delay?

a) Mode-0 b) Mode-1

c) Mode-2 d) all of these

38) Which of the PSW flags are affected by arithmetic instructions?

a) auxiliary carry b) carry

c) overflow d) all of these

39) MOV 50H,35H is a ---------- byte instruction.

a) 1 b) 2

c) 3 d) 4

40) The hardware control bit to start or stop the timer/counter is ----------.

a) GATE b) TF0 & TF1

c) TR0 & TR1 d) M1 & M0

41) Which of the following branching instructions allow a jump anywhere within 2 KB block of program memory?

a) long jump b) short jump

c) absolute jump d) all of these

42) If $\overline{EA}$ pin of uC8051 is connected to +Vcc, then the first address of the Internal code memory is ---------.

a) 0000 H b) 1000 H

c) 7FFF H d) 0FFF H

43) Microcontroller uses ---------- memory architecture while microprocessor uses ---------- architecture.

a) Von Neumann, Harvard b) Harvard, Von Neumann

c) Von Neumann, RISC d) CISC, Harvard

44) The first address of Bank-2 registers is ----------.

a) 00 H b) 08 H

c) 10 H d) 18 H

45) What is the maximum delay generated by the timer, having 12 MHz crystal frequency and operating in Mode-1?

a) 128 µS b) 256 µS

c) 512 µS d) 65536 µS

46) The data value loaded in port to initialize upper nibble as input port and lower nibble as output port, is ---------.

a) F0 H b) FF H

c) 00 H d) 0F H

47) What is the address range of bank registers?

a) 00 – 1F H b) 20 – 2F H

c) 30 – 7F H d) 80 – FF H

48) How many bytes of reserved RAM is present in µC 8051?

a) 16 b) 32

c) 48 d) 64

49) Which rotate instructions do not modify the carry flag?

a) RR A & RL A b) RR A & RLC A

c) RLC A & RRC A d) RLA & RRC A

50) Which one of these figures is a standard baud rate?

a) 512 b) 1024

c) 2048 d) 4800

51) Which one of these is not an embedded product?

a) Mouse b) Keyboard c) TV remote d) Laptop

52) The main component of an embedded system is ----------.

a) Memory b) Application specific circuitry c) microcontroller
d) Communication interface

53) In uC89C51, the hardware RESET is ----------.

a) Active high b) Active low c) both a and b
d) high impedance

54) C programs are converted into machine language using ----------.

a) An assembler b) an interpreter c) a compiler
d) an operating system

55) Which one of these is not a C keyword?

a) char b) if c) while d) next

56) Which one of these statements in C is a loop control statement?

a) if b) if-else c) switch-case d) for

57) The data type used for addressing bit addressable SFR bit is ----------.

a) sbit b) bit c) sfr d) int

58) The header file required for writing an embedded C program for uC 8051 family is ----------.

a) std51.h b) 8051.h c) reg51.h d) uC51.h

59) Which one of these is not a 4-bit code for full-stepping a stepper motor?

a) A b) 9 c) 6 d) 8

60) To display alphanumeric data on LCD, the data is sent in -------- format.

a) ASCII b) BCD c) 7-Segment d) alpha-numeric

ANSWER KEY

FUNDAMENTALS OF MICROCONTROLLER

1	**b**	**11**	**c**	**21**	**d**	**31**	**a**	**41**	**c**	**51**	**d**
2	**d**	**12**	**a**	**22**	**a**	**32**	**b**	**42**	**a**	**52**	**c**
3	**d**	**13**	**a**	**23**	**c**	**33**	**d**	**43**	**b**	**53**	**a**
4	**a**	**14**	**d**	**24**	**a**	**34**	**d**	**44**	**c**	**54**	**c**
5	**c**	**15**	**b**	**25**	**b**	**35**	**b**	**45**	**d**	**55**	**d**
6	**c**	**16**	**c**	**26**	**b**	**36**	**c**	**46**	**a**	**56**	**d**
7	**a**	**17**	**a**	**27**	**c**	**37**	**d**	**47**	**a**	**57**	**a**
8	**b**	**18**	**d**	**28**	**d**	**38**	**d**	**48**	**c**	**58**	**c**
9	**b**	**19**	**b**	**29**	**a**	**39**	**c**	**49**	**a**	**59**	**d**
10	**a**	**20**	**b**	**30**	**a**	**40**	**a**	**50**	**d**	**60**	**a**

i) If Register Bank-3 is selected then the address of register R5 will be --------.

a) 05 H b) 0D H c) 15 H d) 1D H

ii) --------- port in microcontroller 8051 can be used as higher order address bus port.

a) PORT-0 b) PORT-1 c) PORT-2 d) PORT-3

iii) If a crystal of 1 MHz is connected to µC8051 then the time required to complete one machine cycle will be --------- µSec.

a) 1 b) 6 c) 12 d)18

iv) Which one of the following instructions represent register addressing mode ?

a) MOV A,#49 H b) MOV R2,A c) MOV A,@R0 d) MOV 40 H,65 H

v) Microcontroller uses ---------- memory architecture.

a) Von Neumann b) Harvard c) RISC d) CISC

vi) The proper instruction to access internal RAM memory data is --------.

a) MOV A,@R0 b) MOVX A, @DPTR c) MOVC A, @(A+DPTR) d) none of these

vii) If CALL instruction is written at address C180 H, then the RETURN address will be ------.

a) C181 H b) C182 H c) C183 H d) C184 H

viii) The hardware level control pins to STOP or RUN the Timer / Counter is -------.

a) INT0 & INT1 b) T0 & T1 c) $\overline{RD}$ & $\overline{WR}$ d) TxD & RxD

ix) --------- mode in serial communication is 8-bit UART mode with variable baud rate.

a) Mode-0 b) Mode-1 c) Mode-2 d) Mode-3

x) The interrupt flags used in serial data communication are ----------.

a) TF0 & TF1 b) CY & Z c) IE0 & IE1 d) RI & TI

Answer Key (i to x)

i	ii	iii	iv	v	vi	vii	viii	ix	x
d	c	c	b	b	a	c	a	b	d

1. 8051 microcontrollers are manufactured by which of the following companies?

a) Atmel

b) Philips

c) Intel

d) All of the mentioned

Answer: All of the mentioned

2. AT89C2051 has RAM of:

a) 128 bytes

b) 256 bytes

c) 64 bytes

d) 512 bytes

Answer: 128 bytes

3. 8051 series has how many 16 bit registers?

a) 2

b) 3

c) 1

d) 0

Answer: 2

4. When 8051 wakes up then 0x00 is loaded to which register?

a) PSW

b) SP

c) PC

d) None of the mentioned

Answer: PC

5. When the microcontroller executes some arithmetic operations, then the flag bits of which register are affected?

a) PSW

b) SP

c) DPTR

d) PC

Answer: PSW

6. How are the status of the carry, auxiliary carry and parity flag affected if the write instruction

MOV A,#9C

ADD A,#64H

a) CY=0,AC=0,P=0

b) CY=1,AC=1,P=0

c) CY=0,AC=1,P=0

d) CY=1,AC=1,P=1

Answer: CY=1,AC=1,P=0

7. How are the bits of the register PSW affected if we select Bank2 of 8051?

a) PSW.5=0 and PSW.4=1

b) PSW.2=0 and PSW.3=1

c) PSW.3=1 and PSW.4=1

d) PSW.3=0 and PSW.4=1

Answer: PSW.3=0 and PSW.4=1

8. If we push data onto the stack then the stack pointer

a) increases with every push

b) decreases with every push

c) increases & decreases with every push

d) none of the mentioned

Answer: increases with every push

9. On power up, the 8051 uses which RAM locations for register R0- R7

a) 00-2F

b) 00-07

c) 00-7F

d) 00-0F

Answer: 00-07

10. How many bytes of bit addressable memory is present in 8051 based microcontrollers?

a) 8 bytes

b) 32 bytes

c) 16 bytes

d) 128 bytes

Answer: 16 bytes

1. “DJNZ R0, label” is _____ byte instruction.

