SLR-SA – 1

Seat No.	

Set P

B.Sc. I (Biotechnology) (Semester – I) (CBCS Pattern) Examination, 2018
ENGLISH (Comp.) (Old)
On Track – English Skills for Success

Day and Date : Wednesday, 28-3-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing the correct alternative : **14**

1) What did the policeman on the beat constantly do ?
   a) twirl his stick b) interrogate people on his beat
   c) smoke a cigar d) unlock doors

2) Jimmy Wells and Bob were raised in _____
   a) New York b) Chicago c) City d) Restaurant

3) The writer and Miss Krishna _____
   a) were at school together b) met at an exhibition
   c) met at a tea party d) were neighbours

4) In the end the narrator refused to accept all of Miss Krishna's possession except _____
   a) a cigarette lighter b) a little nine-inch clock
   c) a tiny glazed coffee cup d) a small Burmese box

5) 'The Myth of Artificial intelligence' is written by _____
   a) Anita Desai b) Attila Narin
   c) Nargis Dalal d) Dr. Abdul Kalam

6) The word 'intelligence' is derived from the Latin word _____
   a) intellegere b) intellect c) intellectual d) inter

7) The bangle sellers are carrying their loads _____
   a) to a married woman's house b) to the house of a maiden woman
   c) to a temple fair d) to the streets

P.T.O.

8) The phrase 'like the flame of her marriage' is the _____ used by the poet.
   a) Simile b) Metaphor
   c) Personification d) Alliteration

9) The Irish Airman was from _____
   a) Kiltartan Cross b) Dublin
   c) Kross Kitarton d) Kitron Cross

10) This is Ramu and this is _____ dog.
   a) his b) her c) its d) they

11) Ram, Seeta and Vijay went Mumbai and _____ ate Potato wada.
   a) he b) she c) it d) they

12) Doctor is a _____ noun.
   a) Proper b) Common c) Collective d) Countable

13) My friend returned home _____ 10 P.M.
   a) on b) in c) at d) to

14) She can take care of _____
   a) oneself b) herself c) her d) myself

2. Answer **any seven** of the following questions : **14**
   1) What sort of relationship did Bob and Jimmy share ?
   2) What is the climax of the story "After Twenty Years" ?
   3) What do you understand of Miss Krishna's childhood from the story ?
   4) What is the meaning of the word connoisseur ?
   5) What is meant by, 'artificial intelligence' ?
   6) Who is the narrator of poem ' The bangle sellers' ?
   7) What coloured bangles are suitable for a bride on bridal morn ?
   8) What does the phrase "this life, this death" refer to ?
   9) What does the speaker say about those he fights in the poem "An Irish airman foresees his death" ?

3. A) Write short paragraphs on **any two** of the following : **10**
   1) What makes the Computer Intelligent ?
   2) How Ms Krishna spent a few days with writer ?
   3) Describe the scene in the beginning of the story "After Twenty Years" .

   B) Describe the theme of the poem "Bangle Sellers". **4**

4. Answer the following question **any two** : **14**

   1) Superstitions.

   2) Define noun and its types with some examples.

   3) Define pronoun and its types with some examples.

5. Answer the following question **any two** : **14**

   1) Read the following passage carefully and make a note of it.

      Civilised man is by now well aware of the more obvious symptoms of water pollution : scum-covered rivers, stinking bays, and shorelines littered with bloated fish. The cause of much of it is equally clear: the indiscriminate dumping of raw sewage and industrial sludge into the nearest body of water has exceeded the absorptive capacity of the environment. Because the symptoms of this overflow are so compelling, it seems likely that we shall finally attempt to do something about it. But continued population growth makes it impossible that we shall find the funds to do more than skim off the chunks.

      Unfortunately, the most serious water-pollution treats are those which cannot be seen, smelt, or picked up by the handful. The organic content in many domestic water supplies which have been treated to some degree is apparently still high enough to protect viruses from the effects of chlorine. Hence tap water is a suspected transmission route for the alarming rise of infectious hepatitis in the United States today. Moreover, the vast array of chemicals which industry spews into the environment in many cases defies filtration. These chemicals now pervade not only rivers, lakes and even oceans, but also vast reservoirs of ground water. As with air pollutants, their possible toxic effects have in most case not even been adequately catalogued. Many, of course, are known to be fatal to fish, which is the mainstay of high quality protein supplies in much of the world.

   2) Write a paragraph on 'A Meaningful Education'.

   3) Write an essay on 'Impact of Mobiles on the Lives of the Youth Today'.

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SLR-SA – 2

Seat No.	

Set P

B.Sc. – I (Biotechnology) (Semester – I) Examination, 2018
ENGLISH (Compulsory) (New) (CBCS)
"Golden Petals"

Day and Date : Wednesday, 28-03-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by using the correct options. **14**

1) Mark Sennett and Mabel Normand first saw Charlie Chaplin in *A Night in an* _____ *Music Hall*.
   a) Italian b) American c) Indian d) English

2) Before Shanti Tigga getting selected as the first woman jawan, women were selected as officers in _____ combat units only.
   a) pro- b) re- c) non- d) post-

3) Vajasrawas donated Nachiketa to the God of Death, since he was
   a) very generous b) angered by his son
   c) fed up with his son d) poor and helpless

4) The Indian Army started to recruit female officers in the year
   a) 1992 b) 1994 c) 1996 d) 1991

5) The narrator in *I Find No Peace* says that he flew above the wind, yet he couldn't
   a) succeed b) die c) arise d) fall

6) According to Emily Dickinson the people who win are not able to define
   a) loss b) victory c) life d) death

7) "Likewise displeaseth me both life and death,
   And my _____ is causer of this strife."
   a) father b) enemy c) delight d) sorrow

8) The cattle in the photograph _____ to my friend.
   a) is belonging b) belong
   c) belongs d) belonging

9) The noun *friend* carries _____ gender.
   a) masculine b) neuter c) common d) feminine

10) She saw *herself* in the mirror.
   The word herself in the above sentence is _____ pronoun.
   a) a personal b) an emphatic
   c) a reciprocal d) a reflexive

11) He is such _____ unique person that everyone likes him.
   a) an b) a c) the d) no Article

12) If I were a bird, I would fly.
   The above sentence has _____ mood.
   a) Imperative b) Subjunctive
   c) Indicative d) Interrogative

13) I *did* a project.
   The word *did* in the above sentence is a
   a) helping verb b) modal c) main verb d) semi-modal

14) Have you seen _____ Mount Everest ?
   a) a b) the c) no Article d) an

2. Answer the following bits in **two** to **three** sentences **each**. (**Any Seven**) **14**

1) Why did Charlie Chaplin feel that he should return to the stage ?
2) How did Shanti Tigga join the Indian Army ?
3) Why was Nachiketa disappointed by his father, Vajasrawas ?
4) How did the New York writer review Chaplin's first movie *Making a Living* ?
5) What qualities of Shanti Tigga motivated the Indian President to honour her ?
6) Why did Yama give three boons to Nachiketa ?
7) What acting qualities of Charlie Chaplin impressed the audiences ?
8) What does the unexpected death of Shanti Tigga mean ?

3. A) Answer the following questions in about **50** words **each**. (**Any two**) **8**
   1) What do you mean by communication ?
   2) How do you describe the *what*, *why* and *how* of communication ?
   3) How will you communicate to you younger brother the recipe of making tea ?

   B) Write short notes on the following. (**Any two**) **6**
   1) What is the central theme of the poem *I Find No Peace* ?
   2) Why does Emily Dickinson say the purple Host can't tell the definition of victory ?
   3) Why did the poet in *I Find No Peace* experience contradictory feelings ?

4. Answer the following elaborately. (**Any one**) **14**
   1) Bring out in detail the communication process by illuminating its stages.
   2) Describe the importance of *Mind, Medium and Message* in effective communication.

5. Interpret the Seven Cs-Completeness, Clarity, Correctness, Conciseness, Consideration, Courtesy and Concreteness in a successful communication. **14**

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SLR-SA – 3

Seat No.	

Set P

B.Sc. – I (Biotechnology) (Semester – I) (CBCS) Examination, 2018
ECOLOGY AND MICROBIOLOGY
Paper – I : Ecology

Day and Date : Saturday, 31-3-2018 Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

1. Rewrite the sentence using correct alternative given below : **14**

i) Approximate 75% planet earth is covered by _____
   a) Biosphere b) Lithosphere
   c) Hydrosphere d) Atmosphere

ii) Stratosphere is also known as _____
   a) Stratospause b) Troposphere
   c) Ozonosphere d) Ionosphere

iii) The stratosphere has a narrow boundary called the _____ Which has constant region ?
   a) Stratopause b) Tropopause
   c) Mesopause d) Mesosphere

iv) Plants growing in less water are called as _____
   a) Mesophytes b) Hydrophytes
   c) Xerophytes d) Halophytes

v) _____ deals with study of interaction of living and non living things.
   a) Ecosystem b) Ecology
   c) Topology d) Environment

vi) In an ecosystem _____ flow unidirectionally.
   a) Nitrogen b) Carbon
   c) Potassium d) Free energy

vii) Which of the following is primary consumer ?
   a) Producer b) Top carnivore
   c) Carnivore d) Herbivore

viii) The ecological succession begins from the primitive substratum called as _____ succession.
a) Primary b) Secondary
c) Autogenic d) Heterotrophic

ix) River ecosystem is _____ type of ecosystem.
a) Natural b) Lotic
c) Marine d) Limnic

x) _____ is not type of Ex situ conservation.
a) Zoo b) Nurseries
c) Forest d) Laboratories

xi) Sulphur is a type of _____ cycle.
a) Hydrological b) Gaseous
c) Sedimentary d) All of above

xii) Organisms feed on autotrophs called as _____
a) Autotrophs b) Heterotrophs
c) Saprophytes d) Phytoplankton

xiii) The term ecology was coined by _____
a) E. P. Odum b) A. G. Tansley
c) Charles elton d) Juday

xiv) CO_2 concentration in atmosphere is _____
a) 0.3% b) 0.03%
c) 0.003% d) 0.33%

2. Define and explain **any seven** (out of **nine**) of the following : **14**

i) Environment
ii) Lithosphere
iii) Heterotrophs
iv) Hot spot
v) Biogeochemical cycle
vi) Ecological succession
vii) Net productivity
viii) Biodiversity
ix) Evapotranspiration.

3. A) Attempt **any two** (out of **three**) of the following : **10**

   i) Write a short note on hydrosphere.

   ii) Explain productivity of ecosystem.

   iii) Explain about Narmada Bacchao Andolan.

   B) Explain in detail Biosphere. **4**

4. Attempt **any two** (out of **three**) of the following : **14**

   i) Give a detailed account on atmosphere.

   ii) Explain in brief terrestrial ecosystem with any one types.

   iii) Explain conservation and management of natural resources.

5. Attempt **any two** (out of **three**) of the following : **14**

   i) Explain forest as natural resources its conservation and management.

   ii) Write a note on biodiversity in India.

   iii) Explain in detail gaseous cycle and their importance.

SLR-SA – 4

Seat No.	

Set **P**

B.Sc. I (Semester – I) (CBCS) Examination, 2018
(Biotechnology)
ECOLOGY AND MICROBIOLOGY
Paper – II : Microbiology

Day and Date : Monday, 2-4-2018 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*

*2) Figures to the **right** indicate **full** marks.*

*3) Draw **neat** labeled diagrams **wherever** necessary.*

1. Choose the correct alternative and rewrite the sentences again. **14**

i) Cell membrane of Mycoplasma contain high amount of _____ which gives rigidity.

a) Sterols b) Phospholipid
c) Peptidoglycan d) Lipopolysaccharide

ii) Viruses that can infect the bacterial cells are known as _____.

a) Zoophages b) Phytophages
c) Bacteriophages d) All of these

iii) Rickettsia are _____ type of organism.

a) Gram Positive b) Gram Negative
c) Both d) None of these

iv) _____ are the bacterial invasions.

a) Cell wall b) Capsule
c) Cell membrane d) Mesosomes

v) The germ theory of disease was proved by _____.

a) Louis Pasteur b) Joseph Lister
c) Robert Koch d) Antony Van Leeuwenhoek

P.T.O.

vi) Agar-agar is isolated from _____

a) Bacteria b) Fungi c) Algae d) Viruses

vii) Father of microbiology is

a) Louis Pasteur b) Joseph Lister

c) Robert Koch d) Antony Van Leeuwenhoek

viii) In the Gram positive bacteria _____ amount of peptidoglycan present in the cell wall.

a) 10-30% b) 50-80% c) 40-90% d) 15-20%

ix) Antiseptic surgery and pure culture technique was developed by

a) Joseph Lister b) Edward Jenner

c) Antony Van Leeuwenhoek d) Robert Koch

x) Protein coat of virus is called as

a) Viriod b) Virion c) Capsomer d) Capsid

xi) Bacterial ribosomes are of _____ type.

a) 80S b) 90S c) 70S d) 100S

xii) M-ring of flagellum present in _____.

a) Cell wall b) Endospore

c) Cell membrane d) Pili

xiii) _____ microorganism shows pleomorphism.

a) *E.coli* b) *B.Subtilis*

c) *Staphylococci* d) *Rhizobium*

xiv) _____ scientist discovered penicillin antibiotic.

a) Antony Van Leeuwenhoek b) Edward Jenner

c) Alexander Fleming d) Robert Koch

2. Define and explain **any seven** of the following : **14**

   i) Tyndallization

   ii) Geomicrobiology

   iii) Viurs

   iv) Alexander Fleming

   v) Mesosomes

   vi) Rickettsia

   vii) Industrial microbiology

   viii) Pili

   ix) Gnotobiology

3. A) Answer **any two** of the following **:** **10**

      i) Explain in detail arrangement of bacteria.

      ii) Describe in detail types of microorganism.

      iii) Write in detail beneficial and Harmful activities of microorganism.

   B) Difference between prokaryotic and Eukaryotic cell. **4**

4. Answer **any two** of the following **:** **1 4**

   i) Write in detail structure and functions of Gram positive cell wall.

   ii) Explain in detail general characteristics of Archaebacteria.

   iii) Describe in detail structure and function of endospore.

5. Answer **any two** of the following **:** **1 4**

   i) Explain in detail applied branches of microbiology.

   ii) Describe in detail structure and function cytoplasmic membrane.

   iii) Write in detail general characteristics, classification and cultivation of Fungi.

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SLR-SA – 5

Seat No.	

Set P

B.Sc. – I (Biotechnology) (Semester – I) (CBCS) Examination, 2018
INTRODUCTION TO BIOSCIENCES
Paper – I : Animal Science

Day and Date : Tuesday, 3-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw neat and labeled diagrams **wherever** necessary.*
*3) Figures to **right** indicates **full** marks.*

1. Rewrite the following sentences by using correct alternative : **14**

1) *P.vivax* have a incubation period may be delayed for as long as
a) 6-9 months b) 12-14 months c) 1-2 weeks d) 2-3 weeks

2) _____ tissue is formed from the cells of ectoderm, mesoderm and endoderm.
a) Connective b) Muscular c) Epithelium d) Nervous

3) Silkworms are attacked by _____ diseases.
a) Fungal b) Bacterial c) Viral d) All of these

4) Bone contains about _____ % of inorganic salts, which make bones very hard or rigid.
a) 52% b) 45% c) 65% d) 88%

5) _____ gland secretes a watery fluid.
a) Mucous b) Serous c) Mixed d) Miscellaneous

6) Communication in honey bee was discovered by
a) Karl-von Frisch b) Carl Linnaeus c) Darwin d) Wallace

7) _____ cells secrets testosterone hormone.
a) Sertoli b) Leydig's
c) Nurse d) Ovarian follicle

8) _____ is the best biofertilizer.
a) Lac culture b) Pearl culture c) Vermiculture d) Apiculture

9) The number of RBCs in normal adult human male is _____ million/ mm^3.
a) 4.88 b) 5.00 c) 5.74 d) 8.20

10) _____ epithelium is found in inner lining of lung alveoli.
a) Simple squamous b) Simple cuboidal
c) Simple columnar d) Pseudostratified

11) _____ mater is outermost tough membrane of the spinal cord.
a) Pia mater b) Dura mater c) Arachnoid d) Pars nervosa

12) ADH is also known as
a) Stress hormone b) Dark hormone
c) Vasopressin d) ANF

13) _____ is also called as HCl cells in stomach.
a) Chief cell b) Parietal cells c) Goblet cells d) Hepatic cells

14) Snow animals are white due to _____ colouration.
a) Cryptic b) Aggressive c) Warning d) None of these

2. Answer **any seven** of the following : **14**
i) Define : (a) Enamel (b) Dentine.
ii) Sketch and label the L.S. of kidney.
iii) Write a note on amoebic dysentery.
iv) Give the importance of aquaculture.
v) Explain the types of mimicry.
vi) Write a note on simple cuboidal epithelial tissues.
vii) Which are the types of papillae in tongue ?
viii) Distinguish between hyaline and elastic cartilage.
ix) Write a note on adenohypopysis.

3. A) Answer **any two** of the following : **10**
i) Write in brief about vermiculture.
ii) Describe in brief nuptial flight and communication.
iii) Explain in detail T.S. of oesophagus and stomach.
B) Give the location, structure and function of columnar epithelial tissue. **4**

4. Answer **any two** of the following : **14**
i) Describe casts, types, life cycle and economic importance of honey bees.
ii) Describe the glands associated with digestive systems.
iii) Explain in details histology of ovary and salivary glands.

5. Answer **any two** of the following : **14**
i) Explain in detail types of muscular tissue.
ii) Describe external morphology and life cycle of *Bombyx mori*.
iii) Describe life cycle *Schistosoma* and add a note on its parasitic adaptations.

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SLR-SA – 6

Seat No.	

Set P

B.Sc. I (Semester – I) (CBCS) Examination, 2018
BIOTECHNOLOGY (Paper. No. – II) (Plant Sciences)
Introduction to Biosciences

Day and Date : Wednesday, 4-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labeled diagram wherever necessary.*

1. Choose the most correct alternative for the following and rewrite the sentence. **14**

1) _____ algae used as biofertilizer.
a) *Nostoc* b) *Sargassum* c) *Spirogyra* d) *Gracillaria*

2) _____ is simple tissue.
a) Xylem b) Phloem c) Parenchyma d) All the above

3) On the basis of origin, the meristems are classified into _____ types.
a) one b) two c) three d) four

4) Amphivasal vascular bundle is the type of _____ vascular bundle.
a) radial b) conjoint c) amphicribal d) concentric

5) Female reproductive whorl of flower is called
a) sepal b) petal c) stamen d) carpel

6) Pollination takes place by wind is called
a) entomophily b) ornithophily c) anemophily d) hydrophilly

7) Eterio of achene is an example of _____ fruit.
a) simple b) aggregate c) composite d) all type

8) All fungi are
a) autotrophic b) heterotrophic
c) photosynthetic d) chemosynthetic

9) Apical cell theory is proposed by
a) Hofmeister b) Schmidt c) Hanstein D) Nageli

10) Well distinguished flower is present in
a) Bryophyte b) Pteridophyte c) Gymnosperm d) Angiosperm

11) First land plant belongs to
a) Bryophyte b) Pteridophyte c) Gymnosperm d) Angiosperm

12) Anther is the part of
a) sepal b) petal c) stamen d) carpel

13) Coconut fruit is an example of _____ fruit.
a) drupe b) berry c) achene d) sorosis

14) Trichome is a type of _____ tissue system.
a) epidermal b) secretory c) vascular d) mechanical

2. Attempt **any seven** of the following. **14**
1) Give any two examples of fresh water algae.
2) What is fungi ?
3) What is flower ?
4) Define pollination.
5) What is periderm ?
6) Enlist the type of conducting tissue.
7) Give the names of flavor producing plants.
8) Draw neat labeled diagram parenchyma.
9) Write any two functions of meristem.

3. A) Attempt **any two** of the following. **10**
1) Classify the meristem on the basis of position.
2) Explain the structure of dicot seed.
3) Write the general characters of Fungi.

B) Explain in brief Tunica-Corpus theory. **4**

4. Attempt **any two** of the following. **14**
1) Explain in brief internal organization of monocot stem.
2) Give an account of food crops studied by you.
3) What is vascular bundle ? Describe conjoint type of vascular bundle.

5. Attempt **any two** of the following. **14**
1) Describe in brief development of male gametophyte.
2) Explain structure and function of simple tissue.
3) Write general characters and any four economic importance of gymnosperm.

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SLR-SA – 7

Seat No.	

Set **P**

B.Sc. Biotechnology (Part – I) (Semester – I) (CBCS)

Examination, 2018

FUNDAMENTALS OF CHEMISTRY AND BIOPHYSICS

Paper – I : Chemical Science

Day and Date : Thursday, 5-4-2018 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

Instructions** : 1) **All** questions are **compulsory.

*2) Draw neat diagram and give equations **wherever** necessary.*

*3) Figures to the **right** indicate **full** marks.*

*4) **Use** of log table or calculator is **allowed.***

1.Choose the most correct alternative from **each** of the following : **14**

1) _____ is an example of covalent compound.

a) CH_4 b) KNO_3 c) KCl d) HCl

2) Methane involves _____ hybridization of carbon.

a) sp b) sp^2 c) sp^3 d) sp^3d

3) In case of ethane Carbon-Carbon bond length is _____ A^0.

a) 1.54 b) 1.34 c) 1.44 d) 1.25

4) _____ molecule has non zero dipole moment.

a) m-Dichlorobenzene b) CBr_4

c) CCl_4 d) Benzene

5) _____ molecule involves intra molecular hydrogen bonding.

a) HF b) Cl_2

c) H_2 d) o-Nitro phenol

P.T.O.

6) _____ is an example of non-polar solvent.
   a) Methyl alcohol b) Benzene
   c) Water d) o-Nitro phenol

7) For a second order reaction with equal concentration the half-life period, $t_{1/2}$ is given by
   a) 1/k×a b) 1/k c) 1/a d) k×a

8) If 10 g of NaOH is dissolved in 100 ml water the solution will be _____ NaOH solution.
   a) 1N b) 2M c) 10% d) 4M

9) Velocity constant k of second order reaction is expressed in
   a) $mol.lit^{-1}, S^{-1}$ b) $dm^3.mole^{-1}S^{-1}$
   c) $lit^{-1}.mole^{-1}\ S^{-1}$ d) All of these

10) When weight of compound equal to its equivalent weight is dissolved in 1000 ml of solvent, the solution will be one _____ solution.
   a) Molar b) Normal c) Percent d) Molal

11) $3H_2(g) + N_2(g) + Fe(s) \longrightarrow 2\ NH_3(g)$ is an example of
   a) Heterogeneous catalysis b) Homogeneous catalysis
   c) Enzyme catalysis d) All of these

12) The phenomenon of suppression of the degree of dissociation of a weak acid or a weak base by the addition of a strong electrolyte containing a same ion is known as _____ effect.
   a) Osmosis b) Addition c) Solubility d) Common ion

13) _____ bonds are present in simple proteins.
   a) Phospodiester b) Coordinate c) Peptide d) Ionic

14) A process by which molecules of a solvent tend to pass through a semipermeable membrane from a less concentrated solution into a more concentrated one is called as
   a) Osmosis b) Reverse osmosis
   c) Dilution d) Transportation

2. Answer **any seven** of the following : **14**

   1) Explain what are buffers.

   2) What is one percentage solution ?

   3) Give any two general characteristics of enzyme catalyzed reactions.

   4) Define dipole moment, mention its significance.

   5) What are colligative properties ? Give one example.

   6) Write integrated rate expression second order reaction with equal and unequal concentration.

   7) Mention any two characteristics of first order reaction.

   8) Define hypotonic and isotonic solution.