a) 2

b) 3

c) 1

d) Can’t be determined

Answer: 2

2. JZ, JNZ, instructions checked content of _____ register.

a) DPTR

b) B

c) A

d) PSW

Answer: A

3. Calculate the jump code for again and here if code starts at 0000H

MOV R1,#0

MOV A,#0

MOV R0,#25H

AGAIN:ADD A,#0ECH

JNC HERE

HERE: INC R1

DJNZ R0,AGAIN

MOV R0,A

END

a) F3,02

b) F9,01

c) E9,01

d) E3,02

Answer: E9,01

4. When the call instruction is executed the topmost element of stack comes out to be

a) the address where stack pointer starts

b) the address next to the call instruction

c) address of the call instruction

d) next address of the stack pointer

Answer: the address next to the call instruction

5. LCALL instruction takes

a) 2 bytes

b) 4 bytes

c) 3 bytes

d) 1 byte

Answer: 3 bytes

6. Are PUSH and POP instructions are a type of CALL instructions?

a) yes

b) no

c) none of the mentioned

d) cant be determined

Answer: no

7. What is the time taken by one machine cycle if crystal frequency is 20MHz?

a) 1.085 micro seconds

b) 0.60 micro seconds

c) 0.75 micro seconds

d) 1 micro seconds

Answer: 0.60 micro seconds

8. Find the number of times the following loop will be executed

MOV R6,#200

BACK:MOV R5,#100

HERE:DJNZ R5, HERE

DJNZ R6,BACK

END

a) 100

b) 200

c) 20000

d) 2000

Answer: 20000

9. What is the meaning of the instruction MOV A,05H?

a) data 05H is stored in the accumulator

b) fifth bit of accumulator is set to one

c) address 05H is stored in the accumulator

d) none of the mentioned

Answer: address 05H is stored in the accumulator

10. Do the two instructions mean the same?

1) BACK: DEC R0

JZ BACK

2) BACK: DJNZ RO, BACK

a) yes

b) no

c) cant be determined

d) yes and the second one is preferred

Answer: no

I/O Port Programming and Addressing Modes

1. To initialize any port as an output port what value is to be given to it?

a) 0xFF

b) 0x00

c) 0x01

d) A port is by default an output port

Answer: A port is by default an output port

2. Which out of the four ports of 8051 needs a pull-up resistor for using it is as an input or an output port?

a) PORT 0

b) PORT 1

c) PORT 2

d) PORT 3

Answer: PORT 0

3. Which of the ports act as the 16 bit address lines for transferring data through it?

a) PORT 0 and PORT 1

b) PORT 1 and PORT 2

c) PORT 0 and PORT 2

d) PORT 1 and PORT 3

Answer: PORT 0 and PORT 2

4. Which of the following registers are not bit addressable?

a) SCON

b) PCON

c) A

d) PSW

Answer: PCON

5. Which instruction is used to check the status of a single bit?

a) MOV A,P0

b) ADD A,#05H

c) JNB PO.0, label

d) CLR P0.05H

Answer: JNB PO.0, label

6. Which addressing mode is used in pushing or popping any element on or from the stack?

a) immediate

b) direct

c) indirect

d) register

Answer: direct

7. Which operator is the most important while assigning any instruction as register indirect instruction?

a) $

b) #

c) @

d) &

Answer: @

8. What is the advantage of register indirect addressing mode?

a) it makes use of registers R0 and R1

b) it uses the data dynamically

c) it makes use of operator @

d) it is easy

Answer: it uses the data dynamically

9. Which of the following comes under the indexed addressing mode?

a) MOVX A, @DPTR

b) MOVC @A+DPTR,A

c) MOV A,R0

d) MOV @R0,A

Answer: MOVC @A+DPTR,A

10. Is this a valid statement?

SETB A

a) yes

b) no

c) cant be determined

d) none of the mentioned

Answer: no

1. When we add two numbers the destination address must always be.

a) some immediate data

b) any register

c) accumulator

d) memory

Answer: accumulator

2. DAA command adds 6 to the nibble if:

a) CY and AC are necessarily 1

b) either CY or AC is 1

c) no relation with CY or AC

d) CY is 1

Answer: either CY or AC is 1

3. If SUBB A,R4 is executed, then actually what operation is being applied?

a) R4+A

b) R4-A

c) A-R4

d) R4+A

Answer: A-R4

4. A valid division instruction always makes:

a) CY=0,AC=1

b) CY=1,AC=1

c) CY=0,AC=0

d) no relation with AC and CY

Answer: CY=0,AC=0

5. In 8 bit signed number operations, OV flag is set to 1 if:

a) a carry is generated from D7 bit

b) a carry is generated from D3 bit

c) a carry is generated from D7 or D3 bit

d) a carry is generated from D7 or D6 bit

Answer: a carry is generated from D7 or D6 bit

6. In unsigned number addition, the status of which bit is important?

a) OV

b) CY

c) AC

d) PSW

Answer: CY

7. Which instructions have no effect on the flags of PSW?

a) ANL

b) ORL

c) XRL

d) All of the mentioned

Answer: All of the mentioned

8. ANL instruction is used _____

a) to AND the contents of the two registers

b) to mask the status of the bits

c) all of the mentioned

d) none of the mentioned

Answer: all of the mentioned

9. CJNE instruction makes _____

a) the pointer to jump if the values of the destination and the source address are equal

b) sets CY=1, if the contents of the destination register are greater then that of the source register

c) sets CY=0, if the contents of the destination register are smaller then that of the source register

d) none of the mentioned

Answer: none of the mentioned

10. XRL, ORL, ANL commands have _____

a) accumulator as the destination address and any register, memory or any immediate data as the source address

b) accumulator as the destination address and any immediate data as the source address

c) any register as the destination address and accumulator, memory or any immediate data as the source address

d) any register as the destination address and any immediate data as the source address

1. What is the clock source for the timers?

a) some external crystal applied to the micro-controller for executing the timer

b) from the crystal applied to the micro-controller

c) through the software

d) through programming

Answer: from the crystal applied to the micro-controller

2. What is the frequency of the clock that is being used as the clock source for the timer?

a) some externally applied frequency f’

b) controller’s crystal frequency f

c) controller’s crystal frequency /12

d) externally applied frequency/12

Answer: controller’s crystal frequency /12

3. What is the function of the TMOD register?

a) TMOD register is used to set various operation modes of timer/counter

b) TMOD register is used to load the count of the timer

c) Is the destination or the final register where the result is obtained after the operation of the timer

d) Is used to interrupt the timer

Answer: TMOD register is used to set various operation modes of timer/counter

4. What is the maximum delay that can be generated with the crystal frequency of 22MHz?

a) 2978.9 sec

b) 0.011 msec

c) 11.63 sec

d) 2.97 msec

Answer: 2.97 msec

5. Auto reload mode is allowed in which mode of the timer?

a) Mode 0

b) Mode 1

c) Mode 2

d) Mode 3

Answer: Mode 2

6. Find out the roll over value for the timer in Mode 0, Mode 1 and Mode 2?

a) 00FFH,0FFFH,FFFFH

b) 1FFFH,0FFFH,FFFFH

c) 1FFFH,FFFFH,00FFH

d) 1FFFH,00FFH,FFFFH

Answer: 1FFFH,FFFFH,00FFH

7. What steps are followed when we need to turn on any timer?

a) load the count, start the timer, keep monitoring it, stop the timer

c) Is the destination or the final register where the result is obtained after the operation of the timer

d) Is used to interrupt the timer

Answer: TMOD register is used to set various operation modes of timer/counter

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Answer: Mode 2

6. Find out the roll over value for the timer in Mode 0, Mode 1 and Mode 2?

a) 00FFH,0FFFH,FFFFH

b) 1FFFH,0FFFH,FFFFH

c) 1FFFH,FFFFH,00FFH

d) 1FFFH,00FFH,FFFFH

Answer: 1FFFH,FFFFH,00FFH

7. What steps are followed when we need to turn on any timer?

a) load the count, start the timer, keep monitoring it, stop the timer

b) load the TMOD register, load the count, start the timer, keep monitoring it, stop the timerc) load the TMOD register, start the timer, load the count, keep monitoring it, stop the timer

d) none of the mentioned

Answer: load the TMOD register, load the count, start the timer, keep monitoring it, stop the timer

8. If Timer 0 is to be used as a counter, then at what particular pin clock pulse need to be applied?

a) P3.3

b) P3.4

c) P3.5

d) P3.6

Answer: P3.4

9. In the instruction “MOV TH1,#-3”, what is the value that is being loaded in the TH1 register?

a) 0xFCH

b) 0xFBH

c) 0xFDH

d) 0xFEH

Answer: 0xFDH

10. TF1, TR1, TF0, TR0 bits are of which register?

a) TMOD

b) SCON

c) TCON

d) SMOD

Answer: TCON

1. Which devices are specifically being used for converting serial to parallel and from parallel to serial respectively?

a) timers

b) counters

c) registers

d) serial communication

Answer: registers

2. What is the difference between UART and USART communication?

a) they are the names of the same particular thing, just the difference of A and S is there in it

b) one uses asynchronous means of communication and the other uses synchronous means of communication

c) one uses asynchronous means of communication and the other uses asynchronous and synchronous means of communication

d) one uses angular means of the communication and the other uses linear means of communication

Answer: one uses asynchronous means of communication and the other uses asynchronous and synchronous means of communication

3. Which of the following best describes the use of framing in asynchronous means of communication?

a) it binds the data properly

b) it tells us about the start and stops of the data to be transmitted or received

c) it is used for error checking

d) it is used for flow control

Answer: it tells us about the start and stops of the data to be transmitted or received

4. Which of the following signal control the flow of data?

a) RTS

b) DTR

c) RTS & DTR

d) None of the mentioned

Answer: RTS

5. Which of the following is the logic level understood by the micro-controller/micro-processor?

a) TTL logic level

b) RS232 logic level

c) None of the mentioned

d) TTL & RS232 logic level

Answer: TTL logic level

6. What is a null modem connection?

a) no data transmission

b) no MAX232

c) the RxD of one is the TxD for the other

d) no serial communication

Answer: the RxD of one is the TxD for the other

7. Which of the following best states the reason that why baud rate is mentioned in serial communication?

a) to know about the no of bits being transmitted per second

b) to make the two devices compatible with each other, so that the transmission becomes easy and error free

c) to use Timer 1

d) for wasting memory

Answer: to make the two devices compatible with each other, so that the transmission becomes easy and error free

8. With what frequency UART operates(where f denoted the crystal frequency)?

a) f/12

b) f/32

c) f/144

d) f/384

Answer: f/384

9. What is the function of the SCON register?

a) to control SBUF and SMOD registers

b) to program the start bit, stop bit, and data bits of framing

c) to control SMOD registers

d) none of the mentioned

Answer: to program the start bit, stop bit, and data bits of framing

10. What should be done if we want to double the baud rate?

a) change a bit of the TMOD register

b) change a bit of the PCON register

c) change a bit of the SCON register

d) change a bit of the SBUF register

Answer: change a bit of the PCON register

1. When an interrupt is enabled, then where does the pointer moves immediately after this interrupt has occurred?

a) to the next instruction which is to be executed

b) to the first instruction of ISR

c) to a fixed location in memory called interrupt vector table

d) to the end of the program

Answer: to a fixed location in memory called interrupt vector table

2. What are the contents of the IE register, when the interrupt of the memory location 0x00 is caused?

a) 0xFFH

b) 0x00H

c) 0x10H

d) 0xF0H

Answer: 0x00H

3. After RETI instruction is executed then the pointer will move to which location in the program?

a) next interrupt of the interrupt vector table

b) immediate next instruction where interrupt is occurred

c) next instruction after the RETI in the memory

d) none of the mentioned

Answer: immediate next instruction where interrupt is occurred

4. Which pin of the external hardware is said to exhibit INT0 interrupt?

a) pin no 10

b) pin no 11

c) pin no 12

d) pin no 13

Answer: pin no 12

5. Which bit of the IE register is used to enable TxD/RxD interrupt?

a) IE.D5

b) IE.D2

c) IE.D3

d) IE.D4

Answer: IE.D4

6. Which of the following combination is the best to enable the external hardware interrupt 0 of the IE register (assuming initially all bits of the IE register are zero)?

a) EX0=1

b) EA=1

c) any of the mentioned

d) EX0=1 & EA=1

Answer: EX0=1 & EA=1

7. Why normally LJMP instructions are the topmost lines of the ISR?

a) so as to jump to some other location where there is a wider space of memory available to write the codes

b) so as to avoid overwriting of other interrupt instructions

c) all of the mentioned

d) none of the mentioned

Answer: all of the mentioned

8. Which register is used to make the interrupt level or an edge triggered pulse?

a) TCON

b) IE

c) IPR

d) SCON

Answer: TCON

9. What is the disadvantage of a level triggered pulse?

a) a constant pulse is to be maintained for a greater span of time

b) another interrupt may be generated if the low-level signal is not removed before the ISR is finished

c) it is difficult to produce

d) another interrupt may be caused if the signal is still low before the completion of the last instruction

Answer: another interrupt may be caused if the signal is still low before the completion of the last instruction

10. What is the correct order of priority that is set after a controller gets reset?

a) RI/TI > TF1 > TF0 > INT1 > INT0

b) RI/TI < TF1 < TF0 < INT1 < INT0

c) INT0 > TF0 > INT1 > TF1 > RI/TI

d) INT0 < TF0 < INT1 < TF1 < RI/TI

Answer: INT0 > TF0 > INT1 > TF1 > RI/TI

1. How many rows and columns are present in a 16*2 alphanumeric LCD?

a) rows=2, columns=32

b) rows=16, columns=2

c) rows=16, columns=16

d) rows=2, columns=16

Answer: rows=2, columns=16

2. How many data lines are there in a 16*2 alphanumeric LCD?

a) 16

b) 8

c) 1

d) 0

Answer: 8

3. Which pin of the LCD is used for adjusting its contrast?

a) pin no 1

b) pin no 2

c) pin no 3

d) pin no 4

Answer: pin no 3

4. For writing commands on an LCD, RS bit is

a) set

b) reset

c) set & reset

d) none of the mentioned

Answer: reset

5. Which command of an LCD is used to shift the entire display to the right?

a) 0x1C

b) 0x18

c) 0x05

d) 0x07

Answer: 0x1C

6. Which command is used to select the 2 lines and 5*7 matrix of an LCD?

a) 0x01

b) 0x06

c) 0x0e

d) 0x38

Answer: 0x38

7. Which of the following step/s is/are correct for sending data to an LCD?

a) set the R/W bit

b) set the E bit

c) set the RS bit

d) all of the mentioned

Answer: all of the mentioned

8. Which of the following step/s is/are correct to perform reading operation from an LCD?

a) low to high pulse at E pin

b) R/W pin is set high

c) low to high pulse at E pin & R/W pin is set high

d) none of the mentioned

Answer: low to high pulse at E pin & R/W pin is set high

9. Which instruction is used to select the first row first column of an LCD?

a) 0x08

b) 0x0c

c) 0x80

d) 0xc0

Answer: 0x80

10. The RS pin is _____ for an LCD.

a) input

b) output

c) input & output

d) none of the mentioned

Answer: input

2. What is the function of the WR pin?

a) its active high input used to inform ADC0804 to the end of conversion

b) its active low input used to inform ADC0804 to the end of conversion

c) its active low input used to inform ADC0804 to the start of conversion

d) its active high input used to inform ADC0804 to the start of conversion

Answer: its active low input used to inform ADC0804 to the start of conversion

3. State which of the following statements are false?

a) CLK IN pin used for External Clock Input or Internal Clock with external RC element

b) INTR pin tells about the end of the conversion

c) ADC0804 IC is an 8 bit parallel ADC in the family of the ADC0800 series

d) None of the mentioned

Answer: None of the mentioned

Q.1)