3. A) Answer **any two** of the following : **10**

      1) What is common ion effect ? Explain in details with example.

      2) Define and explain the following terms with example (a) Molarity (b) Normality.

      3) Define catalysis, explain its types with example.

   B) The half life of a second order reaction is 40 minutes, when the initial concentrations of reactants are 0.05 M each what is the velocity constant of the reaction. **4**

4. Answer **any two** of the following : **14**

   1) Explain the concept of SP hybridization with respect to ethyne molecule.

   2) Derive an integrated rate expression for second order reaction with equal concentration.

   3) Define solvent, solute and solvation energy; explain different factors affecting solubility.

5. Answer **any two** of the following : **14**

   1) If molecular weight of solid NaOH is 40 units, how will you prepare 1N, 2M and 2% of 1000 ml NaOH solutions ?

   2) Explain the terms rate constant, order and molecularity of reaction.

   3) What are ionic and covalent solids ? Mention examples and give comparison between them.

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SLR-SA – 8

Seat No.	

Set **P**

B.Sc. I (Semester – I) Biotechnology (CBCS Pattern)
Examination, 2018
FUNDAMENTALS OF CHEMISTRY AND BIOPHYSICS
Biophysics (Paper – II)

Day and Date : Friday, 6-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N.B. *: i) All questions are **compulsory**.*
*ii) Figures to the **right** indicate **full** marks.*
*iii) **Neat** diagrams should be drawn **wherever** necessary.*

1. Select the correct alternative from the following. **14**

i) The point on the stress strain curve at which the wire breaks is
   a) neck point b) yield point
   c) breaking point d) elastic limit point

ii) In Helium-Neon Laser, type of pumping is
   a) optical b) electrical c) chemical d) thermal

iii) The angle of contact is _____ for the liquid which partially wets the solid.
   a) obtuse b) zero c) right angle d) acute

iv) Doppler effect is exhibited by
   a) only longitudinal waves b) only mechanical waves
   c) only electromagnetic waves d) all types of waves

v) Dimensions of stress are
   a) $[M^2L^{-1}T^{-2}]$ b) $[M^1L^{-1}T^{-2}]$ c) $[M^1L^1T^{-2}]$ d) $[M^{-1}L^2T^{-1}]$

vi) Viscosity of water _____ with increase in pressure.
   a) increases b) decreases
   c) remains constant d) may increase or decrease

vii) Ultrasonic waves have frequency

a) less than 20 Hz b) between 20Hz and 20KHz

c) greater than 20 KHz d) exactly 1Hz

viii) By Brewster's law, polarising angle (i_p) and refractive index (μ) are related as

a) $\mu = \sin(i_p)$ b) $\mu = \cos(i_p)$ c) $\mu = \tan(i_p)$ d) $\mu = \left(1/i_p\right)$

ix) When the temperature of liquid increases, the surface tension

a) decreases b) increases

c) remains same d) may increase or decrease

x) For propagation of _____ material medium is required.

a) electromagnetic waves b) light waves

c) mechanical waves d) x-rays

xi) Young's modulus is the property of

a) liquids and gases b) only liquids

c) solids and liquids d) only solids

xii) When a ray of light travels from rarer medium to denser medium then light ray bends _____ the normal.

a) parallel to b) perpendicular to

c) away from d) towards

xiii) When sparingly soluble substance is dissolved in water, its surface tension

a) increases b) decreases

c) does not change d) may increase or decrease

xiv) In streamline flow _____ of liquid at a point is constant.

a) acceleration b) velocity c) density d) temperature

2. Answer **any seven** of the following. **14**

1) What do you mean by capillary action ?

2) State Hook's law.

3) What is Doppler effect ?

4) What is population inversion ?

5) Define the terms stress and strain.

6) What is the effect of temperature on viscosity of liquids ?

7) State the principle of superposition of waves.

8) What is pressure energy of liquid ?

9) Give the relation between surface tension, excess pressure and radius of curvature.

3. A) Answer **any two** of the following. **10**

1) Explain the stress strain curve with a neat labelled diagram.

2) Define surface tension and explain in brief any two applications of surface tension.

3) What are transverse and longitudinal waves ? State any three characteristics of each.

B) Describe in brief the venturimeter. **4**

4. Answer **any two** of the following. **14**

1) Explain spontaneous emission and stimulated emission. Draw neat diagram of He-Ne Laser.

2) Define three moduli of elasticity and explain the importance of elasticity.

3) Describe Jaeger's method for measurement of surface tension.

5. Answer **any two** of the following. **14**

1) What are ultrasonic waves ? State the properties and applications of ultrasonic waves.

2) What is polarization by double refraction ? Discuss Nicol Prism.

3) State Bernoulli's theorem and describe the working of pitots tube.

SLR-SA – 9

Seat No.	

Set **P**

B.Sc. I (Biotechnology) (Semester – I) (CBCS) Examination, 2018
CELL BIOLOGY AND BIOSTATISTICS
Paper – I : Cell Biology

Day and Date : Saturday, 7-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** and labeled diagrams **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*

1. Rewrite the following sentences by using correct alternative. **14**

1) Lysosome is called as _____ of the cell.
   a) Protein factory b) Suicide bags
   c) Heart d) Power house

2) Programmed cell death is called as
   a) Necrosis b) Cell quit
   c) Cell termination d) Apoptosis

3) _____ is not a property of cancerous cell.
   a) Metastasis b) Angiogenesis
   c) Autocrine signaling d) Contact inhibition

4) _____ is a initiation codon.
   a) UAA b) UGA c) UAG d) AUG

5) Microfilaments are polymer of
   a) Tubulin dimer b) Globular actin
   c) Keratin d) None of these

6) Fluid mosaic model of plasma membrane was proposed by
   a) Watson and Crick b) Singer and Nicolson
   c) Teamin and Baltimore d) Jacob and Monad

7) End of chromosome is called
   a) Centromere b) Chromomere
   c) Telomere d) Chromocentre

8) _____ are known communication junctions.
   a) Desmosomes b) Hemi-desmosomes
   c) Gap junctions d) Tight junctions

9) _____ are known as secondary messenger molecule.
   a) Ca^{++} b) IP3 c) cAMP d) All of these

10) Polytene chromosomes are found in
   a) Human b) Chironomuos c) Maggots d) Monkey

11) _____ is an example of active transport.
   a) Simple diffusion b) Facilitated diffusion
   c) Osmosis d) Na-K ATPase pump

12) Crossing over is occur in _____ phase of prophase-I in meiosis.
   a) diplotene b) zygotene c) leptotene d) pachytene

13) _____ are required to localize proteins in nucleus.
   a) Nuclear localization signal b) Nucleolar localization signal
   c) Nuclear loading signal d) Nuclear localization tagging

14) _____ is main component of plant cell wall.
   a) glycogen b) cellulose c) protein d) peptidoglycan

2. Answer **any seven** of the following : **14**

i) What are communication junctions ?
ii) Give significance of meiosis.
iii) What are PPLOs ?
iv) What is cell senescence ?
v) What are actin filaments ?
vi) Distinguish between euchromatin and heterochromatin.
vii) What is cell growth ?
viii) Write note on Wooble hypothesis.
ix) What is proton pump ?

3. A) Answer **any two** of the following : **10**
   i) Describe ultra structure and function of typical eukaryotic chromosome.
   ii) Describe ultra structure of plant cell.
   iii) Explain fluid mosaic and unit membrane model of plasma membrane.

   B) Describe different types of cell signaling. **4**

4. Answer **any two** of the following : **14**
   i) Describe process of mitosis and add a note on its significance.
   ii) Describe properties of genetic code.
   iii) Describe passive transport with suitable examples.

5. Answer **any two** of the following : **14**
   i) Describe process of protein trafficking in mitochondria and nucleus.
   ii) Describe ultra structure of nucleus.
   iii) Describe structure and functions of microtubules with suitable example.

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SLR-SA – 10

Seat No.	

Set P

B.Sc. – I (Biotechnology) (Semester – I) (CBCS) Examination, 2018
CELL BIOLOGY AND BIOSTATISTICS
Paper – II : Biostatistics

Day and Date : Monday, 9-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Use of basic calculator is ***allowed****.*
4) Use graph paper ***wherever*** *necessary.*

1. Rewrite the following sentences by using correct alternative : **14**

1) Example of continuous variable is
   a) Weight of a book b) Number of words in the paragraph
   c) Number of pages in the book d) Number of books in the library

2) In a table the headings of the column are called
   a) Stubs b) Captions c) Titles d) Source Note

3) If the sum of 'n' observations is 525 and their mean 25, then the value of n is
   a) 21 b) 25 c) 52.5 d) 5.25

4) Shirt size of the most of the people in India is No. 40. Which measure of central value does it represent ?
   a) Mean b) Median c) Mode d) Average

5) Relative frequency of the variable is always
   a) in percentage b) a fraction
   c) an integer d) an irrational number

6) Following is an example of qualitative data
   a) Height of a house b) Colour of a bike
   c) Shirt size d) Time to finish the race

7) If X = Largest and Y = Smallest value in the data then the coefficient of range is
   a) $(X + Y)/(X – Y)$ b) $(X – Y)/X$
   c) $(X – Y)/(X + Y)$ d) X/Y

P.T.O.

8) If the unit of observations is cm the unit of variance of these observations is
   a) cm b) m c) cm^2 d) no unit

9) Which of the following is a possible value of the correlation coefficient ?
   a) 1.2 b) – 0.9 c) 1.01 d) –1.01

10) Let A be event of rolling a die. Let B be event of an even number between 5 to 9, then $A \cap B$ is
   a) {5, 6} b) {6} c) {4, 6} d) { }

11) If A and B are two events, the probability of occurrence of both A and B is given as
   a) P(A) + P(B) b) $P(A \cup B)$ c) $P(A \cap B)$ d) $P(A) \cdot P(B)$

12) A sample is _____ of population.
   a) Super set b) Power set c) Sub set d) Complement

13) The sum of the probabilities of all sample events in the sample space must be equal to
   a) 0 b) –1 c) 1 d) 0.5

14) If the frequency distribution has classes, 30-31, 32-33, 34-35, then lower class boundary of the class 32-33 is
   a) 32 b) 32.5 c) 31.5 d) 31

2. Attempt **any five** of the following : **14**

1) Define 'Class width' and give an example.

2) State merits of 'Mode'.

3) The marks obtained by 10 students are 58, 70, 67, 49, 73, 64, 57 66, 71, 75. Calculate the mean marks.

4) Compute the coefficient of range for data 42, 55, 79, 16, 55, 69, 13, 26, 95.

5) If $b_{yx} = 0.2$ and the correlation coefficient $r = 0.6$, then find b_{xy}.

6) What is the probability of getting "a perfect square number" in single throw with die ?

7) If $P(A) = 0.3$, $P(B) = 0.4$ and $P(A \cap B) = 0.5$, find $P\left(\frac{A}{B}\right)$.

8) If standard deviation of 10 observations is 4.7, find standard error.

9) For the data, if standard deviation is 3 and mean is 14 then find the coefficient of variation.

3. A) Attempt **any two** of the following : **10**

1) Calculate mode marks from the following data :

Marks	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	5	16	32	13	10	4

2) Write five important applications of Biostatistics in detail.

3) A single card is drawn from a pack of 50 cards, numbered from 1 to 50. Find the probability that it is a multiple of 5 or a multiple of 6.

B) Solve the following : **4**

Population of birds on 100 trees are as follows :

No. of birds	0-10	10-20	20-30	30-40	40-50	50-60
No. of trees	9	21	27	18	19	6

Draw a Histogram.

4. Attempt **any two** of the following : **14**

1) Draw less than and more than Ogive for the following data :

X	10-20	20-30	30-40	40-50	50-60	60-70	70-80
F	8	10	17	15	11	5	4

2) Find the coefficient of correlation (r) from the following data :

X	4	5	6	7	8	9	10
Y	6	7	8	9	10	11	12

3) Find the standard deviation (σ) from the following data :

Class	4	6	7	8	9	10	11
Frequency	3	6	9	12	8	5	4

5. Attempt **any two** of the following : **14**

1) Find the regression equation X on Y from the following data :

X	5	3	7	4	8	2	10	6	8	7
Y	8	6	8	5	9	6	8	5	11	7

2) A coin is tossed 50 times of which head comes 32 times. Use Chi-square test to test the hypothesis that the coin is normal, having no bias for either head or tail (Table value : 3.84).

3) Find the mean deviation about mean of the following series :

Class	0-5	5-10	10-15	15-20	20-25
Frequency	4	6	20	7	3

SLR-SA – 11

Seat No.	

Set P

B.Sc. (Part – I) (Biotechnology) (Semester – II) (CBCS Pattern) (Old)
Examination, 2018
ENGLISH (Compulsory)
On Track – English Skills for Success

Day and Date : Thursday, 12-4-2018 Max.Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

1. Rewrite the following sentences by choosing the correct alternatives : **14**

1) According to Nani Palkhivala _____ is the eighth deadly sin.
a) Hatred b) Anger c) Ignorance d) Ideology

2) _____ have created more deaths and human misery than all the weapons of mass destruction.
a) Strife b) War
c) Human rights violations d) None of the above

3) Vivekananda's first night in Chicago after having met J. H. Wright was spent
a) At the house of Wright's friend b) In a wooden cabin
c) In a big, empty box d) None of the above

4) Who represented Theosophical Society in the parliament of religion at Chicago ?
a) Vivekanand b) Gandhi
c) Dharmapala d) Chakravarti and Annie Besant

5) Which of the following place did Vivekananda not pass while travelling to America ?
a) Ceylon b) Singapore c) Australia d) Penang

6) Dr. Kalam had tested _____ successfully in France.
a) SLV-3 apogee motor b) V-2 Missile
c) Jupiter Missile d) None of the above

7) Who suffer from Not Invented Here Complex (NIH) ?
a) Germans b) Americans c) Russians d) French

8) The poem 'Brahma' is written by
   a) Robert Hayden b) W. B. Yeats
   c) Sarojini Naidu d) Ralph Waldo Emerson

9) The term 'bubble house' refers to
   a) The moon b) The sun c) Stars d) The mars

10) Vivekananda reached Chicago in the month of
   a) September b) December c) February d) July

11) Shanta and Kamal have gone on a holiday. We are taking care of _____ dog for them.
   a) Its b) His c) Their d) There

12) The words 'reveal and conceal' are
   a) Antonyms b) Synonyms
   c) Homographs d) Homophones

13) The words 'die and dye' are
   a) Antonyms b) Synonyms
   c) Homographs d) Homophones

14) Savita is the _____ of all my friends.
   a) More childish b) Most childish
   c) Childish d) None of the above

2. Answer **any seven** of the following questions : **14**

1) Who was Wernher von Braun ?

2) Why did Dr. Kalam question the term 'workaholic' ?

3) What is the first requirement to get into 'Flow' ?

4) Which is the oldest human rights organization ? When was it founded ?

5) How did people respond to Vivekananda's opening words at parliament of religion ?

6) Who introduced Vivekananda to J. H. Wright ? How did J. H. Wright help Vivekananda ?

7) Which is the most dangerous animal in the world ? How does Palkhivala prove it ?

8) Why does Palkhivala say that world continues to be 'less than half free' ?

3. A) Write short answers on **any two** of the following : **8**

   1) What is the central theme of the poem 'Brahma' ?

   2) Does our perception of the moon has changed ? How ?

   3) How does Emerson use contrast in the poem effectively to convey his message ?

   B) Answer **any two** of the following questions briefly : **6**

   1) What are the components of an official formal email letter ?

   2) What is a C.V. ?

   3) What are the features of a notice ?

4. Answer **any one** of the following question : **14**

   A) You are secretary of English Literary Association in your college. The association is organising a national level elocution competition for college students. Prepare the notice and agenda for the meeting of the association.

   B) You are Sunita Sharma, a postgraduate in Physics. Write an email application letter in response to an advertisement in the newspaper for the post of assistant professor in physics to the Principal, Modern College of Arts and Science, Mumbai.

5. You are postgraduate in Commerce. Prepare a C. V. for the post of Assistant Manager in a Co-operative bank. **14**

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SLR-SA – 12

Seat No.	

Set P

B.Sc. – I (Biotechnology) (Semester – II) (New CBCS) Examination, 2018
ENGLISH COMPULSORY
Golden Petals

Day and Date : Thursday, 12-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing the correct option given below : **14**

1) Letter to a teacher was written by _____ students.
a) 7 b) 8 c) 5 d) 3

2) 'My Duty to My Neighbour' is taken from the book _____
a) The Value of Life b) The Value of Society
c) The Value of Neighbour d) The Value of Relations

3) Jim Corbett was born in _____
a) 1875 b) 1865 c) 1855 d) 1845

4) _____ animal's alarm call did the author use to calm down the irritation of his throat.
a) Cat b) Dog c) Langur d) Monkey

5) The English translation of 'Letter to a Teacher' was published in _____
a) 1970 b) 1960 c) 1965 d) 1955

6) The authors of the book 'Letter to a Teacher' belonged to _____ families.
a) Affluent b) Middle class c) Peasant d) Poor

7) In _____ Sir Earnest Barker was elected as a member of Liberal Party Council.
a) 1937 b) 1939 c) 1938 d) 1936

P.T.O.

8) The grass plot was of _____ square feet.
   a) 19 b) 20 c) 30 d) 25

9) Sarojini Naidu was the first woman President of _____ party.
   a) Jan Sangh b) Janta Party
   c) Lok Dal d) Indian National Congress

10) Maya Angelou was an _____ poetess.
   a) American b) African c) Asian d) European

11) _____ your hands for the exercise.
   a) Raise b) Raze c) Redge d) Ridge

12) Sachin doesn't lie, he would call a spade a _____
   a) Tool b) Machine c) Spade d) Hammer

13) A person who has the fear of water, that fear is called _____
   a) Zoophobia b) Demophobia c) Bathophobia d) Hydrophobia

14) It is _____ to bribe anybody.
   a) Illicit b) Elicit c) Ellicit d) Aellicit

2. Answer the following questions in **2** to **3** sentences **each (any seven)** : **14**

1) In what way is the school different from the students homes ?
2) Where do the students go when they are failed out of school ?
3) What is the claim of a larger piety ?
4) What are our duties towards a neighbour ?
5) Why can't tigers lie in one position for long ?
6) What can be assumed from a tiger leaving his kill in the open ?
7) Why did Jim Corbett regret carrying an unlocked rifle ?
8) What did Jim Corbett do after killing the tiger ?

3. A) Answer the following in about **fifty** words **(any two)** : **8**

1) What is an Email and what type of language is used for writing it ?
2) Write a short note on different types of blogs.
3) Write a short note on how to write blogs.

B) Answer **any two** with reference to context : **6**

1) Weavers, weaving solemn and still,
   What do you weave in the moon light chill ?
   White as a feather and white as a cloud.
2) I can accept the idea of my own demise,
   but I am unable to accept the death of any one else.
3) Weavers, weaving at break of day,
   Why do you weave a garment so gay ?
   Blue as the wing of a halcyon wild.

4. Answer **any one** of the following : **14**

1) Write in detail how you will prepare for an interview.
2) Write a script of group discussion on the topic-cleanliness movement in India, in which Rajesh, Shruti, Mohan and Noor participate.

5. Answer the following question : **14**

You are the Secretary of Mahavir Garments Ltd. The meeting of the office-bearers of the company is scheduled for the 10^{th} of the next month. Prepare an agenda for the meeting then draft the minutes of the meeting using the standard format.

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SLR-SA – 13

Seat No.	

Set P

B.Sc. – I (Semester – II) (Biotechnology) (CBCS) Examination, 2018
ENVIRONMENTAL POLLUTION AND
ENVIRONMENTAL POLLUTION TECHNIQUES
(Paper – I) Environmental Pollution

Day and Date : Friday, 13-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labeled diagrams **wherever** necessary.*

1. Choose the correct alternative and rewrite the sentences again : **14**

i) Disease not caused by water pollution is _____
a) Jaundice b) AIDS c) Cholera d) Dysentery

ii) _____ is present in the largest percentage in the biosphere.
a) Carbon b) Hydrogen c) Nitrogen d) Oxygen

iii) Fossil fuels are _____
a) Renewable resource b) Non renewable resource
c) Inexhaustible resource d) Non renewable and exhaustible

iv) CNG is preferred over LPG because it is _____
a) Costlier than LPG b) Lighter than LPG
c) Easy to transport d) Causes less pollution

v) _____ is non-biodegradable pollutant.
a) Plastic b) Sewage c) Litter d) Vegetable waste

vi) _____ is not the long range effect of radiation.
a) Genetic change b) Anaemia
c) Immediate death d) Loss of vitality

vii) Minamata disease is caused due to pollution of _____
a) Lead b) Mercury c) PAN d) SO_2

viii) The major pollution causing agents are _____
a) Animals b) Green house gases
c) Men d) UV-rays

P.T.O.

ix) BOD stands for _____

a) Biochemical Oxygen Demand b) Biome of Desert

c) Boron and Oxygen Depletion d) Bio Oxy Depot

x) Water pollution is caused by _____

a) CO b) PAN

c) Fertilizer d) Fossil Fuel

xi) Ear muffs or cotton plugs are used to reduce pollution of _____

a) Air b) Nuclear

c) Noise d) Thermal

xii) June 5, is celebrated as _____

a) World Food Day b) World Science Day

c) World Environment Day d) Tree Plantation Day

xiii) MIC is related with _____

a) Taj Mahal b) Aerosols

c) Bhopal Gas Tragedy d) London Smog

xiv) Most economic method of water conservation is _____

a) Construction of dam b) Interlinking of rivers

c) Rain water harvesting d) Watershed management

2. Define and explain **any seven** of the given below : **14**

i) Primary and secondary pollutant

ii) Nuclear fusion

iii) Non conventional energy

iv) Biogas

v) Acid rain

vi) Aerosol

vii) Soil pollution

viii) Global warming

ix) Pyrolisis.

3. A) Answer **any two** of the following : **10**

   i) Write a short note on Minamata episode.

   ii) Explain thermal pollution.

   iii) Explain alcohol fermentation using Molasses as substrate.

   B) Explain in detail solar energy. **4**

4. Answer **any two** of the following : **14**

   i) Give a detailed account on sources of noise pollution and its measurement.

   ii) Explain in brief water pollution.

   iii) Explain soil pollution.

5. Answer **any two** of the following : **14**

   i) Discuss in detail sources, local and global impact of pollution.

   ii) Write an account of non conventional energy and its types.

   iii) Explain in detail process of nuclear fission and add note on atom bomb.

SLR-SA – 14

Seat No.	

Set P

B.Sc. I (Semester – II) (Biotechnology) Examination, 2018
(CBCS)
Environmental Pollution and Enviornmental Pollution Techniques
Paper – II : MICROBIAL TECHNIQUES

Day and Date : Monday, 16-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative and rewrite the sentences. **14**

I) _____ Method is used for volutin granule staining.
a) Maneval's b) Albert's c) Gram's d) Giemsa's

II) Starch agar is example of _____ type of media.
a) Enriched b) Living c) Natural d) Synthetic

III) Moist heat sterilization is achieved at _____
a) 121°C for 15 min b) 180°C for 30 min
c) 160°C for 1 hr d) 150°C for 15 min

IV) Hot air oven is based on _____ principle.
a) Radiations b) Moist heat c) Dry heat d) Desiccation

V) _____ filters are provided in Laminar Air Flow device.
a) Asbestos b) Nylon c) Glass d) HEPA

VI) Methylene blue is example of _____ stain.
a) Neutral b) Acidic c) Basic d) Alkaline

VII) Liquid nutrient medium is called as _____
a) Stab b) Broth c) Plate d) Slant

VIII) In *Escherchia coli Escherchia* represent the _____
a) Family b) Order c) Genus d) Species

IX) The media which contains all ingredients of unknown composition is called as _____ media.
a) Synthetic b) Semisynthetic c) Crude d) Neutral

P.T.O.