B) Answer in short (one mark each):

i) Draw RESET circuit in µC8051.

ii) Show the bits in PSW register.

iii) Write the any one arithmetic/logical instructions

iv) What is machine cycle?

v) Draw any two symbols used in flow-charting.

vi) Explain the use of subroutine.

vii) How to configure the parallel ports as input or output ports?

viii) What is Timer Mode-0/Mode-1/Mode-2/Mode-3.

ix) Explain the need of Bit Addressable RAM.

x) Write any two important features of µC8051.

xi) Give the role of $\overline{EA}$/PSEN/ALE pin in µC8051.

xii) Explain AND/OR/XOR/NOT instructions with suitable example.

xiii) Write the instruction for multiplication/division

xiv) What is Algorithm?

xv) Write any one branching instructions in 8051 uC.

xvi) Give the bit configuration of TMOD/TCON/IP/IE/SCON SFR.

xvii) Give the advantage/disadvantage of serial data communication.

xviii) Explain the need of I/O expansion.

Xxiv) Which port of uC89C51 require external passive pull-up resistors?

25) The result of ANDing the data B4 H and 7D H will be ----------.

26) The result after executing the instruction ADD A,#54 H, where A= 98 H, will be --------.

27) What is meant by demultiplexing of the buses?

28) Write any one Boolean(single bit) instruction and explain its meaning.

29) Write any one 3-byte instruction for uC8051

30) Draw the flowchart symbols for Process and Decision making blocks.

Q.2) Answer in short (two marks each):

i) Explain RESET process in µC8051.

ii) Show the bits in PSW register and explain.

iii) Write the two arithmetic instructions for subtraction and division and explain.

iv) How execution of instruction occurs in µC8051?

v) Draw different symbols used in flowcharting.

vi) Explain the concept of subroutine.

vii) How to configure the parallel ports as input and output ports?

viii) Explain Timer Mode-2.

ix) Explain the need of memory expansion.

x) Write the important features of µC8051.

xi) Give the role of $\overline{EA}$ pin in µC8051.

xii) Explain AND and OR instructions with suitable examples.

xiii) Illustrate, with suitable example, the instruction MUL AB.

xiv) What is Algorithm?

xv) Explain the need of Branching Instructions.

xvi) How to configure Timer-1 as a Counter in Mode-1 and Timer-0 as Timer in Mode-2 ?

xvii) Give the advantage and disadvantage of serial data communication.

xviii) Explain the need of I/O expansion.

1. What are the special function registers?

The special function register are stack pointer, index pointer (DPL and DPH), I/O port addresses, status(PSW) and accumulator.

2. What are the uses of accumulator register?

The accumulator registers (A and B at addresses OEOh and OFOh, respectively) are used to store temporary values and the results of arithmetic operations.

3. What is PSW?

Program status word (PSW) is the set of flags that contains the status information and is considered as one of the special function register.

4. What is stack pointer (sp)?

Stack pointer (SP) is a 8 bit wide register and is incremented before the data is stored into the stack using PUSH or CALL instructions.

It contains 8-bit stack top address. It is defined anywhere in the on-chip 128-byte RAM. After reset, the SP register is initialized to 07.

After each write to stack operation, the 8-bit contents of the operand are stored onto the stack, after incrementing the SP register by one.

It is not a top-down data structure. It is allotted an address in the special function register bank.

5. What is data pointer (DTPR)?

It is a 16-bit register that contains a higher byte (DPH) and lower byte (DPL) of a 16-bit external data RAM address.

It is accessed as a 16-bit register or two 8-bit registers. It has been allotted two addresses in the special function register bank, for its two bytes DPH and DPL.

6. Why oscillator circuit is used?

Oscillator circuit is used to generate the basic timing clock signal for the operation of the circuit using crystal oscillator.

7. What is the purpose of using instruction register?

Instruction register is used for the purpose of decoding the opcode of an instruction to be executed and gives information to the timing and control unit generating necessary signals for the execution of the instruction.

8. Give the purpose of ale/prog signal.

ALE/PROG is an address latch enable output pulse and indicates that valid address bits available on the respective pins.

The ALE pulses are emitted at a rate of one-sixth of the oscillator frequency. The signal is valid only for external memory accesses.

It may be used for external timing or clockwise purpose. One ALE pulse is skipped during each access to external data memory.

9. Explain the two power saving mode of operation. The two power saving modes of operation are:

I. Idle mode:

In this mode, the oscillator continues to run and the interrupt, serial port and timer blocks are active, but the clock to the CPU is disabled. The CPU status is preserved. This mode can be terminated with a hardware interrupt or hardware reset signal. After this, the CPU resumes program execution from where it left off.

II. Power down mode:

In this mode, the on-chip oscillator is stopped. All the functions of the controller are held maintaining the contents of RAM. The only way to terminate this mode is hardware reset. The reset redefines all the SFRs but the RAM contents are left unchanged.

10. Differentiate between program memory and data memory. i. In stores the programs to be executed

ii. It stores only program code which is to be executed and thus it need not be written, so it is implemented using EPROM It stores the data, line intermediate results, variables and constants required for the execution of the program.

The data memory may be read from or written to and thus it is implemented using RAM.

11. What are addressing modes?

The various ways of accessing data are called addressing modes.

12. Give the addressing modes of 8051?

There are six addressing modes in 8051.They are

Direct addressing Indirect addressing Register instruction

Registerspecific (register implicit)

Immediate mode Indexed addressing

13. What is direct addressing mode?

The operands are specified using the 8-bit address field, in the instruction format. Only internal data Ram and SFRS can be directly addressed. This is known as direct addressing mode.

Eg: Mov R0, 89H

14. What is indirect addressing mode?

In this mode, the 8-bit address of an operand is stored in a register and the register, instead of the 8-bit address, is specified in the instruction. The registers R0 and R1 of the selected bank of registers or stack

pointer can be used as address registers for storing the 8-bit addresses

The address register for 16-bit addresses can only be „data pointer" (DPTR). Eg: ADD A, @ R0.

15. What is meant by register instructions addressing mode?

The operations are stored in the registers R0 – R7 of the selected register bank. One of these eight registers (R0 – R7) is specified in the instruction using the 3-bit register specification field of the opcode format. A register bank can be selected using the two bank select bits of the PSN. This is called as register instruction addressing mode

Eg: ADD A, R7.

16. What is immediate addressing mode?

An immediate data ie., a constant is specified in the instruction, after the opcode byte.

Eg: MOV A, #100

The immediate data 100 (decimal) is added to the contents of the accumulator. For specifying a hex number, it should be followed by H. These are known as immediate addressing mode.

17. What is indexed addressing?

This addressing mode is used only to access the program memory. It is accomplished in 8051 for look-up table manipulations. Program counter or data pointer are the allowed 16-bit address storage registers, in this mode of addressing. These 16-bit registers point to the base of the look-up table and the ACC register contains a code to be converted using the look-up table. The look-up table data address is found out by adding the contents of register ACC with that of the program counter or data pointer.

In case of jump instruction, the contents of accumulator are added with one of the specified 16-bit registers to form the jump destination address.

Eg: MOV C, A @ A + DPTP JMP @ A + DPTR

18. List the five addressing modes of 8051 microcontroller.

The five addressing modes are, I. Immediate addressing

II. Register addressing III. Direct addressing

IV. Register indirect addressing a. Indexed addressing.

19. MOV R4, R7 is invalid. Why?

The movement of data between the accumulator and Rn (for n = 0 to 7) is valid. But movement of data between Rn register is not allowed. That is why MOV R4, R7 is invalid.

20. WHAT IS SFR?

In the 8051 microcontroller registers A, B, PSW and DPTR are part of the group of registers commonly referred to as special function registers (SFR).

21. WHAT ARE THE TWO MAIN FEATURES OF SFR ADDRESSES?

The following two points should be noted SFR addresses. The special function registers have addresses between 80H and FFH. These addresses are above 80H, since the addresses 00 to 7FH are addresses of RAM memory inside the 8051.

II. Not all the address space of 80 to FH is used by the SFR. The unused locations 80Hto FFH are reserved and must not used by the 8051 programmer.

22. What is the difference between direct and register indirect addressing mode?

Loop is most efficient and is possible only in register indirect addressing whereas looping is not direct addressing mode.

23 List out some compare instructions. The compare instructions are:

a. CJNE

b. CLR

c. CPL

24 Write a program to save the accumulator in r7 of bank 2. CLR PSW – 3

SETB PSW – 4 MOV R7, A.

25. What are single bit instructions? Give example.

Instructions that are used for single bit operation are called single bit instructions. Examples: SETB bit

CLR bit CPL bit

26. Write a program to save the status of bits p1.2 and p1.3 on ram bit LOCATIONS 6 AND 7

RESPECTIVELY.

MOV C, P1.2; save status of P1.2 on CY

MOV O6, C; save carry in RAM bit location 06 MOV C, p1.3; save status of p1.3 on CY

MOV 07, C; save carry in RAM bit location 07.

27. Write a program to see if bits 0 and 5 of register b r1. If they are not, make them so and save it in r0. JNB OFOH, NEXT – 1; JUMP if B.0 is low

SET BOFOH; Make bit B.0 high

NEXT – 1:JNB OF5H, NEXT – 2; JUMP if B.5 is low SETB OF5H; Make B.5 high

NEXT – 2: MOV R0, B; Save register B

28) Intel 8051 follows which architecture?

Ans:

Intel 8051 is Harvard Architecture.

29) What is the difference between Harvard Architecture and von Neumann Architecture?

Ans:

The name Harvard Architecture comes from the Harvard Mark. The most obvious characteristic of the Harvard Architecture is that it has physically separate signals and storage for code and data memory. It is possible to access program memory and data memory simultaneously. Typically, code (or program) memory is read-only and data memory is read-write. Therefore, it is impossible for program contents to be modified by the program itself.

The von Neumann architecture is named after the mathematician and early computer scientist John von Neumann. Von Neumann machines have shared signals and memory for code and data. Thus, the program can be easily modified by itself since it is stored in read-write memory.

30) 8051 was developed using which technology?

Ans:

Intel's original MCS-51 family was developed using NMOS technology, but later versions, identified by a letter C in their name (e.g., 80C51) used CMOS technology and consume less power than their NMOS predecessors. This made them more suitable for battery-powered devices.

31) Why 8051 is called an 8-bit microcontroller?

Ans:

The Intel 8051 is an 8-bit microcontroller which means that most available operations are limited to 8 bits

32) What is the width of the data bus?

Ans:

8-bit data bus

33) What is the width of the address bus?

Ans:

16-bit address bus (PC -16 bit wide).

34) List the features of the 8051 microcontrollers?

Ans:

Listed some basic features of 8051 Micro-controller.

- 40 Pin IC.
- 128 bytes of RAM.
- 4K ROM (On-chip and could be different for different versions).
- 2 Timers (Timer 0 and Timer 1).
- 32 Input/ Output pins.
- 1 serial port.
- 6 Interrupts (Including Reset).

35) What location code memory space and data memory space begins?

Ans:

At location 0x00 for internal or external memory

36) How Much on-chip RAM is available?

Ans:

Original Intel's 8051 Microcontroller had 128B (0x00 to 0x7F) of internal RAM. But almost all modern variants of 8051 Microcontroller have 256B (0x00 to 0xFF) of RAM.

37) With 12 MHz clock frequency how many instructions (of 1 machine cycle and 2 machine cycle) can execute per second?

Ans:

A cycle is, in reality, 12 pulses of the crystal. That is to say, if an instruction takes one machine cycle to execute, it will take 12 pulses of the crystal to execute. Since we know the crystal is pulsing 11,059,000 times per second and that one machine cycle is 12 pulses, we can calculate how many instruction cycles the 8051 can execute per second:

11,059,000 / 12 = 921,583

This means that the 8051 can execute 921,583 single-cycle instructions per second. Since a large number of 8051 instructions are single-cycle instructions it is often considered that the 8051 can execute roughly 1 million instructions per second, although, in reality, it is less–and, depending on the instructions being used, an estimate of about 600,000 instructions per second is more realistic.

NOTE: It is again important to emphasize that not all instructions execute in the same amount of time. The fastest instructions require one machine cycle (12 crystal pulses), many others require two machine cycles (24 crystal pulses), and the two very slow math operations require four machine cycles (48 crystal pulses).

38) List out addressing Modes in MCS-51.

Ans:

- Direct Addressing.
- Register Addressing.
- Register Indirect Addressing.
- Immediate Addressing.
- Index Addressing

39) How much total external data memory that can be interfaced to the 8051?

Ans:

64K data memory (Because PC- 16bits)

40) What are Special Function Registers (SFR)?

Ans:

The 8051 provides 128 bytes of memory (80H to 0FFH) for Special Function Registers (SFRs). SFRs are bit, byte, or word-sized registers that are used to control timers, counters, serial I/O, port I/O, and peripherals

41) What are the types of interrupts in 8051?

Ans:

- External interrupt 0 (IE0).
- External interrupt 1 (IE1)
- Timer interrupt 0 (TF0)
- Timer interrupts 1 (TF1).
- Serial port Interrupt.
- Reset.

42) What are the four distinct types of memory in 8051?

Ans:

- Internal RAM.
- Special function registers.
- Program memory.

- External data memory

43) Tell the addresses which are bit addressable?
Ans:
The bit addressable memory in 8051 is composed from 210 bits: bit address space: 20H – 2FH bytes RAM = 00H – 7FH bits address, SFR registers.

44) What is a .lst file?
Ans:

- This file is also called a list file.
- It lists the opcodes, addresses, and errors detected by the assembler.
- The list file is produced only when indicated by the user.
- It can be accessed by an editor and displayed on the monitor screen or printed.
- The programmer uses this file to find the syntax errors and later fix them.

45) Explain DB.
Ans:

- DB is called as define byte used as a directive in the assembler.
- It is used to define the 8-bit data in binary, hexadecimal, or decimal formats.
- It is the only directive that can be used to define ASCII strings larger than two characters.
- DB is also used to allocate memory in byte-sized chunks.
- The assembler always converts the numbers into hexadecimal.

46) What is EQU?
Ans:

- EQU is the equate assembler directive used to define a constant without occupying a memory location.
- It associates a constant value with data label.
- Whenever the label appears in the program, the constant value is substituted for the label.
- Advantage: The constant value occurring at various positions in a program can be changed at once using this directive.
  Syntax: label EQU constant value

47) How are labels named in assembly language?
Ans:
A label can be placed at the beginning of a statement. During assembly, the label is assigned the current value of the active location counter and serves as an instruction operand. There are rules that you should know before using the labels.

- Label names should be unique and must contain alphabetic letters in both uppercase and lowercase.
- 1st letter should always be an alphabetic letter.
- It can also use digits and special characters?.,@,_,$.
- The label should not be one of the reserved words in assembly language.
- These labels make the program much easier to read and maintain.

48) Are all the bits of flag register used in 8051?
Ans:

The Program Status Word (PSW) contains status bits that reflect the current CPU state. The 8051 variants provide one special function register called PSW with this status information.
The program status word (PSW) register is an 8-bit register, also known as flag register. It is of 8-bit wide but only 6-bit of it is used. The two unused bits are user-defined flags. Four of the flags are called conditional flags, which means that they indicate a condition which results after an instruction is executed. These four are CY (Carry), AC (auxiliary carry), P (parity), and OV (overflow). The bits RS0 and RS1 are used to change the bank registers. The following figure shows the program status word register.
The PSW Register contains that status bit that reflects the current status of the CPU
49) Which bit of the flag register is set when output overflows to the sign bit?
Ans:
The overflow bit of the PSW register.