X) _____ indicator is used in Mac Conkey agar.

a) Neutral red b) Bromothymol blue

c) Andrade's d) Phenolphthalein

XI) Acid fastness of *Mycobacterium* is due to presence of _____

a) mycolic acid b) techoic acid

c) pyruvic acid d) malic acid

XII) Nigrosin is example of _____ stain.

a) acidic b) basic c) neutral d) positive

XIII) Animal tissue culture is example of _____ media.

a) semi-synthetic b) enrichment

c) differential d) living media

XIV) Serial dilution technique was introduced by _____

a) Robert Koch b) Alexander Fleming

c) Joseph Lister d) Tyndall

2. Answer **any seven** of the following : **14**

i) Define growth.

ii) Define Disinfection and give its examples.

iii) Enlist different physical methods of Sterilization.

iv) Define synchronous growth.

v) Define stain give its types.

vi) Define selective and differential media and give its two examples.

vii) Explain any two common indicator used in medium and its function.

viii) Negative staining.

ix) Define Pure culture.

3. A) Answer **any two** of the following : **10**

i) Structure and function of Hot air oven.

ii) Explain streak plate and spread plate methods.

iii) Explain Nutritional requirements of microorganisms.

B) Explain different methods of pasteurization. **4**

4. Answer **any two** of the following : **14**

   i) Explain mechanism of acid fast staining.

   ii) Explain common components of media used for laboratory cultivation of microorganisms and their functions.

   iii) Explain different methods of filtration.

5. Answer **any two** of the following : **14**

   i) Explain classification of stains.

   ii) Explain different methods of Maintenance of pure culture of microorganisms.

   iii) Explain different methods used for cultivation of Anaerobic microorganisms.

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SLR-SA – 15

Seat No.	

Set P

B.Sc. Biotechnology – I (Semester – II) (CBCS) Examination, 2018
TAXONOMY AND TISSUE CULTURE
Taxonomy (Paper – I)

Day and Date : Tuesday, 17-4-2018 Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

1. Multiple choice questions. **14**

1) In ascomycota, one ascus sac contains _____ spores.
   a) 6 b) 8 c) 12 d) 14

2) Phylogenetic classification is also called as _____ classification.
   a) Ohenetic b) Practical c) Artificial d) Natural

3) Which of the following is an example of Arthropoda ?
   a) Cockroach b) Leech c) Snail d) Earthworm

4) In pisces respiration takes place with the help of _____
   a) Gills b) Skin c) Lungs d) Scales

5) Gymnosperms differes from angiosperms in _____
   a) Having seeds b) Having fruits
   c) Having naked ovule d) None of these

6) Production of gamates in bryophytes involve _____
   a) Meiosis b) Mitosis c) Fertilization d) Vegetative propagation

7) Liverworts are closely related to _____
   a) Algae b) Fungi c) Lichens d) Mosses

8) Toxin produced by fungi are called as _____
   a) Phytotoxin b) Mycotoxin c) Antibiotics d) Fungicides

9) Fungi exhibit _____ mode of nutrition.
   a) Autotrophic b) Heterotrophic
   c) Phototrophic d) Lithotrophic

10) _____ animals have segmented body.
   a) Molluscan b) Echinoderm
   c) Annelida d) Coelenterata

11) Sea urchin belongs to phylum _____
   a) Hemichordata b) Arthropoda
   c) Echinodermata d) Chordata

12) The first step in taxonomy is _____
   a) naming b) description
   c) identification d) classification

13) Naming of organism in scientific term is known as _____
   a) Binomial nomenclature b) Trinomial nomenclature
   c) Scientific nomenclature d) All of these

14) Fungal cells do not show following structure
   a) Glycogen b) DNA
   c) Chloroplast d) Ribosomes

2. Answer **any seven** of the following : **14**

i) Give the characteristics of Coelenterates.

ii) What is the role of binomial nomenclature in classification of organisms ?

iii) Write a note on phonetic taxonomy.

iv) Explain the general characteristics of fungi.

v) Give the economic importance of algae.

vi) What is the taxonomic hierarchy ?

vii) Define :
   1) Genus
   2) Taxon.

viii) Distinguish between amphibian and reptile.

ix) Draw a neat and labelled diagram of star fish.

3. A) Answer **any two** of the following : **10**
   i) Explain in detail five kingdom classification.
   ii) Describe bacterial classification on morphological characteristics.
   iii) Give the general characteristics of angiosperm in brief.

   B) Explain the silent features of Urochordata with proper example. **4**

4. Answer **any two** of the following : **14**
   i) Write a note on conventional and numerical taxonomy.
   ii) Describe in detail merits and demerits of Bentham and Hooker's system of classification.
   iii) Compare the salient features of Monera and Protista.

5. Answer **any two** of the following : **14**
   i) Explain in detail cryptogamae.
   ii) Give brief account on Platyhelminthes and Arthropod.
   iii) Describe the different classes of phylum chordate.

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Seat No.	

Set P

B.Sc. (Part – I) (Biotechnology) (Semester – II) (CBCS)
Examination, 2018
TAXONOMY AND TISSUE CULTURE (Paper – II)
Tissue Culture

Day and Date : Wednesday, 18-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *and labeled diagrams.*

1. Rewrite the following sentences by choosing most correct alternatives : **14**

i) _____ the liquid endosperm from immature coconuts, used as a supplement in the culture medium.

a) coconut milk b) casein c) juice d) agar

ii) Reversal of organized structures into an undifferentiated state is

a) redifferentiation b) dedifferentiation
c) organogenesis d) micropropagation

iii) _____ known as the Father of embryology.

a) Hamberlandt b) Murashige
c) Skoog d) Maheshwari and Guha

iv) Elements required by plants in higher concentration than 0.5 mmol/liter referred as

a) vitamins b) cofactors
c) macromolecules d) micromolecules

v) Potentiality or property of a cell to produce a whole organism is termed as

a) apoptosis b) senescence
c) totipotancy d) cell cycle

vi) A type of culture in which cells or cell aggregates are cultured in liquid medium is called

a) suspension culture b) callus
c) anther d) protoplast culture

P.T.O.

vii) In tissue cultures, a morphogenetic response that results in the production of new organs, embryos or whole plants from cultured explants or calli derived from them is called

a) callogenesis b) regeneration

c) micropropagation d) hardening

viii) An isotonic solution of inorganic salts present in approximately the correct physiological concentrations used in animal cell culture is

a) Gamborg solution b) Balanced salt solution

c) Serum d) Plasma

ix) A fragment of tissue transplanted from its original site and maintained in an artificial medium is called

a) organ b) organ system

c) explant d) blood

x) A workstation with filtered air flowing in a laminar (nonturbulent) manner parallel to or perpendicular to the work surface, to maintain the sterility of the work is known as

a) laminar-flow hood b) growth room

c) culture room d) polyhouse

xi) _____ is a culture started from cells, tissues or organs taken directly from an organism and before the first subculture.

a) subculture b) isolation culture

c) cryopreservation d) primary culture

xii) Inhibition of plasma membrane ruffling and cell motility when cells are in complete contact with other adjacent cells is termed as

a) contact inhibition b) hybridization

c) fusion d) suspension

xiii) Growth of animal cells dissociated from the parent tissue by spontaneous migration or mechanical or enzymatic dispersal is termed as

a) cell culture b) continuous culture

c) spontaneous culture d) cancer

xiv) _____ is a determination of living or dead cells, based on a total cell sample.

a) cell count b) cell death c) apoptosis d) cell viability

2. Solve **any seven** of the following : **14**
   i) What is surface sterilization ?
   ii) How can you develop virus-free plants ?
   iii) What is callus tissue ?
   iv) What do you mean by haploid plants and homozygous lines ?
   v) Give the role of inverted microscope and micropipette.
   vi) What is trypsinization ?
   vii) What do you mean by Anchorage dependence of growth.
   viii) Write about continuous cell line
   ix) Differentiate between synthetic media and natural animal culture media.
   x) What is osmoticum ? Give an example of it.

3. A) Solve **any two** of the following : **10**
      i) Plant tissue culture laboratory organization.
      ii) Instruments used in Animal tissue culture laboratory.
      iii) Rapid clonal propagation (micropropagation).
   B) Explain the concept of cytodifferentiation with respect to callus formation. **4**

4. Solve **any two** of the following : **14**
   i) Give a detailed account on plant cell suspension culture.
   ii) Write a note on protoplast isolation and culture.
   iii) Describe animal tissue culture lab organization.

5. Solve **any two** of the following : **14**
   i) What is organogenesis ? Add a note on principles, concept and applications of somatic embryogenesis.
   ii) Discuss animal tissue culture media and add a note on importance of growth factors of the serum.
   iii) What is cell viability ? Add a note on measurement of cell viability.

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Seat No.	

Set P

B.Sc. – I (Biotechnology) (Semester – II) (CBCS) Examination, 2018
Biochemistry and Cell Physiology
Paper – I : BIOCHEMISTRY

Day and Date : Thursday, 19-4-2018 Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions carry* ***equal*** *marks.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *and* ***labeled*** *diagrams.*

1. Rewrite the following sentences by using correct alternative : **14**

1) Cysteine is an example of _____ containing amino acid.
a) phosphorus b) magnesium c) cobalt d) sulfer

2) One helical turn of B form of DNA has _____ number of base pairs.
a) 11 b) 12 c) 9 d) 10

3) In triacylglycerol _____ number of fatty acids are attached to glycerol molecule.
a) 1 b) 2 c) 3 d) 4

4) _____ oxygen carrying protein in human beings.
a) Insulin b) Haemoglobin
c) Oxytocin d) Albumin

5) Fluidity of plasma membrane is maintained by _____
a) glycoprotein b) phospholipid
c) spingolipid d) cholesterol

6) The disaccharide sucrose is composed of _____
a) glucose and glucose
b) glucose and galactose
c) fructose and galactose
d) glucose and fructose

7) The _____ sugar is present in milk.
a) glucose b) galactose c) lactose d) ribose

8) The _____ carbohydrates cannot be further hydrolised.
   a) monosaccharide b) disaccharide
   c) oligosaccharide d) polysaccharide

9) Primary structure of proteins involves _____ type of bond.
   a) peptide b) hydrogen c) disulfide d) glycosidic

10) Liver oils of various fishes are the richest sources of _____
   a) retinol b) riboflavin c) thiamine d) niacin

11) The compounds having same molecular formula but different structures are known as _____
   a) optically active compound b) isomers
   c) oligomers d) epimers

12) The sugar in RNA is _____
   a) deoxyribose b) hexose c) fructose d) ribose

13) _____ is example of non-reducing sugar.
   a) glucose b) fructose c) sucrose d) ribose

14) Beta pleated sheet structures are observed in _____ level of protein structure.
   a) primary b) secondary c) tertiary d) quaternary

2. Answer the following : **14**

i) State the Chargaff's rule.

ii) Draw the chemical structure of sucrose.

iii) What is mutarotation ?

iv) Give classification of amino acids.

v) Which are deficiency disorders of Vitamin K and Vitamin C.

vi) Write a note on peptide bond.

vii) Differentiate between DNA and RNA.

3. A) Answer the following (**any 2**) : **10**

   i) Explain Watson-Crick model of DNA.

   ii) Explain classification of proteins.

   iii) Write about Fluid Mosaic model of plasma membrane.

   B) Discuss the forces involved in stabilization of native structure of protein. **4**

4. Answer **any two** of the following : **14**

   i) Explain titration curve for glycine and histidine amino acids.

   ii) Explain structure and function of t-RNA.

   iii) Write an account on polysaccharides.

5. Answer **any two** of the following : **14**

   i) Write source, requirement and deficiency disorders retinol and thiamine.

   ii) Discuss the structure and functions of compound lipids.

   iii) Explain structural levels of proteins.

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Seat No.	

Set **P**

B.Sc. – I (Biotechnology) (Semester – II) (CBCS) Examination, 2018
BIOCHEMISTRY AND CELL PHYSIOLOGY
Paper – II : Cell Physiology

Day and Date : Friday, 20-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** and labeled diagrams **wherever** necessary.*
*3) Figures to **right** indicates **full** marks.*

1. Rewrite the following sentences by using correct alternative. **14**

1) _____ is structural and functional unit of nervous system.
   a) Chromomere b) Sarcomere
   c) Neuron d) Nephron

2) _____ is shoot inducing hormone.
   a) Auxin b) Cytokinin
   c) ABA d) Ethylene

3) _____ is structural and functional unit of reflex action.
   a) Neuron b) Reflex arc
   c) Nephron d) Sarcomere

4) Human heart is _____
   a) Neurogenic b) Myogenic
   c) Both a) and b) d) None of these

5) _____ is responsible for maintaining basic metabolic rate.
   a) Thyroxin b) ADH
   c) Aldosterone d) STH

6) _____ is largest endocrine gland in the human body.
   a) Thyroid b) Thymus
   c) Pancreas d) Pituitary

7) Malphigian body in human kidney meant for _____
   a) Secretion b) Absorption
   c) Draining d) Filtration

8) _____ cells are responsible for secretion of testosterone.
   a) Leydig b) Serous
   c) Epithelial d) Goblet

9) _____ is known as fruit ripening hormone.
   a) Auxin b) Cytokinin
   c) ABA d) Ethylene

10) _____ is not a trophic hormone.
   a) ACTH b) TSH
   c) GTH d) Thyroxine

11) _____ is responsible for nitrogen fixation.
   a) Azatobacter b) Rhizobium
   c) BGA d) All of these

12) _____ is act as chemical messenger in nervous system.
   a) Neurotransmitter b) Enzyme
   c) Ribozyme d) Hormone

13) _____ not a critically essential element.
   a) Nitrogen b) Phosphorous
   c) Potassium d) Oxygen

14) _____ is not a micronutrient.
   a) Copper b) Zinc
   c) Nitrogen d) Boron

2. Answer the following (**any 7**) : **14**

i) Write a note on ABA.

ii) What is stomatal transpiration ?

iii) What is photoperiodism ?

iv) Write a note on SA node.

v) Draw neat labeled diagram of neuron.

vi) What is reflex action ?

vii) Write a note on florigen.

viii) What is apoplast pathway ?

ix) Write a note on blood.

3. A) Answer **any two** the following : **10**

i) Describe human excretory system with neat labeled diagram.

ii) Explain structure, synthesis and functions of auxin and cytokinin.

iii) Describe human nervous system with neat labeled diagram.

B) Describe types, phases and factors affecting seed dormancy. **4**

4. Answer **any two** of the following : **14**

i) Explain various mechanisms of absorption of elements.

ii) Describe human digestive system.

iii) Describe human respiratory system with neat labeled diagram.

5. Answer **any two** of the following : **14**

i) Explain critically essential elements with its role in plant development.

ii) Describe double circulation with neat labeled diagram.

iii) Explain the structure and function of nephron.

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Seat No.	

Set P

B.Sc. – I (Biotechnology) (Semester – II) (CBCS) Examination, 2018
BIOMETRY AND COMPUTER SCIENCE
Paper – I : Biometry

Day and Date : Saturday, 21-4-2018 Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Use of basic calculator is ***allowed****.*
4) Use graph paper ***wherever*** *necessary.*

1. Rewrite the following sentences by using correct alternative : **14**

1) The solution of the equation $2x - 5 = 0$ is

a) An imaginary number b) An integer
c) A rational number d) An irrational number

2) The conjugate of the complex number 5i is

a) 5i b) $-5i$ c) -5 d) 0

3) If A = {5, 7, 8, 4} and B = {5, 2, 3, 4} then $B \cap A =$

a) {7, 8} b) {2, 3} c) { } d) {4, 5}

4) A function f is said to be an odd function if

a) $f(x) = f(-x)$ b) $f(-x) = -f(x)$
c) $f(x) = 3$ d) $f(x) = 5^x$

5) $\lim_{x \to 0} \left(2 + \frac{e^x - 1}{x} \right) =$

a) 0 b) 3 c) 2 d) 1

6) $f(x) = \frac{x}{2x - 1}$ is discontinuous at x =

a) 0 b) -2 c) 2 d) $\frac{1}{2}$

P.T.O.

7) If f(x) = 4 tan x, then $f'(0)$ is

a) 1 b) 5 c) 0 d) –5

8) A function f is decreasing at a, if

a) $f'(a) > 0$ b) f(a) > 0 c) f(a) < 0 d) $f'(a) < 0$

9) If $\int$ f(x) dx = c then

a) f(x) = k b) f(x) = 0 c) f(x) = 1 d) $f'(x) = c$

10) $\int_1^2 6x^2 dx =$

a) 21 b) 7 c) 14 d) 49

11) If f(x, y) = 3y then $\frac{\partial f}{\partial x} =$

a) 3 b) 3y c) 3xy d) 0

12) Degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^2 + 4\left(\frac{d^3y}{dx^3}\right)^3 = y$ is

a) 3 b) 2 c) 9 d) 4

13) If B is matrix of order 2×3, AB is matrix of order 2×3, then order of B is

a) 3×2 b) 2×3 c) 2×2 d) 3×3

14) $D = \begin{bmatrix} 0 & -1 & 0 \\ 1 & 0 & 1 \\ 0 & -1 & 0 \end{bmatrix}$ is

a) Scalar Matrix b) Rectangular Matrix

c) Identity Matrix d) Skew-symmetric Matrix

2. Attempt **any seven** of the following : **14**

1) Find the value of $2i^1 + i^2 – i^4 + 5i^6$.

2) If B = {p, q} then find power set P(B) of B.

3) If $f(x) = 3x + 5$ and $g(x) = x^2$ then find $f \circ g$.

4) If $\lim_{x \to a} \frac{x^4 - a^4}{x - a} = 32$, find a.

5) If $f(x) = \begin{cases} 5 + 3x & \text{for } x \neq 1 \\ 11 & \text{for } x = 1 \end{cases}$, then examine the continuity of function at x = 1.

6) If $y = \sin x \log x$, then find $\frac{dy}{dx}$.

7) Evaluate $\int 4\sec^2 x + 2\cos x dx$.

8) Evaluate $\int_0^1 (2x + 3)\, dx$.

9) Solve differential equation $\frac{y}{x} = \frac{dx}{dy}$.

3. A) Attempt **any two** of the following : **10**

1) Evaluate $\lim_{x \to 3} \frac{2x^2 - 5x - 3}{3x^2 - 9x}$.

2) Differentiate $\frac{5^x}{\sin x}$ with respect to x.

3) Evaluate $\int 4x^2 \sin x dx$.

B) Solve the following : **4**

If $A = \begin{bmatrix} 9 & 2 & 6 \\ 2 & -3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ -3 & 2 \\ 1 & 6 \end{bmatrix}$ then find AB.

4. Attempt **any two** of the following : **14**

1) If $z_1 = 3 + 3i$, $z_2 = 2 - 2i$, $z_3 = 1 + i$ and $z_4 = 5 + 6i$ then find $\frac{z_1 \cdot z_2}{z_4 + z_3}$.

2) If X = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, A = {1, 2, 3, 4, 5, 6, 7}, B = {1, 2, 5, 6, 8}, C = {6, 7, 8, 9, 10} then verify $A' \cup (B \cap C) = (A' \cup B) \cap (A' \cup C)$.

3) Find the maximum and minimum value of the function $f(x) = x^3 - 12x^2 + 45x + 5$.

5. Attempt **any two** of the following : **14**

1) Draw the graph of linear function $y = f(x) = -2x + 1$.

2) If $f(x) = \begin{cases} \frac{\log(1+2x)}{x} - a & \text{for } x > 0 \\ x + 4 - b & \text{for } x < 0 \\ 2 & \text{for } x = 0 \end{cases}$ is continuous at x = 0 then find a, b.

3) Solve the equations $x - y + z = 4$, $2x + y - 3z = 0$, $x + y + z = 2$ using reduction method or Gaussian Elimination method of matrix.

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Seat No.	

Set P

B.Sc. – I (Semester – II) (Biotechnology) (CBCS Pattern) Examination, 2018
BIOMETRY AND COMPUTER SCIENCE (Paper – II)
Computer Science

Day and Date : Monday, 23-4-2018 Max.Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

***Note** : 1) **All** questions are **compulsory**.*

*2) Figures to the **right** indicate **full** marks.*

1. Choose the correct alternative from the following and rewrite the sentence : **14**

1) _____ is a default file name of word.
   a) Book 1 b) Document 1
   c) Presentation 1 d) Table 1

2) E-mail stands for
   a) Electronic mail b) Electronically mail
   c) Exchange mail d) None

3) Operating system is
   a) Hardware b) Software c) Input device d) Output device

4) To print a file, the shortcut key is
   a) Ctrl + N b) Ctrl + S c) Ctrl + O d) Ctrl + P

5) _____ is a widely used operating system.
   a) Unix b) Dos c) Windows d) None

6) The software which must be loaded before the application software is
   a) Utility Software b) A programming language
   c) Operating system d) None

7) The memory which can be read and write data is
   a) RAM b) ROM
   c) Both a) and b) d) None

8) To modify a document in word, _____ menu is opened.
   a) File b) Edit c) Insert d) Format

9) In excel, a workbook contains _____ worksheets.
   a) 255 b) 256 c) 3 d) 1

10) A diamond box is used to indicate _____ in flowcharts.
a) Input b) Output c) Decision d) None

11) _____ is a pictorial representation of logic of a program.
a) Flow chart b) Chart
c) Pseudo code d) Picture Code

12) _____ is a widely used search engine.
a) Bing b) Google c) Khoj d) Hit counter

13) 1 byte = _____ bits.
a) 4 b) 8 c) 16 d) 32

14) _____ device generates result and displays to the user.
a) Output b) Input c) Storage d) Control

2. Answer **any seven** of the following : **14**
i) Explain any two methods to calculate total in Excel.
ii) Explain benefits of Networking system.
iii) Enlist any four input devices.
iv) Explain need of database.
v) Define the following terms : 1) Software 2) Computer
vi) Explain copy and paste operations in word.
vii) Explain Local Area Network.
viii) Explain the advantages of flowchart.
ix) Draw the different symbols of flowchart.

3. A) Write a note on **any two** of the following : **10**
i) What is Computer ? Explain the parts of Computer.
ii) Define Algorithm and Flow chart. Explain the principles of algorithm.
iii) Explain the advantages of operating system.

B) Write a note on Windows Operating System. **4**

4. Answer **any two** of the following : **14**
i) What is Network ? Explain LAN, MAN and WAN.
ii) Explain History of Computers.
iii) Explain use of basic programming in Biology.

5. Answer **any two** of the following : **14**
i) What is Network Topology ? Explain different topologies with diagram.
ii) What is Computer ? Explain the types of computers.
iii) Explain the features of Linux Operating System.

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Seat No.	