50) What are the issues related to stack and bank 1?
Ans:

- Bank 1 uses the same RAM space as the stack.
- The stack pointer is incremented or decremented according to the push or pop instruction.
- If the stack pointer is decremented it uses locations 7, 6, 5… which belong to register bank 0.
- If a given program uses R1 then the stack is provided new memory location.
- The push instruction may also take a stack to location 0 i.e.it will run out of space.

51) Which 2 ports combine to form the 16-bit address for external memory access?
Ans:
In 8051 Port0 and Port2 are combining to access a 16-bit address for external memory.
52) Can a single bit of a port be accessed in 8051?
Ans:
Yes, we can. for example, if we write the instruction SETB P1.2. It means here we are setting the second pin (pin start from zero so that is why I am saying the second pin) of port 1.

53) Other than SETB, CLR are there any single bit instructions?
Ans:
Yes, there are also some other single bit instructions. Let’s see some instructions.

- CPL bit: complement the bit (bit= NOT bit).
- JB bit, target: Jump to target if bit equal to 1.
- JNB bit, target: Jump to target if the bit is equal to 0.
- JCB bit, target: Jump to target if the bit is equal to 1 and then a clear bit.

54) Internal RAM is located from address 0x00 to ___?
Ans:
Internal RAM in 8051 is located from address 0 to address 0xFF. IRAM from 0x00 to 0x7F can be accessed directly. IRAM from 0x80 to 0xFF must be accessed indirectly.

55) Explain JNC
Ans:
The JNC instruction transfers program control to the specified address if the carry flag is 0. Otherwise, execution continues with the next instruction. No flags are affected by this instruction the carry flag is 0, CPU fetches instructions from the address of the label.

I believe that the above mentioned "8051 Microcontroller Interview Questions and Answers" are helpful. Please comment in the comment box if you have any queries related to the 8051 microcontrollers.

Q.3A and B and Q.4A) (4 or 5 or 6 marks each)

A and B) Five marks each. (5 marks each or 6 marks compulsory)

1) Compare von Neumann and Harvard Architectures.
2) Compare microprocessor and microcontroller.
3) Explain briefly five addressing modes with one example each.
4) What is the difference between Timer and Counter operation in 8051. How to start and stop the counter with and without the use of GATE signal?
5) Explain briefly the interrupts of 8051. Indicate their vector addresses.
6) Write an ALP to generate a square wave of 10 MHz on port pin P1.2 using Timer1. Assume a crystal frequency of 12 MHz.
7) Explain how 8051 sends and receives a character serially.
8) Write an ALP to send a message "Switch On" serially with a baud rate of 4800. Assume a crystal frequency of 11.0592 MHz.
12) Give the comparison between microprocessor and microcontroller.
13) Write a note on interrupts in μC8051.
14) Explain different data addressing modes with at least one instruction for each.
15) Explain the basics of serial communication.
17) Give the overview and features of MCS family.
18) Explain the internal 128-byte RAM structure.
19) Draw the pin distribution diagram of μC8051, without pin numbers.
20) With neat diagram, briefly explain PORT-0/PORT-1/PORT-2/PORT-3 structure.

Q.4B and Q.5) (8 marks each)

i) Explain in detail the interfacing of RAM 6264 to μC8051.

ii) Write an Assembly Language Program to transfer ten bytes of data from internal RAM memory block B1(30H to 39H) to another memory block B2(50H to 59H).

iii) Write an Assembly Language Program to receive the data serially at a baud rate of 9600 and send the data to PORT-1 in parallel form. Assume crystal frequency of 11.0592 MHz.

iv) Illustrate the use of CALL and RETURN instructions to Turn-On and Turn-Off eight LEDs connected to PORT-1 using long time delay.

v) Write an Assembly Language Program to generate a square wave of 10 KHz on port pin P1.6 using Timer-0 in Mode-2. Assume a crystal frequency of 12 MHz.

vi) Give the classification of instruction set of μC8051. Explain at least one instruction from each category with suitable example.

vii) Explain in detail the interfacing of EPROM 2764 to μC8051. Show the address map.

viii) Write an Assembly Language Program to generate a square wave of 5 KHz on port pin P1.3. Use Timer-1 in Mode-2 and assume crystal frequency of 12 MHz.

ix) Draw the internal block diagram of μC8051 and explain.

x) Explain the Logical instruction set with suitable examples.

xi) Write an Assembly Language Program to exchange ten bytes of data between Block B1(40 H to 49 H) and Block B2 (60 H to 69 H) of internal data memory.

xii) Write an Assembly Language Program to transmit the PORT-0 data serially and continuously, at a baud rate of 2400. Assume crystal frequency of 11.0592 MHz.

Xiii) Write an Assembly Language Program, with proper comments, to transfer ten bytes of data from internal RAM memory block B1(Address 30H to 39H) to another memory block B2(Address 50H to 59H).

Xiv) Give the classification of instruction set of μC8051. Explain at least one instruction from each category with suitable example.

Xv) Write an Assembly Language Program to serially transmit PORT-0 data at a baud rate of 4800. Assume crystal frequency of 11.0592 MHz.

Xvi) Explain with suitable block diagram, the architecture of uC 8051.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.Sc- III (Semester – VI) Examination

Computer Science (New w.e.f. Nov 2021) New CBCS

Advanced Java (paper– XII)

Question Bank 80 marks

Question For 2 Marks

1) What is JDBC?
2) What are the JDBC statements?
3) What are Use of RequestDispatcher in servlet?
4) What is Session Tracking in Servlets?
5) What the Request Object in JSP?
6) What are interfaces?
7) What is mean by Cookies?
8) What is mean by Data navigation?
9) Explain HttpSession in servlet?
10) What is pageContext in JSP?
11) Explain simple tag in JSP?
12) What are struts?
13) What is mean by Cookies?
14) What is mean by Hibernate?
15) Explain HttpSession in servlet?
16) Write use Bean tag in JSP
17) Write two Uses of Drivers?
18) What is mean by CGI?
19) What is mean by Java Bean?
20) Define the term Servlet?
21) Define Session in Servlet?
22) What is mean by scriplet tag?
25) The Major Stages of JSP Life Cycle?
26) List of Implicit objects?
27) List Type of Directive Tags?
28) List of JSP Action tags?
29) How to delete a Cookie in a JSP?
30) How is JSP better than Servlet technology?

Question For 3 Marks

1) HTTP Request Model

2) JSP Standard Tag Library (JSTL)
3) GenericServlet
4) HttpServlet
5) Resultset interface
6) ResultsetExtractor.
7) Prepared Statement.
8) Callable Statement.
9) Generator classes
10) Working with Resultset.
11) Explain the and MetaData
12) Use of RequestDispatcher

Question For 4 Marks

1) Working with Resultset interface
2) Write Steps to create application of Hibernate?
3) Explain Features of Struts?
4) Explain features of servlet?
5) What are the steps to connect to the database in java?
6) Explain the use CallableStatement with example.
7) Explain Different JSP Elements?
8) Explain Advantages & disadvantages of cookies
9) Explain different Uses of struts
10) Explain Hibernate with annotation
12) Explain Advantages & Disadvantages of Java Bean

Question For 5 Marks

1) Explain Component and features of JDBC
2) Explain Servlet life Cycle in detail?
3) Explain the use of prepared statement with example
4) Explain the different steps within life cycle of servlet.
5) Write a Servlet program for handling cookies.
6) Explain ServletContext interface.
7) Explain action element in JSP.
8) What are the advantages of JSP over Servlet?
9) Explain different types of implicit object in JSP.
10) Write Steps to create application of struts
12) Explain Hibernate web application