Set P

B.Sc. – II (Biotechnology) (Semester – III) (CBCS) Examination, 2018
INHERITANCE BIOLOGY (New)

Day and Date : Tuesday, 24-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and labeled diagrams.*

1. Rewrite the following sentences by using correct alternative : **14**

1) Extranuclear genes are located in
   a) Lysosomes and chloroplast b) Lysosomes and plasmids
   c) Ribosomes and chloroplast d) Mitochondria and chloroplast

2) Construction of maps of different chromosomes is called
   a) genetic mapping b) linkage mapping
   c) cross over map d) all of these

3) Monohybrid test cross ratio is
   a) 9 : 3 : 3 : 1 b) 1 : 1
   c) 9 : 3 : 4 d) 1 : 1 : 1 : 1

4) _____ is a recessive trait.
   a) Round seeds b) Purple flowers
   c) Yellow pods d) Inflated pods

5) The XX-XO sex determination system was studied by McClung in
   a) Grasshoppers b) Birds
   c) Human d) Honey bee

6) Fur colour in rabbits is an example of
   a) Dominance b) Multiple alleless
   c) Incomplete dominance d) Complementation

7) _____ studied the inheritance of leaf variegation in the *Mirabilis jalapa.*
   a) Thomus Sech b) Mendel
   c) T.H. Morgan d) Carl Correns

8) In pigeon females are
   a) heterogametic b) homogametic
   c) sterile d) none of these

9) _____ the typical Mendelian dihybrid ratio is changed to 9 : 4 : 3.
   a) Complementary gene action b) Supplementary gene action
   c) Inhibitory gene action d) None of these

10) _____ in the yeast were first discovered B. Ephrussi.
   a) Auxotrophic mutants b) Petite mutants
   c) Lac mutants d) Ara mutants

11) _____ is Y-linked disease.
   a) Hemophilia b) Color blindness
   c) Hypertrichosis d) Night blindness

12) Transformation naturally found in
   a) *B.subtilis* b) *H.influenzae*
   c) *D.pneunoniae* d) All of these

13) 'F' plasmids are actively involved in the _____ process.
   a) Transformation b) Conjugation
   c) Transduction d) Transfection

14) The process of transformation was discovered by _____ in bacteria.
   a) A. Hershey and M.chase
   b) J.Lederberg and E.Tatum
   c) F.Griffith
   d) Avery, MacLeod and McCarthy

2. Answer the following (**any 7**) : **14**

i) Write a note competence factor.

ii) What is petite mutants in yeast ?

iii) What are pseudo alleles ?

iv) Write a note on hemophilia.

v) Write a note on inhibitory genes.

vi) What is epistatic gene ?

vii) Write significance of linkage.

viii) Define multiple alleles.

ix) Write note on X chromosome in humans.

3. A) Answer the following (**any 2**) : **10**

i) Explain X linked inheritance with any two suitable examples.

ii) Describe genetic system in mitochondria.

iii) Describe law of independent assortment with suitable example.

B) Describe material inheritance with any two suitable examples. **4**

4. Answer **any two** of the following : **14**

i) Describe mechanism of conjugation with neat labeled diagram.

ii) Describe gene mapping by tetrad analysis.

iii) Describe inheritance of supplementary and complementary genes with suitable example.

5. Answer **any two** of the following : **14**

i) Describe Y linked inheritance with any two suitable examples.

ii) Explain process of transformation in bacteria.

iii) Describe process of crossing over with neat labeled diagram.

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Seat No.	

Set P

B.Sc. – II (Biotechnology) (Semester – III) (New CBCS) Examination, 2018
BASICS OF MOLECULAR BIOLOGY

Day and Date : Wednesday, 25-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagram* ***wherever*** *necessary.*

1. Choose and write correct answers from the given four alternatives : **14**

1) In Blenders experiment the phage protein was labelled with the help of _____
   a) $^{32}PO_4$ b) $^{35}SO_4$ c) T_2 d) ^{15}N

2) Bent DNA structure can be produced by antitumor drug _____
   a) Ciprofloxacin b) Novobiocin c) Nalidixic acid d) Cisplastin

3) Circular DNA found in bacteria and phages biochemically has _____ bases in more amounts.
   a) A = T b) A = G c) G ≡ C d) G ≡ T

4) Arthur Korenberg identified _____ enzyme involved in replication.
   a) DNA polymerase III b) DNA polymerase I
   c) DNA Ligase d) DNA primase

5) The number of base pairs of DNA in E.coli origin is _____
   a) 245bp b) 220 bp c) 232 bp d) 241 bp

6) The length of the DNA replicated in 30 minutes in E.Coli is _____
   a) 10 mm b) 1 mm c) 100 mm d) 1000 mm

7) The percent of DNA : Protein in T2 bacteriophage is _____
   a) 50 : 50 b) 50 : 30 c) 40 : 50 d) 30 : 50

8) The SOS repair mechanism is activated by _____
   a) 5-Bromouracil b) Hydroxylamine
   c) Acridine Orange d) Thymidine dimers

P.T.O.

9) M. Messelson and F. W. Stahl verified semi conservation nature of DNA replication by using _____
   a) Autoradiography b) Fluorescent lable
   c) Electron microscopy d) Isotopic labelling

10) The mode of replication which resemble the Greek Letter sigma is _____
   a) Replicon model b) D-Loop model
   c) Rolling circle model d) Replication fork model

11) The two helix of DNA are held together by hydrogen bonds in which two electronegative atoms share _____ between the bases.
   a) Proton b) Neutron
   c) Electron d) Positron

12) The codon referred to as Amber is _____
   a) UAG b) UGA c) AUG d) AUA

13) The protein present in Eukaryotic DNA is _____
   a) Arginine b) Lysine c) Methionine d) Histone

14) The existence of DNA in the Keto and Enol form is _____
   a) Isomerism b) Tautomerism
   c) Phosphorylation d) Hydroxylation

2. Solve **any seven** of the following : **14**

1) Define Nucleoside.
2) Define Housekeeping Genes.
3) Define Leading Strand.
4) Define Deamination.
5) Define Cot curves.
6) Define Wobble hypothesis.
7) Define DNA damage.
8) Write whether the DNA is single stranded or double stranded.
   A = 33% G = 17% T = 33% C = 17%.
9) Define Solenoid model.

3. A) Attempt **any two** of the following : **10**
   1) Write in detail Griffith's transformation experiment with neat labelled diagram.
   2) Write in detail about the DNA structure with neat labelled diagram.
   3) Write in detail about the organisation of DNA in bacteria with neat labelled diagram.

   B) Explain about the properties of Genetic Code. **4**

4. Attempt **any two** of the following : **14**
   1) Explain in detail the enzymes involved in DNA replication of Prokaryotes.
   2) Explain Rolling Circle model and fate of displaced Tail with neat labelled diagram.
   3) Explain Mitochondrial and chloroplast DNA in detail.

5. Attempt **any two** of the following : **14**
   1) Write in detail Mismatch and NHEJ repair mechanism.
   2) Explain the process of replication of DNA in Eukaryotes with neat labelled diagram.
   3) Write in detail about D-loop model of replication in Mitochondria with neat labelled diagram.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Part – II) (Semester – III) (New CBCS)
Examination, 2018
BIOPHYSICAL INSTRUMENTS

Day and Date : Thursday, 26-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labeled diagrams* ***wherever*** *necessary.*

1. Rewrite the sentence using correct alternative given below. **14**

1) The frequency of visible radiations range from
   A) 200 to 400 nm B) 200 to 300 nm
   C) 400 to 800 nm D) 800 to 1200 nm

2) The pH indicator phenolphthalein shows the color change from colorless to pink, as the pH of the solution
   A) increases B) decreases
   C) remains constant D) suddenly changes

3) In electromagnetic wave, the oscillations are _____ to the direction of propagation of wave and energy.
   A) right angles B) left angles
   C) parallel D) perpendicular

4) The pH meter measures the potential difference between pH glass electrode and a _____ reference electrode.
   A) zinc B) cadmium C) cobalt D) calomel

5) The degree of attenuation of a radiant beam incident on particles suspended in a medium can be measured by
   A) Turbidometry B) AAS
   C) Nephlometry D) XRD

6) In circular dichorism, the differential absorption of _____ light is analyzed.
   A) polarized B) reflected C) inhibited D) deviated

7) Photomultiplier is generally used in the detector for the spectroscopic analysis of _____ region electromagnetic spectrum.
   A) UV-Vis B) AAS C) IR D) Near IR

P.T.O.

8) Isopycnic centrifugation is a technique used to separate molecules on the basis of their
   A) Surface tension B) Conductivity
   C) Redox potential D) Buoyant density

9) Density gradient of _____ is used for the density based separation of DNA molecules.
   A) Calcium chloride B) Sucrose
   C) Glycerol D) Agarose

10) In bright field microscopy the object is observed against _____ background.
   A) Dark B) Bright C) Fluorescent D) Aqueous

11) In centrifugation, for rotation of an object around the fixed central axis, a strong force _____ to the axis of spin has to be applied.
   A) equatorial B) parallel
   C) perpendicular D) longitudinal

12) _____ is the dimensionless number which indicates the propagation of light through the medium.
   A) Numerical aperture B) Refractive index
   C) Optical distance D) Resolution power

13) In GM counter, the Geiger Muller tube is used as a sensing element for detection of _____ radiation.
   A) mutagenic B) emerging C) ionizing D) scintillating

14) Variations in the optical rotation of a substance with changing light wavelength are analyzed in
   A) XRD B) FACS C) GM counting D) CD-ORD

2. Answer **any seven** of the following. **14**

1) Which indicators can be used for pH measurement ?
2) What is difference between scanning and transmission electron microscopy ?
3) Define radioactivity. State its unit.
4) State different wavelength ranges of an electromagnetic spectrum.
5) Give principle of flow cytometry.
6) Which techniques can be used for detection of radioactivity ?
7) Write about relative centrifugal force (RCF).
8) Draw a neat labeled diagram of image formation in light microscopy.
9) How calibration of pH electrode can be done ?

3. A) Answer **any two** of the following. **10**
   1) Write about nature of radioactivity. Enlist types of radioactive decay.
   2) Describe the isopycnic centrifugation.
   3) Write about molecular energy levels of an electromagnetic spectrum.

   B) Describe different types of rotors used for centrifugation. **4**

4. Answer **any two** of the following. **14**
   1) Describe CD-ORD as a molecular characterization technique.
   2) Describe hazardous effects of radioactivity. Add a note on safety measures for handling of radioisotopes.
   3) Describe construction, working and applications of IR spectroscopy.

5. Answer **any two** of the following. **14**
   1) Write optical principle of microscopy. Describe different types of microscopic techniques.
   2) Write an account on Nuclear Magnetic Resonance spectroscopy.
   3) Write an account on pH meter. Describe the errors in pH measurement.

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SLR-SA – 25

Seat No.	

Set P

B.Sc. – II (Biotechnology) (Semester – III) Examination, 2018
ANIMAL TISSUE CULTURE (New CBCS)

Day and Date : Friday, 27-4-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and labeled diagrams.*

1. Rewrite the following sentences by choosing correct alternatives. **14**

1) L929 was the first cloned cell strain isolated by _____
   a) capillary cloning b) cancer tissue
   c) epidermis d) bone marrow

2) _____ cell line is derived from cervical cancer cell.
   a) HeLa b) BHK c) CHO d) MCF7

3) _____ cells have infinite life span.
   a) Lymphocytes b) Stem cells
   c) Transformed d) Normal

4) Liquid culture technique is also known as _____ technique.
   a) Watch glass b) Grid
   c) Raft d) Cyclic exposure

5) In natural media most widely used biological fluid as media is _____
   a) Plasma clot b) Coconut milk
   c) Serum d) Clots

6) Epidermal portion is used to produce _____
   a) Artificial skin b) Feeder layer
   c) Liver d) Blood vessels

7) γ radiation used for activation of _____
   a) Glass surface b) Steel surface
   c) Plastic surface d) Metal surface

8) Avian cells can grow at _____ temperature.
   a) Below 28°C b) 28 to 37°C
   c) 37°C d) 38.5 to 39°C

9) HEPES buffer is nothing but _____
   a) 4-(2-hydroxyethyl) 1-piperazineethane sulfonic acid
   b) 2-hydroxy ethane-piperazine ethyl sulfonic acid
   c) 3-hydroxy ethyl-piperazine ethane sulfonic acid
   d) 6-hydroxy ethyl-piperazine ethane sulfuric acid

10) Thymidine chemical used to block the cell in _____ to get cell synchrony.
   a) Interphase b) Prophase c) M-phase d) S-phase

11) Electronic device used for rapid cell counting is nothing but _____
   a) Coulter counter b) Heamocytometer
   c) Flow cytometer d) Osmometer

12) _____ material is used for treatment of substrate surface.
   a) Albumin b) Transferrin c) Collagen d) Casein

13) Rous and Jones started to use _____ in culture media.
   a) Protein b) Antibiotics c) Hormones d) growth factors

14) Increase in LDH activity in cell culture is indication of _____
   a) Maximum production of NADH
   b) More non viable cells in culture
   c) More healthy cells in culture
   d) Less non viable cells in culture

2. Answer the following (**any seven**) : **14**

1) Describe in brief hormones present in serum containing media.
2) Describe cell synchronization by physical method.
3) Write a note on cell determination by glucose.
4) Define secondary cell culture.

5) Explain Raft method of organ culture.

6) Write a short note on BSS.

7) Write a note on substrate for cell growth.

8) Write a note on CO_2 incubator.

9) Explain maintenance of cell line.

3. A) Answer the following (**any two**) : **10**

1) Write a note on history of ATC.

2) Explain any two methods of cell determination in culture.

3) Give importance of DNA fingerprinting and isozymes pattern in cell line identification.

B) Explain physico-chemical parameter of culture media. **4**

4. Answer the following (**any two**) : **14**

1) Describe different methods of organ culture.

2) Add a note on ATC laboratory design.

3) Give details of method of chemical disaggregation.

5. Answer the following (**any two**) : **14**

1) Discuss in detail cell counting and monitoring.

2) Describe mechanical methods of cell separation.

3) Describe in detail importance of serum in ATC media.

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Seat No.	

Set P

B.Sc. – II (Biotechnology) (Semester – III) (CBCS) Examination, 2018
BIOENERGETICS AND ENZYMOLOGY (New)

Day and Date : Saturday, 28-04-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions carry **equal** marks.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and labeled diagrams.*

1. Rewrite the following sentences by using correct alternative : **14**

1) According to second law of thermodynamics, entropy of a closed universal system always

a) Decreases b) Increases

c) Remains constant d) Disappears

2) In _____ cleavage, one of the atoms retains both bonding electrons after bond breakage.

a) Homolytic b) Internal

c) Heterolytic d) Catalytic

3) The free energy of ATP hydrolysis under standard conditions is _____ KJ/mol.

a) – 2.303 b) – 51.8 c) – 8.314 d) – 30.5

4) The quantitative expression of randomness of a system is

a) Enthalpy b) Entropy

c) Mass action d) Free energy

5) In the reaction $Fe^{2+} \rightarrow Fe^{3+} + e$

a) Fe^{2+} is the electron donor

b) Fe^{2+} is the electron acceptor

c) Fe^{3+} is the electron donor

d) Fe^{+} is the electron donor

6) In _____ type of inhibition, the inhibitor molecule binds with the transition state.
   a) Competitive b) Noncompetitive
   c) Uncompetitive d) Irreversible

7) The _____ molecule is used as energy currency in biological systems.
   a) ATP b) ADP c) TTP d) GDP

8) The molecule gets _____ upon accepting electron.
   a) Reduced b) Oxidized
   c) Phosphorylated d) Hydrolyzed

9) Enzymes are assigned with _____ number for their classification as per IUB.
   a) IUB b) IC c) EC d) IUPAC

10) The protein part an enzyme is
   a) Cofactor b) Modulator
   c) Apoenzyme d) Holoenzyme

11) _____ is the concentration where $v = V_{max}/2$.
   a) ΔH b) V_{max} c) ΔG d) Km

12) Abzymes are the catalytic
   a) RNA b) DNA c) Antibodies d) Proteins

13) The enzyme activity per milligram of protein is known as
   a) Absolute activity b) Specific activity
   c) Turnover number d) Weighed activity

14) The minimum energy barrier required to attain for catalysis is
   a) Free energy
   b) Activation energy
   c) Total energy
   d) Binding energy

2. Answer the following (**any 7**) : **14**

i) Write about biological standard state.

ii) Write about mass action ratio of reaction.

iii) What is standard free energy change ?

iv) Write a note on mode of enzyme action.

v) State the relationship between equilibrium constant and free energy change.

vi) Define redox potential. Write its unit.

vii) Write about aldol condensation.

viii) Write any two clinical significances of LDH.

ix) Write about induced fit hypothesis of enzyme action.

3. A) Answer the following (**any 2**) : **10**

i) Explain free energy concept. How free energy change can be determined ?

ii) Describe group transfer reactions.

iii) Write about thermodynamic systems. State first and second law of thermodynamics.

B) Write a note on line-weaver burk plot and its limitations. **4**

4. Answer **any two** of the following : **14**

i) Write an account on factors affecting enzyme activity.

ii) Describe regulation of enzymes in living system.

iii) Derive Michaelis Menten equation.

5. Answer **any two** of the following : **14**

i) Give detailed classification of enzymes with example of each class.

ii) Describe biological half reactions. Add a note on measurement of redox potential.

iii) Explain in detail competitive, uncompetitive and non-competitive inhibition.

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SLR-SA – 27

Seat No.	

Set P

B.Sc. II (Semester – III) (Biotechnology) (CBCS) Examination, 2018
FUNDAMENTALS OF IMMUNOLOGY (New)

Day and Date : Wednesday, 2-5-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
3) Draw neat labeled diagrams wherever necessary.

1. Choose the correct alternative and rewrite the sentences again. **14**

i) Hematopoietic-Inducing Microenvironment (HIM) is provided by _____

a) NK cells b) Erythrocytes

c) Stromal cells d) Progenitor cells

ii) Macrophage-like cells present in lungs are called as _____

a) Langerhan b) Kuffer c) Microglial d) Alveolar

iii) Tonsils and appendix are the examples of _____ associated lymphoid tissues.

a) Gut b) Bronchus c) Colon d) Mucosa

iv) Iron-binding protein (lactoferrin) present in mucous has _____ ability.

a) antigen presentation b) microbial growth inhibition

c) immune suppression d) phagocytosis

v) Spermine and _____ present in the semen carry out antibacterial activity.

a) cobalt b) copper c) zinc d) nickel

vi) T cell epitopes will be _____ antigens.

a) soluble b) hydrophilic

c) TCR presented d) MHC presented

vii) ABO blood group antigens are examples of _____

a) Microbial antigen b) Autoantigen

c) Isoantigen d) Sequestrated antigen

viii) When cytokine producing cell and target cell is one and same, mechanism of action is called _____

a) autocrine b) paracrine c) endocrine d) antagonism

ix) WSXWS type of conserved amino acids found in _____ cytokine receptor family.

a) Chemokine b) TNF c) Class I d) Class II

x) _____ antibody shows more half-life as well as subclasses.

a) IgA b) IgG c) IgD d) IgM

xi) Dimeric form of antibody is _____

a) serum IgA b) secretary IgA c) IgM d) IgE

xii) Horse Radish Peroxidase is used in _____ antigen-antibody test.

a) ELISA b) RIA

c) immune-fluorescence d) VDRL

xiii) In complement fixation test amboceptor is _____

a) Rabbit RBCs b) Sheep RBCs

c) Horse RBCs d) Anti-Sheep RBCs

xiv) Lissamine rhodamine is used in _____ antigen-antibody test.

a) RIA b) ELISA

c) immune-fluorescence d) Complement fixation

2. Define and explain **any seven** of the following. **14**

i) inflammation

ii) apoptosis

iii) primary lymhoid organs

iv) synergy

v) antigenicity

vi) Fc

vii) immunological specificity

viii) avidity

ix) titre.

3. A) Answer **any two** of the following. **10**

   i) What is cytokines ? Explain the Cytokines receptors with examples.

   ii) Explain the programmed cell death and Homeostasis.

   iii) Explain the properties and functions of phagocytes.

   B) Explain in brief structure and functions of Class I MHC. **4**

4. Answer **any two** of the following. **14**

   i) What is Antigen ? Explain the types of Antigens with examples.

   ii) Explain the structure, properties and functions of IgM.

   iii) Explain in detail immuno-electrophoresis techniques and its applications in diagnosis.

5. Answer **any two** of the following. **14**

   i) Explain the structure and functions of Thymus.

   ii) Explain in detail complement fixation test and its applications in diagnosis.

   iii) Explain the structure, properties and functions of IgE.

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Seat No.	

Set P

B.Sc. – II (Biotechnology) (Sem. – III) (CGPA) (Old) Examination, 2018
INHERITANCE BIOLOGY

Day and Date : Tuesday, 24-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions carry* ***equal*** *marks.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Draw*** *neat and* ***labeled*** *diagrams.*

1. Rewrite the following sentences by using correct alternative : **14**

1) X chromosome of father is transferred to _____
   a) Son b) Grandson
   c) Daughter d) Both son and daughter

2) Roans are produced in cattle's because both alleles _____ expressed.
   a) Partially b) Alternately c) Equally d) Simultaneously

3) Plasmagenes are located on the _____ DNA.
   a) Chromosomal b) Mitochondrial
   c) Nuclear d) X and Y chromosomal

4) The method of construction of maps of different chromosomes is called _____
   a) Genetic mapping b) Linkage mapping
   c) Cross over map d) All of these

5) Experimental material selected by Mendel is wise due to _____
   a) Self-pollinating b) Annual plant
   c) Produce viable seeds d) All of these

6) Extra-nuclear inheritance by chloroplast was first studied in _____ by Carl Correns.
   a) BGA b) Maize
   c) Four 'O' clock plant d) Cyanobacteria

7) In _____ disease patient can't distinguish red and green colour.
   a) Hemophilia b) Color blindness
   c) Hypertrichosis d) Night blindness

P.T.O.

8) In four 'O' clock plants, formation of green, pale or white and variegated leaves on same plant in a cross between _____
   a) Variegated × Variegated
   b) Green × Variegated
   c) Pale or White × Variegated
   d) Green × Green

9) Holandric genes are also called as _____
   a) Autosomal b) X-linked
   c) Y-linked genes d) None of these

10) In inhibitory gene action, the ratio is _____
   a) 9 : 3 : 3 : 1 b) 9 : 7 c) 9 : 3 : 4 d) 13 : 3

11) Monohybrid phenotypic ratio in the F_2 generation is _____
   a) 9 : 3 : 3 : 1 b) 1 : 1 : 1 : 1 c) 9 : 3 : 4 d) 3 : 1

12) Transforming bacteria produce _____ factor for internalization of foreign DNA.
   a) Complement b) Compatibility
   c) Component d) Competence

13) Virulent phages are responsible for _____ type of life cycle in the host cell.
   a) Lysogenic b) Lysolytic
   c) Lysogenic and Lysolytic d) None of these

14) Sex pilus act as _____ tube during transfer of 'F' plasmids in bacterial cells.
   a) Transduction b) Conjugation
   c) Transformation d) Transcription

2. Answer the following (**any 7**) : **14**
   i) What is back cross ?
   ii) What is hypostatic gene ?
   iii) What is complete linkage ?
   iv) What is lysogeny ?

v) Significance of crossing over.

vi) What is cytoplasmic inheritance ?

vii) What is myopia ?

viii) What is Haplodiploidy ?

ix) What are plasmids ?

3. A) Answer the following **(any 2)** : **10**

i) Prove law of independent assortment with suitable example.

ii) Describe process of transformation with neat labeled diagram.

iii) Describe process of mapping by tetrad analysis .

B) Describe multiple alleles with suitable example. **4**

4. Answer **any two** of the following : **14**

i) Describe process of crossing over with neat labeled diagram.

ii) Explain extranuclear inheritance with any two suitable examples.

iii) Describe fiber folded model in bacteria.

5. Answer **any two** of the following : **14**

i) Describe modifications of Mendelian ratios with any two suitable examples.

ii) Describe X and Y linked inheritance with any one suitable example.

iii) Explain process of specialized transduction in bacteria.

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Seat No.	

Set P

B.Sc. – II (Biotechnology) (Semester – III) (Old CGPA) Examination, 2018
CYTO-GENETICS AND POPULATION GENETICS

Day and Date : Wednesday, 25-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw neat labeled diagram **wherever** necessary.*

1. Choose and write a correct answer from given four alternatives : **14**

1) Heterochromatin appears like drumstick bodies in
a) Basophils b) Eosinophils c) Monocytes d) Neutrophils

2) Polytene chromosome are the permanently _____ chromosomes.
a) Telophase b) Anaphase c) Prophase d) Metaphase

3) Slave gene increase the rate of _____ synthesis.
a) DNA b) RNA c) Protein d) cDNA

4) Chromonemal fibrils which can be easily separable from their coil is called
a) Paranemic b) Plectonemic
c) Supercoil d) Double helix coil

5) Cytologist who established the presence of 46 chromosomes is
a) J. H. Tjio and A. Lavan b) C.E. Ford and J.L. Hammerton
c) S. Makino and M.S. Sasakl d) J.D. Watson and F.H. Crick

6) Fluctuation in gene frequency is called
a) Gene pool b) Allele frequency
c) Genetic drift d) Random Drift

7) LINES stands for
a) Long Interspersed Nuclear Sequences
b) Large Interspersed Nuclear Sequences
c) Long Interrelated Nuclear Sequences
d) Large Interrelated Nuclear Sequences

8) Mutual exchange of chromosome segment between non-homologous chromosomes is called
a) Duplication b) Deletion c) Translocation d) Inversion

9) The largest value is 175 and smallest value is 70, so the range of the number is
a) 100 b) 70 c) 105 d) 175

10) The Haploid chromosome number in Allium cepa is
a) 6 b) 8 c) 14 d) 16

P.T.O.

11) The "Y" chromosome is placed in _____ of a human Karyotype.
a) Group B b) Group E c) Group G d) Group F

12) The commonly used absolute measure of dispersion is
a) Variance b) Range
c) Mode d) Standard deviation

13) The Mutagenecity of various chemicals is investigated by
a) AME's test b) Replica plate technique
c) Gradient plate technique d) CLB technique

14) Transposition event involves _____ process.
a) Recombination
b) Transposition
c) Replication
d) Both recombination and replication

2. Solve **any seven** of the following : **14**
1) Define Telomeres.
2) What is induced mutation ?
3) Define constitutive heterochromatin.
4) Define transposons.
5) What are base analogues ?
6) Define gene frequency.
7) Define sex chromosomes.
8) Define Endomitosis.
9) Define Histone.

3. A) Attempt **any two** of the following : **10**
1) Describe the structure of chromosome with a neat diagram.
2) Write in detail about the Mutagenic agents and its effect.
3) Write about Mini Satellite DNA.

B) Explain about the organization of Eukaryotic chromosome. **4**

4. Attempt **any two** of the following : **14**
1) Explain the process of meiosis with neat diagram.
2) Explain in detail the structural alteration chromosome with neat diagram.
3) Describe different types of bacterial transposons with neat diagram.

5. Attempt **any two** of the following : **14**
1) Write in detail about Hardy Weinberg Law and its application.
2) Describe multiple factor hypothesis with suitable examples.
3) Describe the Giant chromosomes with a neat labelled diagram.

Set P

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Seat No.	

Set P

B.Sc. (Biotechnology Part – II) (Semester – III) (Old) Examination, 2018
BIOPHYSICAL INSTRUMENTS (CGPA)

Day and Date : Thursday, 26-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** side indicate **full** marks.*
*3) Draw **neat** labeled diagrams **wherever** necessary.*

1. Rewrite the sentence using correct alternative given below. **14**

1) The pH indicator phenolphthalein shows the color change from colorless to pink, as the pH of the solution

A) increases B) decreases

C) remains constant D) suddenly changes

2) In UV Visible spectroscopy, the _____ filament lamp is generally used as a source for generation of visible radiations.

A) xenon B) tungsten C) deuterium D) hydrogen

3) The pH meter measures the potential difference between pH glass electrode and a _____ reference electrode.

A) zinc B) cadmium C) cobalt D) calomel

4) Photomultiplier is generally used in the detector for the spectroscopic analysis of _____ region electromagnetic spectrum.

A) UV B) Visible C) IR D) Near IR

5) The frequency of visible radiations range from

A) 200 to 400 nm B) 200 to 300 nm

C) 400 to 800 nm D) 800 to 1200 nm

6) Density gradient of _____ is used for the density based separation of DNA molecules.

A) Calcium chloride B) Sucrose

C) Glycerol D) Agarose

7) The _____ rotors are designed to hold the sample containers at a constant angle relative to central axis.

A) Fixed angle B) Vertical C) Angular D) Swinging bucket

8) A thick suspension of _____ is used during determination of IR spectra of solids.

A) SDS B) sucrose C) paraffin D) nujol

9) In bright field microscopy the object is observed against _____background.

A) Dark B) Bright C) Fluorescent D) Aqueous

10) _____ is the dimensionless number which indicates the propagation of light through the medium.

A) Numerical aperture B) Refractive index

C) Optical distance D) Resolution power

11) In GM counter, the Geiger Muller tube is used as a sensing element for detection of _____ radiation.

A) mutagenic B) emerging C) ionizing D) scintillating

12) Variations in the optical rotation of a substance with changing light wavelength are analyzed in

A) XRD B) FACS C) GM counting D) CD-ORD

13) The radiation energy absorbed per unit mass is known as the _____ dose.

A) effective B) equivalent C) absorbed D) measured

14) A _____ meter can determine the intensity of scattered light at the right angles to the direction of incident light.

A) pH B) dosi C) turbido D) nephlo

2. Answer **any seven** of the following. **14**

1) Differentiate between dark field and bright field microscopy.

2) State the properties of gamma radiations.

3) How the deviation from Beer's law may occur ?

4) Give examples of indicators for pH measurement.

5) State the relation between RPM and RCF.

6) State any two hazardous biological effects of radiations.

7) State different wavelength ranges of an electromagnetic spectrum.

8) How the X-ray diffraction technique can be used for molecular characterization ?

9) Draw the image formation in light microscopy.

3. A) Answer **any two** of the following. **10**

1) Write about molecular energy levels of an electromagnetic spectrum.

2) Write a note on rotors used for centrifugation.

3) Write a note on radioactive dosimetry.

B) State the biological applications of radioisotopes. **4**

4. Answer **any two** of the following. **14**

1) Write an account on pH meter. Describe the errors in pH measurement.

2) Describe the construction, working and applications of UV Visible spectroscopy.

3) Write an account on analytical ultracentrifugation.

5. Answer **any two** of the following. **14**

1) Illustrate any two techniques used for detection of radioactivity.

2) Illustrate the principle, working and applications of NMR.

3) Describe the design and practice of electron microscopy techniques.

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Seat No.	

Set P

B.Sc. Biotechnology (Part – II) (Semester – III) (Old) (CGPA) Examination, 2018
ANALYTICAL TECHNIQUES

Day and Date : Friday, 27-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** side indicate **full** marks.*
*3) **Draw** neat labeled diagrams **wherever** necessary.*

1. Rewrite the sentence using correct alternative given below : **14**

1) In _____ method N terminal of proteins is determined.
   a) Edman degradation b) Carboxy terminal
   c) Both a) and b) d) None of this

2) Paper chromatography is _____ type of chromatography.
   a) Liquid-Liquid b) Liquid-Solid
   c) Gas-Liquid d) Gas

3) In Southern Blotting _____ is hybridised.
   a) DNA b) RNA c) Protein d) None

4) Radioactivity labeled nucleotides can be visualized in situ by _____
   a) Flow cytometer b) AAS
   c) UV Spectrometer d) Autoradiography

5) The matrix used in ion exchange chromatograpahy is _____
   a) Sephadex b) DEAE c) SDS d) PAGE

6) To measure _____ UV radiation is used.
   a) Protein conc. b) Lipid conc.
   c) Carbohydrate d) All of the above

7) The _____ is used as a cell disrupting agent.
   a) Sulphuric acid b) Lysosome
   c) PEG d) All of the above

P.T.O.

8) The material extracted from sea weeds used in electrophoresis is _____
   a) Polyacrylamide b) Agarose
   c) Resin d) Buffer solution

9) The name of the protine staining dye is _____
   a) Safranine b) Diphenyle amine
   c) Basic fuchsin d) Coomasie brilliant blue

10) The membrane used in blotting of DNA is _____ membrane.
   a) Dialysis b) Nitrocellulose
   c) Polyethylene d) All of the above

11) The nuclear fraction is sedimented at _____ rpm.
   a) 10,000 b) 1,000 c) 8,000 d) 12,000

12) The DNSA, Anthrone and resorcinol method are methods of _____ estimation.
   a) Lipids b) Carbohydrates
   c) Proteins d) All of the above

13) Volume of _____ per unit time is known as flow rate.
   a) Stationary phase b) Mobile phase
   c) Slurry d) Sample

14) _____ gives information needed for the synthesis of oligonucleotide.
   a) Macrosequencing b) Microsequencing
   c) Blotting d) Blocking

2. Answer **any seven** of the following : **14**

1) Comment on the role of Dialysis in protein purification.

2) Give the uses of Western blotting technique.

3) State the principle of HPLC.

4) Define Proteomics.

5) Explain DPA method.

6) Write the principle of 2D Gel electrophoresis.

7) Explain Saponification value of lipid.

8) Give the role of Ammonium persulphate.

9) Explain method of Ultrafiltration.

3. A) Write the short answers to **(any two)** : **10**

   1) Describe the method of Lowry assay.

   2) Write an account on staining of proteins in gels.

   3) Write the principle of mass spectroscopy.

   B) Discuss the importance of support material in Chromatography. **4**

4. Write short notes on **any two** of the following : **14**

   1) Explain in brief the working of MALDI.

   2) State the principle of Gel permeation and give its applications.

   3) What is the use of stacking gel and resolving gel in SDS PAGE ?

5. Attempt **any two** of the following : **14**

   1) Write the advantages and limitations of estimation methods.

   2) Describe the method of solvent precipitation.

   3) Explain the method of Edman degradation for protein sequencing.

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Seat No.	

Set P

B.Sc. – II (Semester – III) (Biotechnology) (Old – CGPA) Examination, 2018
IMMUNOLOGY – I

Day and Date : Saturday, 28-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N. B. : *1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labelled diagrams **wherever** necessary.*

1. Choose the correct alternative and rewrite the sentence : **14**

i) Lysozyme is present in _____
   a) Saliva b) Cerebrospinal fluid
   c) Sweat d) Urine

ii) Passive immunization is done by using _____
   a) Vaccines b) Toxoids
   c) Immune sera d) None of these

iii) Tuberculin test is an example of _____ hypersensitivity.
   a) type I b) type II c) type III d) type IV

iv) _____ is a autoantigen.
   a) Hapten b) RBCs
   c) Eye lens proteins d) WBCs

v) BCG is an example of _____ vaccine.
   a) Killed b) Live attenuated
   c) Toxoid d) None of these

vi) In cell mediated immunity _____ will perform role in target cell killing.
   a) perforins b) fragmentins
   c) granzymes d) all of these

vii) _____ is used for fusion of myeloma cells and B lymphocytes in synthesis of monoclonal antibodies.
   a) PEG b) Ig c) HGPRT d) HAT

P.T.O.

viii) Systemic Lupus erythematosus is _____ type of autoimmune disease.

a) Organ-specific b) Organ non-specific

c) hemolytic d) None of these

ix) _____ is normal flora of skin.

a) Staphylococcus aureus b) Staphylococcus epidermidis

c) Propionibacterium acne d) All of these

x) _____ is primary mediator of anaphylaxis.

a) Histamine b) Prostaglandins

c) Leukotrienes d) Platelet activating factor

xi) _____ antibody is involved in type I hypersensitivity reactions.

a) IgM b) IgG c) IgD d) IgE

xii) B cells mature in _____

a) Lymphnode b) Spleen c) Bone marrow d) Thymus

xiii) In the A blood group person _____ type of isoantibodies are present.

a) Anti-A b) Anti-B c) Anti-AB d) Anti-D

xiv) _____ hypersensitivity may involve complement activation, pore formation and destruction of cells.

a) Type II b) Type III

c) Type IV d) Type II and III

2. Define and explain **any seven** of the following : **14**

i) Innate immunity and factors influencing innate immunity.

ii) Give names of chemical barriers of Innate Immunity.

iii) Serum sickness.

iv) Applications of monoclonal antibodies.

v) Give difference between immediate hypersensitivity and delayed type of hypersensitivity.

vi) T cell receptors.

vii) Define anaphylaxis and atopy.

viii) Give applications of blood group.

3. A) Answer **any two** of the following : **10**
   i) Write in detail immunity to protozoa with an example.
   ii) Write in detail physical barriers of Innate immunity.
   iii) Write in detail antibody production against T cell dependent and independent antigens.

   B) Write in brief on 'Hybridoma technology'. **4**

4. Answer **any two** of the following : **14**
   i) Explain T cell mediated immune response in detail.
   ii) Explain in detail traditional vaccines.
   iii) Write in detail ABO and Rh blood group systems.

5. Answer **any two** of the following : **14**
   i) Explain in detail mechanism of autoimmunity.
   ii) Explain in detail immunity to viruses.
   iii) Explain in detail phagocytosis and inflammation.

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Seat No.	

Set P

B.Sc. – II (Semester – III) (Biotechnology) (Old CGPA) Examination, 2018
IMMUNOLOGY – II

Day and Date : Wednesday, 2-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw neat labelled diagrams ***wherever*** *necessary.*

1. Rewrite the sentences by selecting correct answer from the given alternatives : **14**

i) Secondary immune response is characterised by the production of _____ type of antibodies.
a) IgM b) IgG c) IgD d) IgE

ii) _____ antibody is called as secretary antibody.
a) IgG b) IgM c) IgA d) IgE

iii) Blood group antigens are the examples of _____ antigens.
a) Histocompatibility b) Auto
c) Iso d) Heterophile

iv) Antibodies labelled with enzyme are used in _____ test.
a) Immunofluorescence b) Agglutination
c) Complement fixation d) ELISA

v) Class II MHC molecules peptide binding cleft is formed by _____ domains.
a) α_1 and α_2 b) α_1 and β_1 c) α_3 and β_2 d) α_2 and β_2

vi) CD_4^+ cells are known as
a) T_{Helper} b) Dendritic cells
c) $T_{cytotoxic}$ d) Macrophages

vii) _____ test is used in diagnosis of enteric fever.
a) Tuberculin b) Widal c) VDRL d) Montoux

P.T.O.

viii) Viral multiplication in animal cell is prevented by
a) Lysozyme b) Interferon
c) Colicin d) None of these

ix) B cells mature in
a) Lymph node b) Spleen c) Bone marrow d) Macrophages

x) In complement fixation test amboceptor is
a) Rabbit RBCs b) Anti-sheep RBCs
c) Horse RBCs d) Human RBCs

xi) VDRL test is used for diagnosis of _____ disease.
a) Influenza b) Syphilis c) AIDs d) Typhoid

xii) _____ refers to the ability of one cytokine having multiple effects on diverse cell types.
a) Redundancy b) Synergy
c) Antagonism d) Pleiotropism

xiii) Endogenous antigen targeted for lysis first combine with _____ small protein molecule.
a) Calnexin b) Tapasin
c) Ubiquitin d) None of these

xiv) In alternate pathway binding of _____ stabilizes the C_3bBb.
a) Lectin b) Serine protease
c) Properdin d) C_1

2. Answer **any seven** of the following : **14**

i) Define Hematopoiesis and give factors involved in hematopoiesis.
ii) Give primary and secondary lymphoid organs.
iii) Define agglutination and precipitation.
iv) Define antigen and give its type.
v) Give properties of cytokines.
vi) Define apoptosis and programmed cell death.
vii) Define ELISA and Immunofluorescence test.
viii) Define cross-reactivity and give its example.

3. A) Answer **any two** of the following : **10**
   i) Write an account on Lectin pathway.
   ii) Write note on MHC class II molecule.
   iii) Write note on factors affecting antigenicity.

   B) Give an account on complement fixation test and Radioimmunoassay. **4**

4. Answer **any two** of the following : **14**
   i) Give basic structure antibody molecule and its different types.
   ii) Give an account on processing and presentation of exogenous antigen.
   iii) Classical complement pathway.

5. Answer **any two** of the following : **14**
   i) Write an account on process of hematopoiesis.
   ii) Immunodiffusion and Immunoelectrophoresis.
   iii) Write note on cells of immune system.

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Seat No.	

Set P

B.Sc. – II (Semester – IV) (New CBCS) Examination, 2018
Biotechnology
CYTOGENETICS AND POPULATION GENETICS

Day and Date : Thursday, 03-05-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and labelled diagram **wherever** necessary.*

1. Choose and write the correct answer from the given four alternatives : **14**

1) Cytologist who established the presence of 46 chromosomes are
   a) J. H. Tjio and A. Lavan b) C. E. Ford and F. H. Crick
   c) S. Makino and M. S. Sasakl d) J. D. Watson and F. H. Crick

2) Heterochromatin appears like Drumstick bodies in
   a) Basophils b) Eosinophils
   c) Monocytes d) Neutrophils

3) Genes located on the "Y" chromosomes are
   a) Slave Genes b) Holandric Genes
   c) Plasmagenes d) Guide Genes

4) Trisomy of chromosome 21 results in
   a) Down's syndrome b) Edward's syndrome
   c) Patau's syndrome d) Klienfelter's syndrome

5) The position of centromere in the "Y" chromosome is
   a) Acrocentric b) Metacentric
   c) Acentric d) Telocentric

6) In meiosis crossing over between the Homologous chromosome occurs during _____ stage.
   a) Zygotene b) Leptotene
   c) Pachytene d) Diplotene

P.T.O.

7) Division of cytoplasm is called
   a) Cytokinesis b) Karyokinesis
   c) Mitosis d) Meiosis

8) Complete set of chromosome that an organism possess is called
   a) Idiogram b) Pictogram
   c) Karyotype d) Phenotype

9) The "X" chromosome is placed in _____ of a human karyotype.
   a) Group A b) Group B c) Group C d) Group D

10) Radocabbage is the result of
   a) Triploid b) Tetraploid
   c) Autopolyploid d) Allopolyploid

11) The transposons inserted themselves at certain position called
   a) Target site b) Parent site
   c) Hotspot d) Direct repeats

12) The fluctuation in Gene Frequency is called
   a) Gene Pool b) Allele Frequency
   c) Genetic drift d) Random drift

13) Barr Bodies in nucleus of male chromosome is
   a) 2 b) 1 c) 3 d) 0

14) The number of Haploid chromosome in peaplant is
   a) 4 b) 23 c) 7 d) 8

2. Solve **any seven** of the following : **14**

1) Define Mutant.
2) Define Transposition.
3) Define slave genes.
4) Define polyploidy.
5) Define Range.
6) Define migration.
7) What is AME's Test ?
8) What is genetic drift ?
9) Give examples of transposons in drosophila melanogastor.

3. A) Attempt **any two** of the following : **10**
   1) Describe the structure of chromosome with a neat labelled diagram.
   2) Write in detail about spontaneous and induced mutation with examples.
   3) Write in detail about detection of mutant.

   B) Solve : **4**

   Explain process of Mitosis and add a note on its significance.

4. Attempt **any two** of the following : **14**
   1) Write in detail about the numerical changes in chromosome.
   2) Describe in detail about the Giant chromosomes with neat labelled diagram.
   3) Write in detail about minisatellites and its application.

5. Attempt **any two** of the following : **14**
   1) Write in detail about Hardy-Weinberg Law and its application.
   2) Describe multiple factor hypothesis with suitable examples.
   3) Describe the genetic basis of evolution in Brassica and Wheat.

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Seat No.	

Set P

B.Sc. – II (Biotechnology) (Semester – IV) (New CBCS) Examination, 2018
MECHANISMS IN MOLECULAR BIOLOGY

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *and labeled diagrams* ***wherever*** *necessary.*

1. Rewrite the following sentences by using correct alternative : **14**

1) _____ is synthesized by RNA polymerase II.
   a) hnRNA b) snoRNA
   c) rRNA d) U6 snRNA

2) Intrinsic termination of transcription is carried out with help of _____ in prokaryotes.
   a) Sigma factor b) Rho factor
   c) Pol-α d) Hairpin loop formation

3) During mRNA processing, poly A tail is formed at _____ end of mRNA molecule.
   a) Only at 5' b) Both 5' and 3'
   c) Only at 3' d) None of these

4) Ribosome binding site is having _____ sequences.
   a) TATAAT b) T TAGGC c) AGGAGGU d) ATGC

5) In lactose operon, regulatory protein is encoded from _____ gene.
   a) Lac 'a' b) Lac 'i'
   c) Lac 'z' d) Lac 'y'

6) _____ is act as initiator tRNA molecule in eukaryotic translation process.
   a) $tRNA^{met}$ b) $tRNA^{fmet}$
   c) $tRNA^{pro}$ d) $tRNA^{val}$

P.T.O.

7) _____ binds to 30S subunit of ribosome to inhibit proteins synthesis in bacterial cells.
   a) Ampicillin b) Tetracycline
   c) Rifampicin d) Peptidyl transfersae

8) _____ inhibits bacterial DNA dependent RNA synthesis.
   a) Ampicillin b) Tetracycline
   c) Rifampicin d) Doxorubicin

9) Codons GGG, GGA, GGA and GGU specify same amino acid, this property of genetic code is called _____
   a) Non-ambiguous b) Degeneracy
   c) Overlapping d) Ambiguous

10) Proteosomes plays important role in _____
   a) Protein trafficking b) Protein folding
   c) Protein synthesis d) Misfolded protein degradation

11) In *trp* operon, tryptophan is act as _____
   a) Holo-repressor b) Co-repressor
   c) Apo-repressor d) Inducer

12) Evolution of TPA gene is an example of _____
   a) Splicing b) RNA editing
   c) Alternative splicing d) Exon shuffling

13) Editosome is large multi-protein complex that catalyzes the _____ of mRNA molecule.
   a) Editing b) Removal of introns
   c) Tailing d) Capping

14) Acetyl groups added to core histones by a family of enzymes called _____
   a) Histone acetyltransferases b) Histone transacetylases
   c) Histone methylases d) Histone deacetylases

2. Answer the following (**any 7**) : **14**
   i) What is exon shuffling ?
   ii) Write a note editosome.
   iii) Write a note on prokaryotic RNA polymerase.
   iv) What are promoters ?

v) What is fidelity of translation ?

vi) Write a note on introns.

vii) Write a note aminoacylation of tRNA.

viii) Write a note on CTD domain of RNA polymerase II.

ix) What are transcriptional repressors ?

3. A) Answer the following (**any 2**) : **10**

i) Describe structure and function of ribosome in prokaryotes and eukaryotes.

ii) Explain process of transcription termination in prokaryotes.

iii) Describe process of translation initiation in eukaryotes.

B) Explain alternative splicing mechanisms. **4**

4. Answer **any two** of the following : **14**

i) Describe post-translational modifications in proteins.

ii) Describe process of mRNA processing in eukaryotes.

iii) Explain structure and regulation of trp operon in bacteria.

5. Answer **any two** of the following : **14**

i) Describe mechanism of translation in prokaryotes.

ii) Explain gene regulation in eukaryotes with suitable examples.

iii) Explain mechanism of transcription in eukaryotes.

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Seat No.	