Question For 8 Marks

1) Define the term JSP? Explain JSP architecture in detail
2) Explain JDBC Architecture with Types of Divers
3) Explain JSP Lifecycle and elements of jsp?
4) Explain Servlet Architecture and Types of Servlet
5) What is Session? Explain Session tracking mechanism in servlet?
6) Explain Architecture of Hibernate in detail
7) What is mean by Java Bean? Explain Advantages and Disadvantages of Java Bean?
8) What is cookies and explain advantages and disadvantages of cookies in servlet
9) Explain types of JDBC drivers with suitable example
10) Explain Session tracking mechanism in Servlet?
11) Explain Architecture of struts in details
12) Explain JSP life cycle with Advantages of JSP

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
B.Sc.-III SEM V New CBCS (w.e.f. Nov 2021) EXAMINATION
OPERATING SYSTEM (PAPER XI) Marks- 80
QUESTION BANK

Questions for 02 MARKS

1) Write down the main purposes of an operating system?
2) What is Operating system?
3) What is Multiprogramming Operating system?
4) What is system model?
5) What is Time Sharing O.S.?
6) What is Real Time O.S.?
7) List out services provided of O.S.
8) What is disk scheduling?
9) Define Hard Real Time O.S.
10) Define Time Sharing O.S.
11) What is file?
12) What is System Model?
13) What is Thread?
14) List out types of system calls.
15) Define Virtual Machine
16) What is Throughput?
17) What is Waiting Time?
18) What is Response Time?
19) What is Turnaround Time?
20) Define Process and Program
21) List out differences between program and process.
22) What is Process Synchronization?
23) Define Context Switching with its Drawback.
24) Define Process Creation.
25) What is Process Termination.
26) What is paging ?
27) What is Co-Operating Process?
28) Define Concurrent Process.
29) What is process Synchronization?
30) What is mean by race condition?

Questions for 05 MARKS

1) Explain the different Services provided by Operating System?
2) Define the term process. Describe the contents of a Process Control Block (PCB)
3) Define the term deadlock? Explain the necessary conditions for deadlock to occur?
4) List out different types of operating system? Explain Time Sharing and
5) Distributed operating system
6) Explain concept of process with process state?
7) Explain FCFS scheduling algorithm with Example?
8) Short note on System Calls
9) Short note on File System structure
10) Short note on Swapping
11) Explain OS Structure with Diagram.
12) Explain Multiprogramming O.S. with advantages.
13) Explain Real Time O.S. With its types.

14) Explain Layered Approach.
15) Explain Disk Structure with Dig.

Questions for 06 MARKS

1) Explain Pre-Emptive-SJF Scheduling Algorithm.
2) Explain FCFS Scheduling Algorithm.
3) Explain SJF Scheduling Algorithm.
4) Explain Priority Scheduling Algorithm.
5) Explain Contiguous memory allocation with fixed sized partitions.
6) Explain Contiguous memory allocation with dynamic/variable sized partitions.
7) Explain Paging with advantages and dis-advantages.
8) Explain free space mgt. techniques.

Questions for 04 MARKS

1) Define Scheduling? Explain Types of Schedulers?
2) Explain process state with diagram?
3) Explain different File type in storage management?
4) Write note on Batch O.S.
5) Write note on Context Switching.
6) Explain in brief Process Creation
7) Write Note on Semaphore.
8) Write note on Overlays.
9) Explain Compaction with advantages and dis-advantages.
10) Explain in brief segmentation.
11) State four necessary conditions to occur Deadlock.
12) Write note on Sequential File Access method.
13) Write note FCFS scheduling algorithms.
14) Explain Process scheduling with its types.
15) Define File and state its attributes.

Questions for 08 MARKS

1) What are the different services of operating system?
2) What is page replacement? Write the working of LRU page replacement algorithm.
3) What is PCB ?Explain with neat diagram.
4) Explain the Reader-Writer problem in detail
5) Explain banker's algorithm with example?
6) Explain Dinning Philosopher problem in Process Synchronization
7) Explain Bankers Algorithm with example?
8) What is page replacement? Write the working of FIFO page replacement algorithm?
9) Define O.S. and Explain Components of O.S.
10) Define Scheduler and explain its all types.
11) Explain Reader Writers Problem with example.
12) Define File and explain various operations on file.
13) Define Process state and explain Process Life cycle with diagram.
14) Explain various file access methods with advantages and disadvantages.
15) Define Directory and Explain Types of directory structure.
16) What is System call? Explain types of system calls.
17) Explain working of RR and SJF scheduling algorithm with example.

B.Sc. – I (Semester – I) CBCS, Examination 2022

English (Compulsory)

Literary Voyage

Q. 2. Answer the following questions briefly. (Any Four of Six from Prose and Poetry)

1. What did the Chairman ask Gandhi ji?
2. What was the continuous preoccupation with Gandhi ji?
3. What was the major theme of the speeches delivered by Mahatma Gandhi?
4. What was the solution to the problem of poverty according to Gandhi ji?
5. How could the *wheel* bring about a change in the life of men and women in India?
6. When was Jadav Payeng given the Padma Shri award?
7. What is Jadav Payeng known for?
8. Where did Jadav Payeng start his work?
9. How did Jadav Payeng convert the Majuli island into a thick forest?
10. What were the personality traits of Jadav Payeng?
11. What is the theme of the account "The Portrait of a Lady" by Khushwant Singh?
12. Who is the main character in the story "The Portrait of a Lady"?
13. How is the grandmother described by Khushwant Singh?
14. How did the child Khushwant Singh attend the school in his grandmother's village?
15. How would the grandmother of Khushwant Singh feed the dogs?
16. What happened when Khushwant Singh became a young man?
17. Describe the death of the grandmother.
18. How did the sparrows react after the death of the grandmother?
19. What is the prayer of Rabindranath Tagore?
20. What is the theme of the poem "Let me not Pray to be Sheltered from Dangers"?
21. How did Rabindranath Tagore want to face dangers in his life?
22. How was Rabindranath Tagore going to achieve freedom in his life?
23. What is the theme of the poem "Lotus"?

24. What are the two quarreling flowers shown in “Lotus”?

25. What goddesses are referred to in “Lotus”?

26. How did the quarrel between the rose and lily come to an end?

27. What is the theme of the poem “The Toys” by Coventry Patmore?

28. What are the persons involved in the poem “The Toys”?

29. Why did the father slap the son?

30. How did the father react when he saw his son in his bedroom?

Q. 3. A. OR B. Broad question. (Any One of Two from Communication & Other Skills)

1. What is communication? Bring out the process of communication.

2. Describe the process of communication by illuminating all the steps.

3. Bring out a detailed note on the channels of communication.

4. What are the essentials of effective communication? Discuss.

5. Discuss the Richest channels versus the Leanest channels of communication.

6. Differentiate formal channels from inform channels of communication in detail.

7. Describe in detail the principles of effective communication.

8. What is narration? Discuss different types of narration.

9. Describe First, Second and Third person narrative styles.

10. Describe different types of narrative strategies in detail.

Q. 4. Broad question. (One question without options from Communication & Other Skills)

1. What is description? Discuss different characteristics of description.

2. Prepare a descriptive essay on the vegetable market in your city.

3. Describe the process of making tea by illuminating all the steps.

4. Describe a memorable trip you undertook during your college days.

5. Bring out a description of a memorable person in your life.

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B.Sc. – I (Semester – II) CBCS, Examination 2022

English (Compulsory)