Set P

B.Sc. (Part – II) (Semester – IV) (New – CBCS) Examination, 2018
BIOTECHNOLOGY
Plant Tissue Culture

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and labeled diagrams **wherever** necessary.*

1. Choose one of the correct alternatives from the following. **14**

1) _____ had used culture filtrate of the fungus *Myrothecium verrucaria* and thereby introduced the concept of enzymatic isolation of plant protoplasts.
   a) Murashige b) Cocking
   c) Skoog d) Nisch

2) The temperature of growth room in Plant Tissue culture is maintained at _____°C.
   a) 37 b) 25 c) 121 d) 4

3) Thermolabile components of culture media can be sterilized by
   a) autoclaving b) UV irradiation
   c) filtration d) heating

4) _____ is not used for surface sterilization of explant.
   a) Sterile water b) Sodium hypochlorite
   c) $HgCl_2$ d) Alcohol

5) Highest concentration of auxin exist at the _____
   a) growing tips of plants b) leaves
   c) in xylem d) base of any plant organ

6) _____ culture technique is used for obtaining haploid plants.
   a) Micropropagation b) Callus
   c) Anther d) Protoplast

7) The phenomenon of suppression of growth of an axillary bud in the presence of the terminal bud on the branch is known as _____
   a) apical dominance b) lateral dominance
   c) organogenesis d) differentiation

8) _____ is a tissue arising from disorganized proliferation of cells either in cultures or in nature.
   a) Shoot b) Root c) Callus d) Embryo

9) A cell or plant with nucleus of one parent and extranuclear genes of another or both parents, from the fusion of protoplasts is known as
   a) hybrid b) protoplast
   c) cytoplast d) cybrid

10) _____ is preservation and storage of cells, tissues and organs by immersion into liquid nitrogen.
   a) Cryopreservation b) Autoclaving
   c) Sterilization d) Culturing

11) Yellowing or whitening of green tissues in plant occurring due to deficiency of light, magnesium, iron or other factors is called as
   a) necrosis b) apoptosis
   c) chlorosis d) aging

12) Reversal of organized structures into an undifferentiated state is called as
   a) cytodifferentiation b) dedifferentiation
   c) redifferentiation d) nucleation

13) _____ is the length of time plants are exposed to light in an alternating light-dark interval sequence.
   a) Photoperiod b) Phototropism
   c) Incubation d) Protoperiod

14) Ability of plant cell to form entire plant is known as
   a) Totipotency b) Pleuripotency
   c) Integrity d) Continuity

2. Answer the following (**any seven**). **14**

1) Mention the methods for sterilization of glassware.
2) What is surface disinfection ? Give an example of it.
3) Explain the levels of safety.
4) Differentiate between organ culture and organogenesis.
5) How the plant hardening is carried out ?
6) What do you mean by synthetic seed ?

7) Give the advantages of cryopreservation.
8) Define cytodifferentiation.
9) Draw a neat labeled diagram of general plant tissue culture laboratory setup.

3. A) Answer the following (**any two**). **10**
   1) Discuss organogenesis.
   2) Explain different methods of isolation of protoplast.
   3) Write an account on callus culture.

   B) Explain cryopreservations by freezing treatment. **4**

4. Answer the following (**any two**). **14**
   1) Explain in detail about-Somatic embryogenesis.
   2) Discuss the anther and pollen culture for haploid production.
   3) Explain in detail the General Plant Tissue Culture Laboratory design and equipments used for Plant Tissue Culture Technique.

5. Answer the following (**any two**). **14**
   1) Explain in brief-Somaclonal variation.
   2) Give a detailed account on organ culture.
   3) Explain various sterilization techniques used in Plant Tissue Culture Laboratory.

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Seat No.	

Set **P**

B.Sc. (Biotechnology) II (Semester – IV) (New CBCS) Examination, 2018
ANALYTICAL TECHNIQUES

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and **labeled** diagrams.*

1. Rewrite the following sentences by choosing correct alternatives. **14**

1) Purpose of using _____ gel is to Concentrate Proteins.
a) Stacking b) Separating c) Starch d) Agarose

2) Volume of _____ per unit time is known as flow rate.
a) Stationary phase b) Mobile phase
c) Slurry d) Sample

3) Salting out is the process of _____ of proteins in solution by the addition of large amount of inorganic salt.
a) Agglutination b) Coagulation
c) Precipitation d) Dilution

4) Osmotic Shock is the _____ method of cell disruption.
a) Enzymatic b) Chemical c) Analytical d) Physical

5) Usually in _____ chromatography stationary phase is Water.
a) Paper b) TLC
c) Affinity d) Gel Permeation

6) _____ is extensively used chromatographic technique to determine base composition of nucleic acid.
a) GLC b) Ion exchange
c) Affinity d) Adsorption

7) ESI creates _____ by holding a liquid at high potential difference.
a) Molecules b) Compound
c) Ions d) Fragments of molecules

8) Protein Expression Mapping involves _____ study of global changes in protein expression in cell or tissue.
a) Comparative b) Operative c) Qualitative d) Quantitative

9) In _____ technique pH gradient in gel is used for separation.
   a) IEF b) SDS-PAGE
   c) Sedimentation d) PAGE

10) Dr. Willem Kolff constructed first working _____ in 1943.
   a) Capacitor b) Dialyzer c) Model d) Detector

11) _____ is the most suitable gas to use as a carrier gas in GLC.
   a) Carbon dioxide b) Oxygen
   c) Helium d) Methane

12) _____ are inversely proportional to Volatility of analyte in GLC.
   a) Concentrations b) Volume of mobile phase
   c) Volume of stationary phase d) Partition coefficients

13) Membrane proteins are _____ during 2-D gel electrophoresis.
   a) under represented b) Isolated
   c) Lysed d) Clotted

14) _____ & _____ invented 2-D gel electrophoresis independently in 1975.
   a) Klose & Muller b) O'Farrel & Klose
   c) Darvin & Klose d) O'Farrel & Muller

2. Answer the following **(Any seven)**. **14**

1) How will you prepare separating gel in SDS-PAGE ?
2) Explain the role of homogenizerin cell disruption.
3) How buffer affect electrophoretic mobility ?
4) Enlist the advantages and limitations of lowry assay.
5) Write a note on Introduction of proteomics.
6) Define isoelectric point.
7) Column used in column chromatography.
8) Write a note on chromatography.
9) Write the principle of Bradfoard assay.

3. A) Answer the following. (**Any two**) **10**

1) Describe the ascending paper chromatographic technique.
2) How will you purify the proteins by dialysis ?
3) Discuss limitations of 2-D gel electrophoresis.

B) Describe assay used for iodine value. **4**

4. Answer the following (**Any two)**. **14**
   1) In which electrophoretic technique proteins get separated at its isoelectric point.
   2) Describe Edman degradation for protein sequencing.
   3) Describe disc gel electrophoretic technique for protein.

5. Answer the following (**Any two)**. **14**
   1) Give details of protein estimation by Bicinchonic acid.
   2) Discuss chromatographic technique in which resins are used for ions.
   3) Explain DNA blotting technique.

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Seat No.	

Set P

B.Sc. (Part – II) (Semester – IV) (Biotechnology) (New CBCS) Examination, 2018
MECHANISMS IN IMMUNOLOGY

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions : ***All*** *questions are* ***compulsory****.*
Figures to the ***right*** *side indicates* ***full*** *marks.*

1. Rewrite the following sentences by choosing the correct alternative given below : **14**

   i) In cell mediated immunity _____ will perform role in target cell killing.
   a) Perforans b) Fragmentins
   c) Granzymes d) All of these

   ii) In the B blood group person _____ type of isoantibodies are present.
   a) Anti-A b) Anti-B
   c) Anti-AB d) Anti-D

   iii) _____ is non-organ specific autoimmune disease.
   a) Myasthenia gravis b) Systemic lupus erythromatosus
   c) Graves disease d) Pernicious anemia

   iv) B cells are matured in _____
   a) Bone marrow b) Spleen
   c) Thymu's d) Lymph node

   v) _____ is primary mediator of anaphylaxis.
   a) Platelet activating factor b) Prostaglandins
   c) Leukotrienes d) All of these

   vi) _____ will be used for fusion of B lymphocytes and myeloma cells in monoclonal antibody synthesis technique.
   a) PEG b) HAT
   c) HGPRT d) Ig

vii) Exogenous antigen is presented to T cells by _____ molecule.
a) MHC II b) MHC III
c) MHC I d) None of these

viii) Transfer of antibodies from mother to baby is called as _____ immunization.
a) Natural passive
b) Artificial passive
c) Natural active
d) None of these

ix) Blood group antigens were discovered by _____
a) Landsteiner b) Burnett
c) Marrack d) Darwin

x) Lysozyme is present in _____ body fluids.
a) Saliva b) Sweat
c) Cerebrospinal fluid d) Urine

xi) Primary immune response is characterized by the production of _____ type of antibodies.
a) IgM b) IgD
c) IgG d) IgA

xii) _____ complement component contains unstable thioester bond undergo spontaneous hydrolysis in alternate pathaway.
a) C1 b) C2
c) C3 d) C4

xiii) Erythroblastosis fetalis, hemolytic disease of newborn is caused by _____ hypersensitivity.
a) Type I b) Type II
c) Type III d) Type IV

xiv) _____ discovered hybridoma technique for monoclonal antibody production.
a) Robert Koch
b) Burnett
c) Kohler and Milestein
d) Marrack

2. Answer **any seven** (out of **nine**) of the following : **14**

   i) Complement components.

   ii) Define antibody and give its types.

   iii) Inflammation.

   iv) Define hypersensitivity.

   v) Define autoimmunity.

   vi) Functions of B cells.

   vii) Hemolytic diseases.

   viii) NK cells.

   ix) Innate and acquired immunity.

3. A) Answer **any two** (out of **three**) of the following : **10**

      i) Chemical barriers of innate immunity.

      ii) Primary and secondary immune response.

      iii) Explain any two non-organ specific autoimmune diseases.

   B) Explain ABO and Rh blood group system. **4**

4. Answer **any two** of the following : **14**

   i) Explain processing and presentation of endogenous antigen.

   ii) Explain traditional vaccines with example.

   iii) Explain General mechanism of autoimmunity (any 4 mechanism).

5. Answer **any two** of the following : **14**

   i) Explain T cell maturation, activation and differentiation.

   ii) Explain alternate complement pathway.

   iii) Monoclonal antibody synthesis and its application.

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Seat No.	

Set P

B.Sc. – II (Biotechnology) (Semester – IV) (CBCS) Examination, 2018
METABOLISM (New)

Day and Date : Friday, 11-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions carry equal marks.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and **labeled** diagrams.*

1. Rewrite the following sentences by using correct alternative : **14**

1) _____ is not an intermediate of citric acid cycle.
a) Acetoacetate b) Citrate c) Ketoglutarate d) Succinate

2) _____ is a coenzyme in the reaction catalysed by glyceraldehydes 3-phosphate dehydrogenase.
a) ATP b) Cu^{2+} c) Heme d) NAD+

3) The conversion of one molecule of glucose to two molecules of pyruvate results in the net formation of
a) 6 ATP b) 2 ATP c) 3 ATP d) 4 ATP

4) Enzymes of glycolysis are located in the
a) Mitochondria b) Nucleus c) Cytoplasm d) Lysosome

5) The synthesis of glucose from lactate, glycerol or amino acids is called
a) Glycogenolysis b) Glycolysis
c) Lipolysis d) Gluconeogenesis

6) Fatty acids are transported into the mitochondria bound to
a) Ornithine b) Citrulline
c) Carnithine d) Succinylcholine

7) Pyruvate dehydrogenase complex catalyses
a) Conversion of pyruvate to acetyl-CoA
b) Conversion of acetyl-CoA to pyruvate
c) Conversion of pyruvate to lactate
d) Conversion of lactate to pyruvate

8) _____coenzyme is required in the transamination reaction.
a) Biotin b) Flavin nucleotide
c) Puridoxal phosphate d) Nicotinamide

9) The first intermediate with complete purine ring is
a) Inosinate b) Formate c) Aspartate d) Glycine

10) CTP is formed from UTP by the action of
a) Adenylate kinase b) Dihydroorotase
c) Aspartate transcarbamolase d) Cytidylate synthase

P.T.O.

11) _____ is required for both purine and pyrimidine biosynthesis.
a) Aspartate b) Asparagine c) Arginine d) Alanine

12) De novo pathway of purine synthesis require _____ molecules of ATP.
a) 6 b) 5 c) 4 d) 3

13) _____ compound is produced in both TCA and Urea cycle.
a) α-ketoglutarate b) Succinyl Co-A c) Oxaloacetate d) Fumarate

14) Net generation of energy on complete oxidation of palmitic acid is
a) 129 ATP b) 131 ATP c) 146 ATP d) 148 ATP

2. Answer the following **(any 7)** : **14**

i) Write a note on ethanol fermentation.
ii) Draw the neat labeled diagram of mitochondria.
iii) Give the diagrammatic representation of non-cyclic photophosphorylations.
iv) Explain the reaction for conversion of acetyl Co-A into malonyl Co-A.
v) Give two examples of uncouplers of oxidative phosphorylation.
vi) Define photophosphorylation.
vii) How the UDP glucose forms ?
viii) Write a note on hydrolysis of triacylglycerols.
ix) Enlist the sources in purine ring.

3. A) Answer the following **(any 2)** : **10**

i) Explain transamination and deamination reaction of amino acid metabolism.
ii) Write a note on cyclic photophosphorylation in plants.
iii) How the transport of fatty acids occurs in mitochondria ?

B) Explain the process for synthesis of ATP by ATP synthase enzyme. **4**

4. Answer **any two** of the following : **14**

i) Write a note on urea cycle.
ii) Describe in brief hexose monophosphate shunt pathway.
iii) Explain the enzymatic reactions for the oxidation glucose molecule in aerobic conditions.

5. Answer **any two** of the following : **14**

i) Write a note on oxidative phosphorylation.
ii) Explain carbon dioxide fixation in C4 plants. Add a note on rubisco enzyme.
iii) Describe in detail the process of β oxidation of saturated fatty acids.

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SLR-SA – 40

Seat No.	

Set P

B.Sc. – II (Biotechnology) (Semester – IV) (CGPA) Examination, 2018
MOLECULAR BIOLOGY – I (Old)

Day and Date : Thursday, 3-5-2018 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labelled diagram **wherever** necessary.*

1. Choose and write correct answers from given four alternatives : **14**

1) In Blenders experiment the phage protein was labelled with the help of
   a) 32_{PO4} b) $^{35}SO_4$ c) T_2 d) 15_N

2) Bent DNA structure can be produced by antitumor drug
   a) Ciprofloxacin b) Novobiocin
   c) Nalidixic acid d) Cisplastin

3) In Z DNA number of base pairs per complete turn is
   a) 10 b) 11 c) 12 d) None of these

4) Arthur Korenberg indentified the enzyme involved in replication
   a) DNA polymerase III b) DNA polymerase I
   c) DNA ligase d) DNA primase

5) The number of base pairs of DNA in E. coli origin is
   a) 245bp b) 220bp c) 232bp d) 241bp

6) The length of the DNA replicated in 30 minutes in E. coli is
   a) 10 mm b) 1 mm c) 100 mm d) 1000 mm

7) Okazaki fragments are joined together into a continuous strand by the activity of the enzyme
   a) DNA polymerase b) DNA polymerase II
   c) DNA polymerase III d) DNA ligase

8) The SOS repair mechanism is activated by
   a) 5-Bromouracil b) Hydroxylamine
   c) Acridine orange d) Thymidine dimers

9) M. Messelson and F. W. Stahl verified semi conservation nature of DNA replication by using
   a) Autoradiography b) Fluroscent label
   c) Electron microscopy d) Isotopic labelling

10) The mode of replication which resemble the Greek Letter sigma is
   a) Replicon model b) D-Loop model
   c) Rolling circle model d) Replication fork model

11) Enzyme called the molecular glue is
   a) DNA Polymerase b) DNA Ligase
   c) DNA Helicase d) DNA Primase

12) The codon referred to as Amber is
   a) UAG b) UGA c) AUG d) AUA

13) The protein present in Eukaryotic DNA is
   a) Arginine b) Lysine c) Methionine d) Histone

14) DNA repair mechanism and application was studied by
   a) James Watson b) Francis Crick
   c) Thomas Lindahl d) Arther Korenberg

2. Solve **any seven** of the following : **14**

1) Define Gene.
2) Define Denaturation.
3) Define linking number.
4) Define supercoiling.
5) Define Cot curves.
6) Define Chargaff's Rule.
7) Define Coliphages.
8) Define Wobble hypothesis.
9) Justify whether the nucleic acid is DNA or RNA.
   A = 33% G = 17% T = 0% C = 17% U = 33%

3. A) Attempt **any two** of the following : **10**

   1) Write in detail Hershey and Chase experiment with a neat labelled diagram.

   2) Write in detail about the DNA structure with a neat labelled diagram.

   3) Explain Cot curve analysis with a neat labelled diagram.

   B) Explain about the properties of genetic code. **4**

4. Attempt **any two** of the following : **14**

   1) Explain in detail the enzymes involved in DNA replication of prokaryotes.

   2) Explain mitochondrial and chloroplast genome in detail.

   3) Explain the organisation of genome in eukaryotes with a neat labelled diagram.

5. Attempt **any two** of the following : **14**

   1) Write in detail nucleotide excision repair and SOS repair mechanism.

   2) Explain the process of replication of DNA in eukaryotes with a neat labelled diagram.

   3) Write in detail about D-Loop model of replication with a neat labelled diagram.

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Seat No.	

Set P

B.Sc. II (Biotechnology) (Semester – IV) (CGPA) Examination, 2018
MOLECULAR BIOLOGY – II (Old)

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and labeled diagrams **wherever** necessary.*

1. Rewrite the following sentences by using correct alternatives : **14**

1) _____ is synthesized by RNA polymerase III.
a) mRNA b) snoRNA c) rRNA d) U6 snRNA

2) Extrinsic termination of transcription is carried out with help of _____ in prokaryotes.
a) Sigma factor b) Rho factor c) Pol-α d) Core enzyme

3) During mRNA processing 7-methylguanosine cap is formed at _____ end of mRNA molecule.
a) only at 5' b) both 5' and 3'
c) only at 3' d) none of these

4) Shine-Dalgarno sequences is called as
a) Consensus b) Promoter
c) Ribosome binding site d) None of these

5) In lac operon, Galactoside permease enzyme is encoded from _____ gene.
a) lac 'a' b) lac 'b' c) lac 'z' d) lac 'y'

6) _____ is act as initiator tRNA molecule in prokaryotic translation process.
a) $tRNA^{met}$ b) $tRNA^{fmet}$ c) $tRNA^{pro}$ d) $tRNA^{val}$

7) _____ enzyme is responsible for polypeptide bond formation in translation process.
a) Aminoacyl tRNA synthetase b) DNA glycosylase
c) Peptidyl di-sulphide isomerase d) Peptidyl transfersae

P.T.O.

8) _____ model of tRNA was proposed by Robert Holly.
   a) Clover leaf b) Fluid mosaic c) Hairpin loop d) Double helix

9) Codons GGG, GGA, GGA and GGU specify same amino acid, this property of genetic code is called
   a) Non-ambiguous b) Degeneracy
   c) Overlapping d) Ambiguous

10) Chaperons plays important role in
   a) protein targeting b) protein folding
   c) protein synthesis d) protein degradation

11) In lactose operon _____ is act as inducer.
   a) Glucose b) Galactose c) Allolactose d) Fructose

12) The expression of most genes is also regulated by even more distant DNA elements called
   a) silencers b) promoters
   c) operators d) enhancers

13) Spliceosome is responsible for _____ from pre-mRNA molecule.
   a) glycosylation b) removal of introns
   c) tailing d) capping

14) Removal of acetyl groups from the core histones by a family of enzymes called
   a) histone acetyltransferases b) histone transacetylases
   c) histone methylases d) histone deacetylases

2. Answer the following (**any 7**) : **14**

i) What is attenuation ?

ii) Write a note on Chaperons.

iii) What is General transcription factors ?

iv) What is rho protein ?

v) What are translational drugs ?

vi) What is anticodons ?

vii) Write a note on mRNA transport.

viii) Write a note CTD domain of RNA polymerase II.

ix) What are transcriptional activators ?

3. A) Answer the following (**any 2**) : **10**
   i) Explain structure and regulation of trp operon in bacteria.
   ii) Describe termination of transcription in prokaryotes.
   iii) Explain alternative splicing mechanisms.

   B) Explain structure of ribosome. **4**

4. Answer **any two** of the following : **14**
   i) Describe mechanism of signal integration with suitable example.
   ii) Explain signal transduction in gene regulation with suitable examples.
   iii) Describe process of transcription in eukaryotes.

5. Answer **any two** of the following : **14**
   i) Explain post-translational modifications in proteins.
   ii) Describe process of mRNA processing in eukaryotes.
   iii) Describe process of translation in prokaryotes.

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Seat No.	

Set P

B.Sc. – II (Semester – IV) (CGPA) (Old) Examination, 2018
BIOTECHNOLOGY
Plant Tissue Culture

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagram* ***wherever*** *necessary.*

1. A) Choose and write a correct answer from given **four** alternatives : **14**

1) Concentration of Myo-inositol required to improve cell growth is _____
   a) 100 mg/lit b) 50 mg/lit
   c) 25 mg/lit d) 10 mg/lit

2) Naturally occurring cytokinin hormone in plants is _____
   a) Indole acetic acid b) Gibberellins
   c) Zeatin d) Ethylene

3) Growth regulator used for induction of embryogenesis of _____
   a) Gibberellins b) Abcissic acid
   c) Kinetin d) Glutamine

4) The commercial bleach used for sterilization of explant is _____
   a) Sodium hypochlorite b) Calcium hypochlorite
   c) Bromine water d) Mercuric chloride

5) Brown colour developed by callus due to phenol compounds can be controlled by _____
   a) Coconut milk b) Tomato juice
   c) Activated charcoal d) Yeast extract

6) The pH of enzyme solution used for protoplast isolation is _____
   a) 4.7 – 6.0 b) 3.0 – 6.0
   c) 5.0 – 6.0 d) 4.0 – 6.0

P.T.O.

7) _____ cells present in the explant undergo differentiation to different tissues.
   a) Parenchyma b) Aerenchyma
   c) Sclerenchyma d) All of these

8) The temperature normally required for callus formation is _____
   a) 22°C – 28°C b) 30°C – 37°C c) 28°C – 37°C d) 22°C – 30°C

9) _____ are the cells without cell wall.
   a) Protoplast b) Cytoplast c) Chloroplast d) Chromoplast

10) The different stages of micropropagation was outlined by _____
   a) Skoog b) Murashige c) White c) Guha

11) Encapsulation of somatic embryos is done by using _____
   a) Calcium chloride b) Calcium hydroxide
   c) Sodium alginate d) Ferrous chloride

12) The term protoplast was coined by _____
   a) Klercker b) Hanstein c) Morel d) Martin

13) The convenient and most suitable source of protoplast is _____
   a) Mesophyll tissue b) Root tips
   c) Shoot tips d) Callus

14) High auxin concentration results in _____
   a) Adventitious root formation b) Callus formation
   c) Hairy root formation d) None of these

2. Solve **any seven** of the following : **14**

1) Define totipotency.
2) Define acclimatization.
3) Define browning of callus.
4) Define micropropagation.
5) Define embryoids.
6) Define packed cell volume.
7) Define vermiculite.
8) Define viability of cell.
9) Define cybrids.

3. A) Attempt **any two** of the following : **10**

   1) Write about the laboratory setup of plant tissue culture and its scope.

   2) Write about pollen culture with neat labelled diagram.

   3) Write about the factors affecting somatic embryogenesis.

   B) Solve : **4**

   Write about the laboratory and personal safety precautions to be taken in a tissue culture lab.

4. Attempt **any two** of the following : **14**

   1) Write in detail about the different media and its composition used in plant tissue culture and its significance.

   2) Write in detail about the different sterilization techniques employed in plant tissue culture.

   3) Write in detail about callus culture and its importance with neat labelled diagram.

5. Attempt **any two** of the following : **14**

   1) Explain in detail the major stages of micropropagation and its application.

   2) Explain in detail about the different protoplast isolation method with neat labelled diagram.