Literary Voyage

Q. 2. Answer the following questions briefly. (Any Four of Six from Prose and Poetry)

1. What is the major contribution of Francis Bacon to English literature?

2. What is the main theme of the essay "Of Discourse"?

3. What is the role of wit in discourse according to Bacon?

4. What are the areas to avoid while making use of jest in discourse?

5. Why did Bacon say that discretion is more important than eloquence?

6. What is the central idea expressed in Bertrand Russell's "Does Education do Harm?"?

7. What businesspersons Russell refers to in the beginning of this essay?

8. What type of education Russell didn't like?

9. What type of education Russell preferred?

10. What was Russell's childhood experience about the squirrels?

11. How is real virtue according to Russell?

12. What is the central idea in Rabindranath Tagore's "The Spirit of Freedom"?

13. How did Tagore estimate America's treatment of freedom?

14. Why was Tagore not happy with the condition of freedom in America?

15. What is Rabindranath Tagore's definition of freedom?

16. Why was Rabindranath Tagore worried about the freedom of India?

17. What was the condition of freedom during the ancient times?

18. What is the theme of the poem "Our Earth will not Die"?

19. Why is Niyi Osundare hopeful about the future of the earth?

20. What is the structure of the poem "Our Earth will not Die"?

21. What is the condition of water, air and land according to Osundare?

22. Describe the ending of the poem "Our Earth will not Die".

23. What is the theme of the poem "Ode on Solitude" by Alexander Pope?

24. Who is the happy man according to Pope?

25. What are the qualities of a happy man according to Pope?

26. How would a happy man get his food and clothes?

27. How would Alexander Pope like die?

28. What is the theme of the poem “Remember”?

29. Whom is Christina Rossetti addressing in the poem “Remember” and how?

30. How is the ending of “Remember” done by the poet?

Q. 3. A. OR B. Broad question. (Any One of Two from Communication & Other Skills)

1. What are the factors in describing a process? Discuss.

2. Describe the process of making tea by illuminating different steps.

3. Describe the process of inserting sim card in the mobile with all the steps.

4. Bring out a description of making bread using all the steps.

5. Write down the steps involved in the process of making masala rice.

6. Imagine that you are a teacher at a school and you write a formal letter for seeking permission to organize a guest lecture on Science Day.

7. Write a letter of application addressing Principal, Silver Jubilee College for the post of Assistant Professor in Chemistry.

8. Write a letter of complaint addressing the Manager, Modern Electronics, about the problem with a recently bought handset there.

9. Write a letter seeking information about an institution named Saint Williams School of your city regarding its establishment, education offered, classes, achievements, etc.

10. Write a letter to the Editor, The Times of Mumbai and let him know your admiration of the recently published editorial on the current politics in the nation.

Q. 4. Broad question. (One question without options from Communication & Other Skills)

1. Make a presentation on the recently completed ‘IPL- 2022’ by making at least eight slides with concise details.

2. Write down a presentation on the topic ‘Freedom Struggle of India’ by making at least eight slides with precisely written relevant matter.

3. Make a presentation on your recent ‘Visit to a City’ by making at least eight slides with relevant data.

4. Bring out a presentation on the topic ‘My Favourite Cricketer’ by making at least eight slides with concise details.

5. Make a presentation on the topic ‘My Favourite Actor’ by making at least eight slides with concise details.

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Question Bank
Punyashlok Ahilyadevi Holkar Solapur University, Solapur
BSc I Sem-II (w. e. f. June 2019) P-III Organic Chemistry

Submitted by

Dr. Pratapsinha Gorepatil

Assistant Professor

Sangameshwar College, Solapur

Q.No. 1) Short Answer 2 marks each

i) Explain the fission of covalent bond with suitable examples.

ii) Define electrophilic substitution reaction with example.

iii) Define carbocation and write any one method of formation.

iv) Write structural formula of 3,3-dimethyl but-1-ene

v) Define the term hybridization. Give shape of following compounds a) CH_4 b) C_2H_2

vi) Explain sp hybridization with suitable example.

vii) Define a) Bond length b) Bond energy

viii) Explain hyperconjugation effect using toluene molecule.

ix) What are the alkanes and what is the general formula of alkane?

x) Explain Wurtz reaction with suitable example.

xi) What is the action of conc. HBr on cylcopropane ring.

xii) Explain Kolbe reaction.

xiii) How propene is prepared from 1-bromopropane

xiv) What happens when propene is treated with cold H_2SO_4?

xv) Explain term hydrohalogenation with suitable example.

xvi) Explain term dienes? Give their general formula.

xvii) Write short notes on element of symmetry

xviii) Write the structural formula of 2-chloro-3-bromobutane and identify the chiral centre.

xix) Define the meso compounds with suitable example.

xx) Define the enantiomers.

xxi) Define and explain aromaticity with suitable examples

xxii) What is mean by benzenoid and non-benzenoid aromatic compound? Give its examples.

xxiii) Define Aromatic substitution.

xxiv) What are the conditions for aromaticity?

xxv) What is the action of Dil. $KMnO_4$ with propene?

xxvi) What is the action of per acid on propene with propene?

xxvii) What is the action of BH_3/H_2O_2 on ethene?

xxviii) What is the action of acidic $KMnO_4$ with ethene?

xxix) What is the action of HOCl with ethene?

xxx) What is the action of H_2/Raney Ni with ethene?

Q.No. 2 A) Write short notes on any two of the following 4 marks each

i) Explain the structure and stability of carbocation

ii) Explain addition reaction with its sub types

iii) Write short note on resonance effect using suitable examples

iv) Write short note on bond angle with respect to sp, sp2, sp3 hybridization

v) What is the action of a) conc. H_2SO_4 b) H_2/Ni on cylcopropane ring.

vi) What are cycloalkanes? Write two methods for the preparation of cycloalkane.

vii) What is the action of a) H_2/Pd b) HCN on ethyne

viii) Write the structural formula for the given compounds a) 4,5-dimethyl hex-2-ene b) 4,4-dimethyl hex-2-yne c) but-3-yne d) but-1,3-diene

ix) Define and explain the terms a) Plane of symmetry b) Centre of symmetry

x) Give an account of isomerism exhibited by tartaric acid.

xi) Write short note on nitration of benzene

xii) Write short note on sulphonation of benzene.

xiii) Write short note on Diels-Alder reaction

xiv) Write chemical reaction of ozonolysis of propene

xv) Write short note on hydroboration of alkene by using suitable example.

Q. No. 3) Answer any Two of the following 4 marks for each

i) Explain types of reagents with its classification

ii) Explain the structure and stability of carbanion.

iii) Explain the orientation and reactivity of phenol with respect to resonance effect.

iv) Explain the steric effect with respect to mesitoic acid.

v) Write short note on internal Wurtz reaction.

vi) Write short note on Corey- House reaction

vii) Describe the various types of dienes with suitable examples.

viii) Explain the addition of HBr to propene with respect to Markownikoffs rule and anti-Markownikoffs rule.

ix) Explain the following terms by using suitable example a) Chiral centre b) Racemic modification.

x) Write short note on Friedel-Craft alkylation with suitable example and its mechanism.

xi) Explain the structure of benzene with respect to molecular orbital picture.

xii) What is mean by nitrenes? How nitrenes are prepared?

xiii) What is mean by carbenes? How carbenes are prepared?

xiv) Write short note on diastereoisomers.

xv) What is resonance? Explain resonance effect with respect to phenol.

Q.No.4) Answer any one of the following 8 marks each

i) Write short note on use of different types arrow with suitable examples.

ii) Explain and demonstrate sp3, sp2, sp hybridization by using suitable example.

iii) Write short note on free radical mechanism of halogenation of methane.

iv) What is dehydration? Explain the mechanism of dehydration of lower alcohols with suitable example.

v) What is geometrical isomerism? Explain the geometrical isomerism using maleic acid and fumaric acid

vi) What is Friedel-Craft reaction? Discuss the mechanism of Friedel-Craft acylation.

vii) What is optical activity? Discuss the optical isomerism of 2,3-dihydroxy butanoic acid.

viii) Explain reagent and its different types with suitable examples.

ix) Explain chirality? Give the condition for optical activity. Explain element of symmetry.

x) What are dienes? Give classification of dienes with suitable examples.