   3) Explain in detail about the androgenic method of haploid production in angiosperm plants, with neat labelled diagram.

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Set P

B.Sc. – II (Biotechnology) (Semester – IV) Examination, 2018
ANIMAL TISSUE CULTURE (Old CGPA)

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** and labeled diagrams.*

1. Rewrite the following sentences by choosing correct alternatives. **14**

1) _____ was the first cloned cell strain isolated by capillary cloning.
a) L929 b) Hela c) MCF7 d) BHK

2) Hela cell line is derived from _____ cell line.
a) Stomach cancer b) Cervical cancer
c) Lung cancer d) Blood cancer

3) Which of the following method used for activation of plastic substrate ?
a) UV radiation b) Heat c) γ radiation d) Visible light

4) _____ cells have finite life span.
a) Tumor b) Cancerous c) Transformed d) Normal

5) Plasma clot technique is also known as _____ Technique.
a) Watch glass b) Grid c) Raft d) Cyclic exposure

6) In natural media most widely used biological fluid as media is _____
a) Plasma clot b) Serum c) Coconut milk d) Clots

7) _____ is a physical method used to get all the cells in same phase of growth in culture.
a) TLC b) HPLC
c) Cell size and sedimentation d) Electrophoresis

8) Most cell lines grow well at pH _____
a) 7.1 b) 7.2 c) 7.3 d) 7.4

9) _____ is used as diluent for concentrates of amino acids and vitamins.
   a) BSS b) FBS c) CBS d) MS

10) _____ is often added to the cell suspension before viable counting.
   a) Gram stain b) Tryphan blue
   c) Crystal violet d) Fluorescein

11) _____ measurement is probably the best method to use as an indicator for the number of cells in a solid tissue.
   a) Protein b) Lipid c) DNA d) Carbohydrate

12) A colorimetric assay for viable cells has been developed by using _____ dye.
   a) CTT b) GTT c) MTT d) None of these

13) In primary culture, cell divide to give same type of cells by _____ process.
   a) Proliferation b) Differentiation
   c) Cultivation d) Initiation

14) _____ involves the exposure of the cell suspension to a high voltage electrical impulse.
   a) Encapsulation b) Electroporation
   c) Liposome d) Protoplast

2. Answer the following **(any seven)** : **14**

1) Write short note on synthetic media.
2) Describe in brief Laminar air flow.
3) Explain in brief characteristics of animal cell in culture.
4) How will you select cell line for culture ?
5) Define organ culture.
6) Define cell synchronization.
7) Explain maintenance of cell line.
8) Give brief account on purpose of use of bioreactor for animal cell.
9) Write a note on cell determination by DNA.

3. A) Answer the following **(any two)** : **10**
   1) Explain analysis of cell cycle.
   2) Explain karyotyping for identification of cell lines.
   3) Describe mechanical methods of cell separation.

   B) Write a note on history of ATC. **4**

4. Answer the following **(any two)** : **14**
   1) Describe in detail serum containing media.
   2) Explain in detail laboratory design for ATC.
   3) Give details of efficiency and productivity of a culture system.

5. Answer the following **(any two)** : **14**
   1) Discuss in detail cell counting and monitoring.
   2) Give details of cold trypsinization.
   3) Give details of different techniques of organ culture.

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Set P

B.Sc. – II Biotechnology (Semester – IV) (CGPA) (Old) Examination, 2018
BIOENERGETICS AND ENZYMOLOGY

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions carry **equal** marks.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and labeled diagrams.*

1. Rewrite the following sentences by using correct alternative. **14**

1) Entropy of a system is measure of its _____
   a) hardness b) softness
   c) randomness d) spontaneity

2) According to second law of thermodynamics, the _____ of a system always increases.
   a) free energy b) velocity
   c) enthalpy d) entropy

3) The _____ system can exchange both energy and matter with its surroundings.
   a) open b) closed
   c) isolated d) thermodynamic

4) _____ is the carbon carbon bond forming reaction among esters in presence of a strong base.
   a) Isomerization b) Claisen condensation
   c) Elimination d) Aldol condensation

5) The tendency of a chemical species to acquire electrons is its _____ potential.
   a) electron b) reduction c) oxidation d) action

6) The more _____ is the reduction potential, greater is the species affinity for electrons and tendency to be reduced.
   a) negative b) positive c) equilibrium d) steady

7) The nonprotein part covalently bound to the enzyme is the _____
   a) holoenzyme b) apoenzyme
   c) prosthetic group d) ribozyme

8) In _____ inhibition of enzymes, the inhibitor binds to the site other than active site of an enzyme.
   a) competitive b) noncompetitive
   c) uncompetitive d) irreversible

9) Abzymes are the antibodies with catalytic activity and also known as _____
   a) immunocatalysts b) globular enzymes
   c) catmabs d) interferons

10) Ribozymes are the _____ molecules capable of catalyzing specific biochemical reactions.
   a) DNA b) RNA c) protein d) ribosome

11) Lactate dehydrogenase is observed in _____ isomeric forms in mammals.
   a) 2 b) 3 c) 4 d) 5

12) At optimum temperature or pH, the rate or velocity of an enzymatic reaction is
   a) maximum b) minimum c) moderate d) constant

13) The rigidity of active site upon binding with substrate can be explained on the basis of _____ mechanism.
   a) Induced-fit b) Ping pong
   c) Michaelis Menten d) Lock and Key

14) Km of an enzymatic reaction is the concentration of _____ at which enzyme shows half of its maximum velocity.
   a) enzyme b) substrate c) ES complex d) product

2. Answer the following (**any 7**) : **14**

i) What is biological standard state ?

ii) State the relation between standard redox potential and standard free energy change.

iii) State induced fit hypothesis of enzyme catalysis.

iv) What is significance of Km ?

v) State role of an allosteric modulator.

vi) Differentiate between competitive and noncompetitive inhibition.

vii) What are features of active site of an enzyme ?

viii) Define the terms : coenzyme and prosthetic group.

ix) What is mass action ratio of a reaction ?

3. A) Answer the following (**any 2**) : **10**

i) Explain ATP as an universal currency of free energy in biological system.

ii) Describe classification of enzyme with an example of each class.

iii) Write a note on specificity of enzymes.

B) Solve the following : **4**

Calculate the standard free-energy change of the reaction catalyzed by the enzyme phosphoglucomutase.

Glucose 1-phosphate $\rightleftharpoons$ glucose 6-phosphate

Given : R = 8.315 J/mol, T = 298 K.

Initial concentration : Glucose 1 phosphate : 20 mM, glucose 6 phosphate : 0 mM concentration at equilibrium : Glucose 1 phosphate : 1 mM, glucose 6 phosphate : 19 mM.

4. Answer **any two** of the following : **14**

i) Add an account on 'Common Biochemical Reactions'.

ii) Discuss in detail 'regulation of enzymes' in biological system.

iii) Describe in detail factors affecting enzyme activity.

5. Answer **any two** of the following : **14**

i) Describe in detail types of enzyme inhibition.

ii) Discuss biological oxidation reduction reactions. Add a note on measurement of redox potential.

iii) Describe in detail isoenzymes of lactate dehydrogenase and their clinical importance.

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Seat No.	

Set P

B.Sc. II Biotechnology (Semester – IV) (CGPA) Examination, 2018
METABOLISM (Old)

Day and Date : Friday, 11-5-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions carry **equal** marks.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** and labeled diagrams.*

1. Rewrite the following sentences by using correct alternative : **14**

1) Which of the following is both ketogenic and glucogenic amino acid ?
   a) valine b) tryptophan c) lysine d) none of these

2) How many molecules of acetyl co-A produced in oxidation of palmitic acid (C_{16}) ?
   a) 6 b) 7 c) 8 d) 9

3) _____ is an example of uncoupler of ATP synthesis.
   a) DNSA b) 2, 4 dinitrophenol
   c) Tryptomycin d) IAA

4) How many molecules of ATPs are synthesized per NADH oxidation ?
   a) 1 b) 2 c) 3 d) 4

5) Citric acid cycle takes place in
   a) cytosole
   b) inter membrane space
   c) inner membrane of mitochondria
   d) matrix of mitochondria

6) Transaminase enzymes are present in
   a) liver b) pancreas
   c) heart d) intestine

7) PFK-2 converts fructose 6 phosphate to
   a) glucose 6 phosphate b) fructose 1 phosphate
   c) fructose 1, 6 bisphosphate d) fructose 2, 6 bisphosphate

8) The final product formed in glycolysis is _____ acid.
   a) acitic b) carboxylic c) lactic d) pyruvic

9) In C4 plants during CO_2 fixation _____ enzyme converts pyruvate into PEP.
   a) hexokinase b) glucokinase
   c) phosphofructo kinase d) pyruvate phosphate dikinase

10) The succinate is oxidized to fumarate by the flavoprotein
   a) succinate dehydrogenase b) succinate synthase
   c) fumarase d) fumerate synthase

11) The site for oxidative phosphorylation is _____ of mitochondria.
   a) Outer membrane b) Inner membrane
   c) Matrix d) Inter membrane space

12) De Novo purine nucleotide synthesis begins with
   a) PRPP b) PEP c) GAR d) FGAR

13) The most active NADH shuttle, which functions in liver, kidney and heart mitochondria is the
   a) malate-aspartate shuttle b) glycerol 3-phosphate shuttle
   c) glycerol malate shuttle d) none of these

14) Transamination is the process where
   a) carboxyl group is transferred from amino acid.
   b) amino group is transferred from amino acid
   c) amino acid synthesis takes place
   d) amino acid breakdown takes place

2. Answer the following (**any 7**) : **14**

i) What is photosystem ?

ii) Write a note on reciprocal regulation of glycolysis and gluconeogenesis.

iii) Give the diagrammatic representation of ATP synthese enzyme.

iv) What is β-oxidation ?

v) Give two examples of glycogenic amino acids.

vi) Define photophosphorylation.

vii) How the UDP glucose forms ?

viii) Write a note on chemiosmotic hypothesis.

ix) Define glycolysis.

3. A) Answer the following (**any 2**) : **10**

   i) Explain the biosynthesis of amino acids.

   ii) Write a note on inhibitors and uncouplers of electron transport chain.

   iii) How the cholesterol regulation takes place ?

   B) Explain the synthesis of glucose from its non carbohydrate precursors. **4**

4. Answer **any two** of the following : **14**

   i) Write a note on biosynthesis of purines and pyrimidines.

   ii) Explain the shuttles through which reducing poteintail is transferred from cytosole to mitochondria.

   iii) Write a note on tricarboxylic acid cycle.

5. Answer **any two** of the following : **14**

   i) Write a note on oxidative phosphorylation.

   ii) Explain z-scheme of non cyclic photophosphorylation.

   iii) How the oxidation of unsaturated and odd chain fatty acids takes place ?

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Seat No.	

Set **P**

B.Sc.– III (Biotechnology) (Semester – V) (CGPA) Examination, 2018
ENGLISH (Compulsory)
Breakthrough

Day and Date : Thursday, 12-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. A) Choose the **correct** alternative : **10**

1) Shaw believes that a society must not be judged by _____
   a) Its average parson b) Its few rebels
   c) Its Journalists and editors d) Its millions of obedient subjects

2) The average parson teaches _____ at the village school.
   a) Honesty and equality b) Honesty and religion
   c) Religion and law d) None of the above

3) The United States was founded on the principle that _____
   a) All men are equal
   b) White men are superior
   c) It is under God
   d) A government of the people, by the people and for the people

4) The United States was founded _____ years ago.
   a) Four score and six years
   b) Four score and eight years
   c) Four score and five years
   d) Four score and seven years

5) The value accorded to _____ prevented women from living a free life like a male writers.
   a) Decency b) Humility c) Anonymity d) Chastity

6) _____ declared that it was impossible for any woman to have the genius of Shakespeare.
   a) A priest b) A bishop
   c) A clergy d) Nick Greene

7) Those who love _____ are blessed by God.
   a) Their fellowmen b) God
   c) Father and mother d) Their duty

8) The angel was writing in the book of _____
   a) Silver b) God c) Gold d) Prayer

9) The ship in the poem 'O Captain ! My Captain !' is a metaphor for _____
   a) Abraham Lincoln b) Walt Whitman
   c) Shakespeare d) America

10) Our 'fearful trip' refers to _____
   a) American Civil War b) Spanish Civil War
   c) British Civil War d) Indian Civil War

B) Rewrite the following sentences choosing the correct modal auxiliary from the brackets : **2**

1) Mahesh loves books _____ we take some for him ?
   (Shall, Could, Must, Used to)
2) _____ I use your mobile, please.
   (Could, Should, Must, Would)

C) Write the following sentences in indirect speech. **2**

1) Namdeo said, 'Oxygen is essential for life'.
2) Sneha said, 'Sachin studies for six hours every day'.

2. Answer **any seven** of the following questions in brief : **14**

1) What does average parson do in the village school ?
2) What are the opinions of Shaw about Science ?
3) Why did we all blame ex-Kaisar, according to Shaw ?

4) What did our fathers do four score and seven years ago, according to Lincoln ?
5) Why did the people of America meet together on a great battle-field of the war ?
6) Why did Lincoln say that we cannot consecrate the battle-field ?
7) What did a bishop declare, according to Virginia Woolf ?
8) Where isn't a genius like Shakespeare born, according to Woolf ?
9) What would have happened to any woman born with a great gift in 16th century ?

3. A) Answer **any two** of the following : **8**
   1) What is the theme of the poem 'Abou Ben Adhem' ?
   2) What dialogue does take place between Abou Ben Adhem and angel ?
   3) Why does the poet ask the captain to rise up ?

   B) Write short reports on **any two** of the following : **6**
   1) Celebration of 'Teachers' Day' in your college.
   2) Prize Distribution Ceremony in your college.
   3) Visit to Indian Institute of Chemical Technology (IICT), Hyderabad.

4. Answer **any one** of the following : **14**
   1) Prepare a presentation consisting of five charts or slides to a "New Samsung Mobile" in the market.
   2) Write a presentation on the topic "Water Management" using charts, transparencies or slides.

5. Write a transcript of group discussion on the topic "Loan Write-off to Farmers". **14**

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Seat No.	

Set P

B.Sc. – III (Biotechnology) (Semester – V) (CGPA) Examination, 2018
PLANT DEVELOPMENT

Day and Date : Friday, 13-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *labeled diagram* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the most correct alternative for the following and rewrite the sentences : **14**

1) Which of the following layer of anther wall has a great physiological significance in the development of pollen grain ?

a) Epidermis b) Endothecium
c) Middle layer d) Tapetum

2) _____ is a condition in which the stigma matures first and loses its receptivity by the time the anthers shed their pollens.

a) Protogyny b) Protoandry c) Herkogamy d) Heterostyly

3) The flowers which open normally are called _____

a) Cleistogamous flower b) Deistogamous flower
c) Chasmogamous flower d) All of these

4) _____ is the albuminous seed.

a) Gram b) Pea c) Bean d) Castor

5) Polyembryony was first time found by _____

a) Avery b) Arber
c) Antony Van Leewenhoek d) Nawaschin

6) The embryo evolved in culture medium are known as _____

a) Adventitious embryos b) Somatic embryo
c) Embryoids d) All of these

7) Arabidopsis thaliana is a member of _____ family.
   a) Brassicaceae b) Arabidopsis
   c) Asteraceae d) Bignoniaceae

8) Genome size of Arabidopsis thaliana is
   a) 135 bp b) 3 Mbp
   c) 140 bp d) 135 Mbp

9) Pectin which is present in plant cell wall is _____
   a) Protein b) Lipid
   c) Carbohydrate d) None of these

10) Indole -3-Acetic Acid (IAA) is derived from _____
   a) Glycine b) Tryptophan
   c) Histidine d) Aspartic acid

11) TAIR stands for _____
   a) The Arabidopsis India Resource
   b) The Arabidopsis Information Resource
   c) The Arabidopsis Indian Region
   d) The Arabidopsis International Resource

12) In cellulose the glucose molecules are linked to each other by _____
   a) β 1-6 linkage b) α 1-4 linkage
   c) β 1-4 linkage d) α 1-6 linkage

13) _____ is used as rooting hormone to successfully develop new plants from cuttings.
   a) NAA b) GA c) ABA d) Ethylene

14) _____ is a product of metabolism of the amino acid methionine and is produced in greater amounts in senescing tissues than in young or mature tissues.
   a) Auxin b) Cytokinins
   c) Ethylene d) Gibberellins

2. Attempt **any seven** of the following : **14**

1) Define pollination and give its types.

2) What is meant by Pollen embryo ?

3) What are the difference between monocot and dicot plants ?

4) Define Apomixis and give its types.

5) Why Arabidopsis thaliana is used as model plant ?

6) What are the practical application of ethylene ?

7) What are the functions of stomata ?

8) What is plant patterning ?

9) What is cytoskeleton ?

3. A) Attempt **any two** of the following : **10**

1) Pollen-Pistil interaction.

2) Cell wall development in plants.

3) What are the different mode of entry of pollen tube into ovule ?

B) Describe biochemistry of fruit maturation. **4**

4. Attempt **any two** of the following : **14**

1) Write an account on development of male gametophyte.

2) Explain the development of embryo development in monocot plant.

3) Give general account on auxin with its practical application.

5. Attempt **any two** of the following : **14**

1) Describe self-incompatibility.

2) Describe the endosperm formation with its type.

3) Explain the leaf development in plants.

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Seat No.	

Set P

B.Sc. III (Biotechnology) (Semester – V) (CGPA) Examination, 2018
ANIMAL DEVELOPMENT

Day and Date : Monday, 16-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** and labeled diagrams **wherever** necessary.*
*3) Figures to **right** indicates **full** marks.*

1. Rewrite the following sentences by using correct alternative. **14**

1) According to Gilchrist (1968), the prospective _____ is called "Zone of involution".

a) Ectodermal zone b) Endodermal zone
c) Mesodermal zone d) None of these

2) Development of an individual without fertilization is called as

a) Metamorphosis b) Fertilization
c) Reproduction d) Parthenogenesis

3) Lung cancer is a type of

a) Sarcoma b) Carcinoma c) Osteoma d) Lymphoma

4) _____ was the first to distinguish germ plasm as a separate entity from somatoplasm.

a) Weismann b) Roux c) E.Haeckel d) Child

5) According to _____ theory the embryo develops by progressive growth and differentiation.

a) Germplasm b) Biogenetic c) Mosaic d) Epigenesis

6) Synthesis of yolk from vitellogenin is takes place in
   a) Kidney b) Pancreas c) Liver d) Ovary

7) _____ cells are responsible for testosterone secretion.
   a) Sertoli b) Interstitial cells
   c) Sperm d) Spermatogonial

8) _____ is not a property of asexual reproduction.
   a) uniparental
   b) produce clones
   c) produce variations
   d) gametogenesis and fertilization absent

9) The branch of biology dealing with study cancer
   a) Oncology b) Gerontology c) Herpetology d) Teratology

10) The hormone causing moulting in arthropods is
   a) Prolactin b) Ecdysone c) TSH d) Somatotrophin

11) *Rb* gene is an example of
   a) oncogene b) proto-oncogene
   c) anti-oncogene d) none of these

12) If 10 spermatogonial cells undergoing spermatogenesis _____ number of spermatids are produced.
   a) 10 b) 20 c) 30 d) 40

13) Insect egg is characterized by _____ type of cleavage.
   a) Superficial meroblastic b) Radial holoblastic
   c) Discoidal meroblastic d) Spiral holoblastic

14) Reptilian egg is an example of
   a) Centrolecithal b) Telolecithal
   c) Mesolecithal d) Microlecithal

2. Answer the following **(any 7)**. **14**

   i) Write a note on Germplasm theory.

   ii) Give free radical theory of aging.

   iii) What is cortical reaction ?

   iv) Write a note on significance of fertilization.

   v) Write a note on Corpus luteum.

   vi) Write a note on chemical changes during cleavage.

   vii) What are morphogenetic cell movements ?

   viii) What is differentiation and de-differentiation ?

   ix) Regeneration in protozoa.

3. A) Answer **any two** of the following. **10**

      i) Describe blastulation in telolecithal egg with neat labeled diagram.

      ii) Describe mechanism regeneration in vertebrates with suitable example.

      iii) Describe Fate map of frog blastula.

   B) Describe types of cleavage with neat labeled diagram. **4**

4. Answer **any two** of the following. **14**

   i) Explain different types of regeneration with suitable examples.

   ii) Describe causes and types of cancers.

   iii) Explain embryonic adaptations in Amphioxus and frog.

5. Answer **any two** of the following. **14**

   i) Describe process of spermatogenesis with neat labeled diagram.

   ii) Describe process of gastrulation in frog with neat labeled diagram.

   iii) Describe process of metamorphosis in frog.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Part – III) (Semester – V) (CGPA) Examination, 2018
BIOINFORMATICS AND NANOTECHNOLOGY

Day and Date : Tuesday, 17-4-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right side** indicate **full** marks.*
*3) Draw **neat** labeled diagrams **wherever** necessary.*

1. Rewrite the sentence using correct alternative given below. **14**

1) SWISS-PROT represents _____ database.
   a) Nucleic acid sequence b) Protein sequence
   c) Genome sequence d) Cancer chromosome

2) FASTA algorithm was described by _____.
   a) Altschul b) Lipman and Pearson
   c) Wunch d) Smith-Waterman

3) _____ is not the structural database of nucleic acid.
   a) PDB b) NRL-3D c) GenBank d) NDB

4) OWL is _____ database.
   a) Redundant b) Unverified
   c) Unannotated d) Composite

5) The study of complete genome of organism is known as
   a) Proteomics b) Metagenomics
   c) Genomics d) Pharmacology

6) To obtain the thin films without changing the composition of original material, _____ technique is used.
   a) Laser ablation b) Sputter deposition
   c) Electric arc discharge d) Electrochemical etching

7) The uncertainty principle about position and momentum of particles was proposed by _____.

a) Robert Brown b) Schrodinger c) Heisenberg d) Max Planck

8) In _____ approach, the atoms and molecules are removed from a bulk material or sometimes thin films so as to obtain desired nanostructure.

a) top down b) bottom up c) traditional d) modern

9) The suitably modified polymeric nanoparticles in the form of _____ loaded with drugs are able to pass the blood brain barrier.

a) liposomes b) fullerence c) quantum dots d) nanotubes

10) For characterization of Nanoparticles _____ tool is used.

a) Scanning Electron Microscopy (SEM)

b) Compound microscope

c) Electrophoresis

d) Colorimeter

11) _____ is a Structural Database.

a) Prosite b) Swiss-prot c) GenBank d) MMDB

12) _____ is developed by EBI to retrieve information from database.

a) SRS b) Entrez c) Yahoo d) Google

13) _____ is the mother of Bioinformatics.

a) Margaret Oakley Dayhoff b) David Lipman

c) Watson and Crick d) Karl Ereky

14) 1 m is _____ nm.

a) 10^{-9} b) 10^{-8} c) 10^{9} d) 10^{8}

2. Answer **any seven** of the following : **14**

   1) Photodynamic therapy.

   2) NanoCAD.

   3) Local alignment.

   4) Composite protein sequence databases with full forms.

   5) Gene function prediction.

   6) Top down and bottom up approach.

   7) Nanoscience.

   8) Tools used for analysis of regulatory sequences.

   9) Phylogenetic analysis.

3. A) Answer **any two** of the following **:** **10**

      1) Write an account on scanning probe instruments.

      2) Explain in detail primary protein databases.

      3) Write an account on quantum idea and quantum mechanics.

   B) Describe the PubMed and PMC database. **4**

4. Answer **any two** of the following **:** **14**

   1) Describe nomenclature and code letter for DNA and protein sequence.

   2) Write an account on structural databases.

   3) Describe in detail physical and chemical methods of nanomaterial synthesis.

5. Answer **any two** of the following **:** **14**

   1) Write in brief about history of bioinformatics and its applications.

   2) Explain multiple sequence alignment using Clustal X.

   3) Explain the tools for analysis of protein sequences.

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Seat No.	

Set P

B.Sc. (Part – III) (Semester – V) (CGPA) Examination, 2018
BIOTECHNOLOGY
Recent Trends in Biotechnology

Day and Date : Wednesday, 18-4-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **All** questions carry **equal** marks.*
*3) Draw **neat** and labelled diagrams **wherever** necessary.*

1. Rewrite the sentences selecting most correct answer from the given option : **14**

1) Which of the following reactions used for the purpose of recycling enzymes in bioprocesses ?
   a) Isomerization b) Phosphorylation
   c) Immobilization d) Polymerization

2) The process of converting environmental pollutants into harmless products by naturally occurring micro organisms is called
   a) Detoxication b) Intrinsic bioremediation
   c) Bioprocessing d) Biotransformation

3) The PCR technique was developed by
   a) Kary Mullis b) Kohler c) Milstein d) Atman

4) The three major types of ethical issues include except
   a) Communication issues b) Systemic issues
   c) Corporate issues d) Individual issues

5) The mode of transport for toxicants in inhalation is
   a) Air b) Water c) Food d) Soil

6) Most industrial enzymes are obtained from
   a) Plants b) Microbes
   c) Insects d) Animal tissues

P.T.O.

7) Cloning will be subjected to most serious moral questions if applied to
   a) Reptiles b) Humans c) Birds d) Mammals

8) Which of the following microbes is widely used in the removal of industrial wastes ?
   a) Trichoderma species b) *Aspergillus niger*
   c) *Pseudomonas putida* d) *Klebsiella*

9) The removal of metals by using micro organisms is done by
   a) Adsorption and complexation b) Extraction
   c) Agglutination d) Precipitation

10) Bioethics is concerned with
   a) Research
   b) Etiquette in medical facilities
   c) The ethical implication of biological research methods and results
   d) None of above

11) Stirred tank bioreactor have been designed for
   a) Purification of the product
   b) Addition of preservatives to the product
   c) Availability of O_2 throughout the process
   d) Ensuring anaerobic conditions in the culture vessel

12) Chronic exposure to toxins
   a) Is always fatal
   b) Is never fatal
   c) Occurs almost immediately when toxin is given
   d) Occurs over long period of time

13) _____ term is used to describe the accumulation of dangerously high levels of toxins inside cells.
   a) Biomagnification b) Synergism
   c) Persistent organic pollutants d) Bioaccumulation

14) Restriction of movement of proteins within specified region is known as
   a) Enzyme engineering b) Protein engineering
   c) Enzyme immobilization d) Metabolic engineering

2. Answer **any seven** of the following : **14**
   1) What are the properties of ideal carrier material used for immobilization ?
   2) Define bioremediation and mention its types.
   3) Give the application of metabolic engineering.
   4) Write a note on human cloning.
   5) What is cell immobilization and which method is used for immobilization ?
   6) Write a note on NOEL.
   7) What is solvent engineering ?
   8) State the role of Glucose isomerase.
   9) Define bioaugmentation.

3. A) Answer **any two** of the following : **10**
      1) Write a note on industrial application of protein engineering.
      2) Define Xenobiotic compounds. What are the routs of entry of Xenobiotic compounds in human body ?
      3) Write a note on cross linking method and entrapment method of immobilization.

   B) Explain metabolic control analysis and metabolic flux analysis. **4**

4. Answer **any two** of the following : **14**
   1) Explain the ethical issues of biodiversity.
   2) Explain enzyme immobilization. Give advantages and disadvantages of each method.
   3) Explain biotreatment mechanisms of industrial waste water.

5. Answer **any two** of the following : **14**
   1) Write a note on phytoremediation technologies for soil decontamination.
   2) What is bioethics ? Give the ethical issues of stem cell research.
   3) Explain the detoxification mechanism in human body.

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Seat No.	

Set P

B.Sc. – III (Semester – VI) (Biotechnology) Examination, 2018
ENGLISH (Compulsory) (CGPA)
Breakthrough

Day and Date : Wednesday, 28-3-2018 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative. **14**

1) William Shakespeare adapts and retells the story of Pyramus and Thisbe in his play _____
   a) As You Like It b) A Midsummer Night's Dream
   c) Comedy of Errors d) Love's Labour Lost

2) Speaking of Davy's Safety Lamp, Moore is reminded of _____ that separated Thisbe and her lover.
   a) the fate b) parents c) the wall d) the lion

3) The party given by the Minister of Education of Mathilde and Loisel was scheduled on _____
   a) Sunday, January 18 b) Monday, January 19
   c) Sunday, January 19 d) Monday, January 18

4) Loiselhad saved four hundred francs to buy a gun because _____
   a) he had interest in shooting
   b) there was a threat to his life
   c) he wanted to present it to the Minister
   d) he wanted to present it to his wife

5) Mark Twain's *Whitewashing the Fence* is an extract from _____
   a) The Adventures of Tom Sawyer
   b) The Adventures of Huckleberry Finn
   c) The Prince and the Pauper
   d) The Great American Novel

6) A great law of human action that Tom discovered to make a person covet a thing was _____
   a) to make the thing easy to do
   b) to make the thing difficult to attain
   c) to make the thing simple to attain
   d) to neglect the thing

7) In the poem *'In the Bazaars of Hyderabad'* the goldsmith makes girdles of gold for _____
   a) Musicians b) Maidens c) Queens d) Dancers

8) In the poem *On Virtue*, Phillis Wheatley says that wisdom is higher than _____ can reach.
   a) a rich b) a poor c) a fool d) a wise

9) In the poem On Virtue the phrase 'the false joys of time' indicates _____
   a) joy that cannot be real
   b) joy that is only transitory
   c) joy that cannot be measured by time
   d) joy which is actually sadness

10) In the poem *'In the Bazaars of Hyderabad'* , tunics, mirrors and daggars are sold by _____
   a) Goldsmiths b) Merchants c) Ironsmiths d) Magicians

11) The snails <u>that he eats voraciously</u> are expensive. The underlined clause is _____
   a) a noun clause b) a relative clause
   c) an adverbial clause d) a prepositional clause

12) 'Ramesh asked me <u>how I grow my carrots</u>'. The underlined clause is _____
   a) an adverbial clause b) an adjectival clause
   c) a relative clause d) a noun clause

13) The tag question for the sentence "No one is asleep" is _____
   a) are they ? b) isn't it ? c) aren't they ? d) isn't he ?

14) "You can pay the bill in cash or by cheque". This sentence is a _____
   a) simple sentence
   b) complex sentence
   c) compound sentence
   d) none of the above

2. Answer **any seven** of the following in brief : **14**
   1) What is metamorphosis ? How it is used in the story *Pyramus and Thisbe* ?
   2) What is the source of the story *Pyramus and Thisbe* ?
   3) What is the importance of the wall in the story *Pyramus and Thisbe* ?
   4) What is the moral of the story *The Necklace* ?
   5) What was the reaction of Mathilde after reading the invitation for the party ?
   6) Why was Tom in melancholic spirit on the Saturday morning ?
   7) What did Tom acquire at the end of the day ?
   8) What did Loisel do to replace the necklace ?

3. A) Answer **any two** of the following : **8**
      1) What is Phillis Wheatley's attitude to life on earth ?
      2) What is the theme of the poem *In the Bazaars of Hyderabad* ?
      3) What does the pursuit of virtue lead to ?

   B) Answer **any two** of the following : **6**
      1) When you do feel stressed, how do you manage it ?
      2) You are an attendant in a multinational company in Mumbai and you have been recently married. You find it difficult to pay house rent and other bills in Mumbai. Besides your parents are old and medical treatment is needed. What will you do to solve the financial problem ?
      3) Suppose that you have just been completed your B.Sc. and admitted to M.Sc. in JNU, Delhi. How will you adapt to the new surrounding there ?

4. Write in detail the description of your favorite national leader. Remember to convey the character, thoughts and mood of him/her. **14**

   OR

   Imagine that you are going to college by bus which meets an accident in which three old men get injured. You take them to the hospital. Narrate in detail the accident and your experience in the hospital.

5. Read the following passage and write the summary of it : **14**

   The great advantage of early rising is the good start it gives us in our day's work. The early riser has done a large amount of hard work before other men have got out of bed. In the early morning the mind is fresh and there are few sounds or other distractions, so that work done at that time is generally well done. In many cases the early riser also finds time to take some exercise in

fresh morning air and this exercise supplies him with a fund of energy that will last until the evening. By beginning so early, he knows that he has plenty of time to do thoroughly all the work he can be expected to do, and is not tempted to hurry over any part of it. All his work being finished in good time, he has a long interval of rest in the evening before the timely hour when he goes to bed. He gets to several hours before midnight, at the time when sleep is most refreshing and after a sound night's rest rises early next morning in good health and spirits for the labours of a new day.

It is very plain that such a life as this is far more conductive to health than that of the man who shortens his waking hours by rising late and so can afford in the course of the day little leisure for necessary rest. Anyone who lies in bed late must, if he wishes to do a full day's work, go on working to a correspondingly late hour and deny himself the hour or two of evening exercise that he ought to take for the benefit of his heath. But in spite of all his efforts, he will probably produce as good results as the early riser, because he misses the best working hours of the day.

It may be objected to this that some find the perfect quiet of midnight by far the best time for working. This is no doubt true in certain cases. Several great thinkers have found by experience that their intellect is clearest and they can write best, when they burn the midnight oil. But even in such cases the practice of working late at night cannot be commended. Few men, if any, can exert the full power of their intellect at the time when nature prescribes sleep, without ruining their health thereby; and of course the injury done to the health must in the long run have a bad effect on the quality of the work done.

_____

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Seat No.	

Set **P**

B.Sc. (Biotechnology) (Part – III) (Semester – VI) (CGPA)
Examination, 2018
TOOLS AND TECHNIQUES

Day and Date : Saturday, 31-3-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **rightside** indicate **full** marks.*
*3) **Draw neat** labeled diagrams **wherever** necessary.*

1. Rewrite the sentence using correct alternative given below : **14**

1) A rapid method of amplifying a length of target DNA is by _____
   a) PCR b) Transformation
   c) Labeling d) Transfection

2) Maxam Gilbert method is used for sequencing of _____
   a) RNA b) DNA
   c) Protein d) Other bimolecules

3) _____ is a technique in which Minisatellite sequences are used for analysis.
   a) DNA fingerprinting b) Dot blot
   c) Autoradiography d) DNA hybridization

4) A _____ is a short or long length of ssRNA or DNA.
   a) Nucleic acid b) Isotope
   c) cDNA d) Probe

5) Restriction enzymes cleave the DNA at _____ sites.
   a) Nicks b) Single strand
   c) Palindromic d) Ends

6) PBR322 is a _____
   a) Cosmid b) Natural plasmid
   c) Constructed plasmid d) Phagemid

7) Taq DNA polymerase is a _____ enzyme used in PCR.
   a) Thermolabile b) Thermostable
   c) Halophilic d) Halophobic

8) In blotting techniques nucleic acids are transferred to the _____ membrane.
   a) Cell b) Cellulose
   c) Nitrocellulose d) None of these

9) The Crown Gall disease caused in plants is due to _____
   a) *Archaebacterium* b) *Agrobacterium Tumefacians*
   c) *Agrobacterium rhizogenes* d) *Aerogenes*

10) The technique of using electric current to allow entry of DNA into a cell is called _____
   a) Electrophoresis b) Electroporation
   c) Microinjection d) Macroinjection

11) C-DNA library is prepared from _____
   a) r-RNA b) t-RNA c) m-RNA d) Sn-RNA

12) _____ is a self replicating entity used as a vector in gene transfer technique.
   a) Plasmid b) Virus c) Bacteriophage d) Probe

13) Insert size of 400 -450 Kb can be incorporated in a _____
   a) Cosmid b) Virus c) Plasmid d) YAC

14) Type-II restriction endonucleases are most commonly used in _____ technique.
   a) PCR b) RFLP
   c) Western blotting d) Ligation

2. Answer **any seven** of the following : **14**

i) What is electroporation ?

ii) Explain the method of screening using nucleic acid hybridization.

iii) Give the role of c DNA probes.

iv) Give the characteristics of a plant viruses as vectors.

v) Explain the role of chromogenic substrates for screening of recombinants.

vi) Explain the method of DNA Foot-Printing.

vii) Discuss the method of automated sequencing.

viii) Give the significance of ligase enzyme.

ix) Explain the principle of complementation of defined mutations.

3. A) Write the short answers **(any two)** : **10**

   1) Describe the technique of RAPD. Write its application.

   2) How is selection of the recombinant clones done ?

   3) Write down the role of different enzymes in gene cloning.

   B) Write a note on agrobacterium mediated gene transfer technique. **4**

4. Write short notes on **any two** of the following : **14**

   1) Write an account on chromosome walking.

   2) Describe the method of Southern blotting.

   3) Comment on methods used for labeling of probes.

5. Attempt **any two** of the following : **14**

   1) Enlist the names of cloning vectors with explanation.

   2) Explain in detail the insert size of DNA used in various artificial chromosomes.

   3) Explain the mechanism and give applications of DOT Blot technique.

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Seat No.	

Set P

B.Sc. Biotechnology (Semester – VI) (CGPA) Examination, 2018
APPLICATIONS

Day and Date : Monday, 2-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *and* ***labeled*** *diagrams.*

1. Rewrite the following sentences by choosing correct alternatives. **14**

1) Lignin is made up of _____ subunits with no chains of regular repeating units.
a) Phenylpropane b) Butane c) Propane d) Phenol

2) Microbes represents _____ Biomass of our planet.
a) 25% b) 50% c) 20% d) 10%

3) Interferon α and β are synthesized in cells that have been exposed _____
a) Bacteria b) Fungus c) Viruses d) Protozons

4) _____ began the work in direction of protein engineering in early 1954.
a) Morris Gayle b) Carrel c) Zernik d) Max Perutz

5) The composition of _____ oligonucleotide includes a single mixed oligonucleotides with ribonucleotides and deoxyribonucleotides.
a) Chimeric b) Antisense c) Fused d) Antagonist

6) The addition of _____ to animal cell reduces the expression of the gene from which double stranded RNA sequence is derived.
a) Ds DNA b) Ds RNA c) Ss DNA d) Ss RNA

7) Genetically engineered X. *Campestris* was grow on whey due to Insertion of _____ gene.
a) *Bacillus lac ZY* b) *Pseudomonas lac ZY*
c) *E.Coli lac ZY* d) *Fungi lac ZY*

8) Subunit vaccine for cholera is prepared by _____ epitope.
   a) Cholera toxin C subunit b) Cholera toxin A subunit
   c) Cholera toxin D subunit d) Cholera toxin B subunit

9) Crystal shape of CRY II(Subgroup) is _____
   a) Cuboidal b) Bipyramidal c) Flat d) Irregular

10) _____ Portion is 3000 times sweeter than sucrose.
   a) Morphin b) Monellin c) Casein d) BSA

11) _____ Aromatic compounds mainly present in pesticides and herbicides are converted to catechol.
   a) Conjugated b) Activated c) Halogenated d) Precipitated

12) Site specific mutagenesis of the cloned hGH _____ was used to change some of the amino acids.
   a) t RNA b) DNA c) mRNA d) cDNA

13) Based on the _____ structure of the soluble antigenic FMDV VPI, chemically synthesized domains of the protein were tested as potential peptide vaccine.
   a) X ray crystallographic b) IR Spectroscopic
   c) UV Spectroscopic d) Autoradiographic

14) _____ Domain of A subunit of V. Cholerae has a toxic activity.
   a) A_4 Peptide b) A_1 Peptide c) A_2 Peptide d) A_3 Peptide

2. Answer the following (**any seven**) : **14**
   1) Give brief account on plant as edible vaccine.
   2) Write a short note on increase in enzyme stability.
   3) Explain in brief peptide vaccines.
   4) Explain antisense Oligonucleotide.
   5) Write short note on chimeric RNA DNA molecule.
   6) Write a note on gene therapy for cystic fibrosis.
   7) Write short note on plant as a bioreactor.
   8) Write a short note on Biosynthesis of rubber.
   9) Enlist the applications of transgenic animals.

3. A) Answer the following (**any two**) : **10**

   1) Explain antisense RNA as therapeutic agent.

   2) How will you increase enzyme activity explain with example ?

   3) Explain cloning livestock by nuclear transfer.

   B) Explain attenuated vaccines against viruses. **4**

4. Answer the following (**any two**) : **14**

   1) Give details of utilization of cellulose as a component of lignocellulases.

   2) Describe herbicide resistant plants.

   3) Explain in detail transgenic mice.

5. Answer the following (**any two**) : **14**

   1) Discuss insect resistant plants.

   2) Give details of genetic engineering of biodegradative pathway by manipulation by transfer of plasmid.

   3) Explain salt stress tolerant plants.

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Seat No.	

Set P

B.Sc. III (Semester – VI) (Biotechnology) (CGPA) Examination, 2018
FERMENTATION TECHNOLOGY

Day and Date : Tuesday, 3-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labeled diagrams* ***wherever*** *necessary.*

1. Choose the correct alternative and rewrite the sentences again. **14**

i) In the fermentation process _____ prevents vortex formation.
   a) antifoam agents b) baffles
   c) spargers d) agitator

ii) Sulfite waste liquor is the byproduct of _____ industry.
   a) paper and pulp b) sugar
   c) dairy d) pharma

iii) _____ technique is used for selection of auxotrophic mutants.
   a) Alcohol b) Acid c) Base d) Penicillin

iv) End point determination assay are performed for
   a) growth regulators b) vitamins
   c) antibiotics d) enzymes

v) In continuous culture, chemostat is a _____ self balancing culture system.
   a) nutrient limiting b) pH limiting
   c) temperature limiting d) recovery limiting

vi) Exponential growth in Batch culture may be prolonged by adding
   a) acid to media b) base to media
   c) fresh nutrient to media d) salts to media

vii) Crystallization is the best established method for recovery of
   a) ethers b) alcohols
   c) single cell proteins d) organic acids

viii) Ethanol is purified using
a) crystallization b) distillation
c) centrifugation d) solvent extraction

ix) Phenyl acetic acid used as precursor in _____ fermentation.
a) Penicillin b) Vitamin B_{12}
c) Citric acid d) Acetic acid

x) Citric acid is produced by
a) *Bacillus subtilis* b) *Fusarium moniliforme*
c) *Micrococcus glutamicus* d) *Aspergillus niger*

xi) In the fermentation process Redox potential is controlled by adding
a) ascorbic acid b) cysteine
c) glucose d) all of these

xii) pH indicators are used in the primary screening of _____ producers.
a) Alcohol b) Acid c) Vitamins d) Penicillin

xiii) *Bacillus thurigiensis* is used for _____ production.
a) organic acid b) insecticide c) vitamin d) antibiotic

xiv) Concentration of growth limiting substance is maintained by _____ in continuous fermentation.
a) chemostat b) turbidostat
c) pH electrode d) conductivity electrode

2. Define and explain **any seven** of the given below. **14**

i) microbial growth
ii) aeration
iii) antifoam agent
iv) precursor
v) distillation
vi) mutation
vii) submerged fermentation
viii) secondary screening.

3. A) Answer **any two** of the following. **10**
   i) Explain the batch and anaerobic fermentation.
   ii) Explain the methodology used for recovery of vitamin B_{12} and ethanol.
   iii) Explain components and working of typical fermenter.

   B) Explain biological assays with example. **4**

4. Answer **any two** of the following. **14**
   i) Explain in detail primary screening of antibiotic, vitamin and organic acid producers.
   ii) Write an essay on amylase production.
   iii) Write in brief various methods used for maintenance of microorganisms.

5. Answer **any two** of the following. **14**
   i) Write in detail on penicillin fermentation.
   ii) Write an essay on downstream processing.
   iii) Give the note on raw materials used for industrial media preparation.

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Seat No.	

Set P

B.Sc. – III (Biotechnology) (Semester – VI) (CGPA) Examination, 2018
FOOD AND DAIRY TECHNOLOGY

Day and Date : Wednesday, 4-4-2018 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*

1. Rewrite the sentences by selecting correct answer from the given alternatives : **14**

i) The efficiency of pasteurization of milk is detected by
   a) Phosphatase test b) MPN
   c) MBRT d) SPC

ii) In sauerkraut fermentation, salt added must be within the range of
   a) 4-5% w/w b) 2-3% w/w c) 5-6% w/w d) None of these

iii) Baird-Parker agar is used for enumeration of
   a) *E.Coli* b) *Salmonella typhi*
   c) *Staphylococcus aureus* d) *Moulds*

iv) Quaternary ammonium compounds (QUATs) which having _____ charge on it.
   a) Positive b) Negative c) No d) None of these

v) Number of coliforms present in the water is determined by _____ test.
   a) MBRT b) Most probable number
   c) Resazurin d) Phosphatase

vi) In ISO 9000, ISO stands for
   a) International Standard Organisation
   b) International Selection Organisation
   c) International State Organisation
   d) International Standard Opportunity

vii) The spoilage of canned foods mainly caused due to
   a) *Staphylococcus aureus* b) *E.Coli*
   c) *Salmonella typhi* d) *Clostridium spp.*

viii) Vinegar is produced by using
   a) *Acetobacter and Gluconobacter* b) *Saccharomyces cerevisiae*
   c) *Lactobacillus and Leuconostoc* d) None of these

ix) Slim production in the milk is due to growth of _____ in it.
   a) *E.Coli* b) *Salmonella typhi*
   c) *Serretia marcescens* d) *Alcaligenes Viscolactis*

x) In LTH method of pasteurisation _____ temperature is used.
   a) 71.7°C for 15 sec. b) 62.8°C for 30 min.
   c) 120°C for 1 sec. d) None of these

P.T.O.

xi) _____ are the rapid methods for detection of specific organisms and toxins in food.
a) ELISA b) PCR
c) DNA/RNA Methodology d) All of these

xii) _____ is an indicator organism of water pollution.
a) *Staphylococcus aureus* b) *Streptococcus faccalis*
c) *Salmonella typhi* d) *E.Coli*

xiii) The commercial production of beer is carried out by using
a) *E.Coli*
b) *Aspergillus niger*
c) *Lactobacillus plantarum and leuconostoc mesenteroides*
d) *Saccharomyces cerevisiae var. cerevisiae and saccharomyces cerevisiae var. carlsbergensis*

xiv) Mycotoxins are produced by
a) Bacteria b) Yeast c) Fungi d) Viruses

2. Answer **any seven** of the following : **14**
i) Give starter culture used for cheese production.
ii) Define pasteurisation and give its different methods.
iii) Define canning.
iv) Define milk and give composition of milk.
v) Give 2 names of quality systems of food.
vi) Give any four facilities and operations in food industries.
vii) Name of microorganisms used in sauerkraut production.
viii) Characteristics of indicator organism of food spoilage.

3. A) Answer **any two** of the following : **10**
i) Methylene Blue Reduction Time Test (MBRT).
ii) Bread fermentation.
iii) Use of food additives and radiations in food preservations.
B) Explain microbial spoilage of different milk and milk products. **4**

4. Answer **any two** of the following : **14**
i) Explain chemical and physical properties of food affecting microbial growth.
ii) Explain phosphatase and resazurin test.
iii) Rapid methods for detection of specific microorganisms and toxins in food.

5. Answer **any two** of the following : **14**
i) Explain use of high temperature for preservation of food.
ii) Explain different enumeration methods for microbiological examination of foods.
iii) Explain Hazard Analysis and Critical Control Points (HACCP).

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