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M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE
Fundamentals of Environmental Science (MSC20101)

Day & Date: Wednesday, 19-07-2023
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Q. Nos. 1 and 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to Q. No. 7
 3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ)

10

- 1) Which of the following is the cause of soil pollution?
 - a) Ozone
 - b) Acid rain
 - c) Aerosol
 - d) None of the above
- 2) At what time of the day relative humidity in the environment is at minimum?
 - a) When the air temperature is lowest
 - b) Before sunrise
 - c) Midnight
 - d) When the air temperature is higher
- 3) Which of the following is the first national park in India?
 - a) Gir National Park
 - b) Kanha National Park
 - c) Jim Corbett National Park
 - d) Ranthambore National Park
- 4) The uses of CFCs _____.
 - a) Insulators
 - b) Aerosol propellants
 - c) Refrigerants
 - d) All of the above
- 5) Which of the following gas destroys the chlorophyll present in the plant leaves?
 - a) SO₃
 - b) H₂S
 - c) SO₂
 - d) CO₂
- 6) Which of the following state in India is called the "Tiger state"?
 - a) Gujarat
 - b) Andhra Pradesh
 - c) Madhya Pradesh
 - d) Assam
- 7) Wildlife week is celebrated from _____.
 - a) 2nd October to 8th October
 - b) 15th October to 21st October
 - c) 14th June to 20th June
 - d) None of the above
- 8) In food chain Zooplankton is called as _____.
 - a) Primary produces
 - b) Tertiary consumers
 - c) Secondary consumers
 - d) Primary consumers
- 9) Which one of the following is not a greenhouse gas?
 - a) Methane
 - b) Ozone
 - c) Nitrous oxide
 - d) Hydrogen

10) The maximum rate of growth of any population under ideal conditions is called _____.

- a) Exponential growth
- b) Biotic potential
- c) Exponential potential
- d) Environmental growth

B) Fill in the blanks OR Write True / False.

06

- 1) The tertiary consumers are carnivorous and dependent on primary consumer and indirectly on producers thus they are least dependent on producers. True / False
- 2) Biosphere is combination of lithosphere, hydrosphere and atmosphere. True / False
- 3) Solar energy is the source of energy in ecosystem. True / False
- 4) Hydrogen gas exists in the highest concentration in the Earth's atmosphere? True / False
- 5) Draught is due to lack of rainfall of sufficient duration. True / False
- 6) A theory of plate tectonics is associated with Thunderstorm. True / False

Q.2 Answer the following.

16

- a) Write a short note on Population characteristics.
- b) Write an account on Ecological Niche.
- c) Structure and composition of Lithosphere.
- d) Explain Sustainable Development Goals.

Q.3 Answer the following.

- a) Liebig's law of minimum and Shelford law of tolerance.
- b) What is Environment? Explain its components in detail.

08

08

Q.4 Answer the following.

- a) Discuss Environmental movements in India.
- b) What is atmosphere? Explain its composition in detail? How CO₂ is responsible for the increase in troposphere temperature near the earth?

08

08

Q.5 Answer the following.

- a) Discuss why environmental science is called multidisciplinary science? Explain the need of natural resource conservation with suitable example?
- b) What responsible for the increase in troposphere temperature near the earth?

08

08

Q.6 Answer the following.

- a) Explain Gaia Hypothesis.
- b) Write a brief on Impact of cultural change on environment.

08

08

Q.7 Answer the following.

- a) Explain what are El Nino and La Nina?
- b) Explain biotic and abiotic components of environment.

08

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M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE

Environmental Chemistry & Instrumentation (MSC20102)

Day & Date: Thursday, 20-07-2023

Max. Marks: 80

Time: 03:00 PM To 06:00 PM

- Instructions:** 1) Q. Nos. 1 and. 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7
3) Figure to right indicate full marks.

Q.1 A) Fill in the blanks by choosing correct alternatives given below. 10

- 1) The energy released in the form of nuclear radiations in addition to heat and light during nuclear reactions is known as _____.
a) Chemical energy b) Nuclear energy
c) Heat energy d) Electrical energy
- 2) The energy obtained from electric cells and batteries as a result of a chemical reaction is called _____.
a) Chemical energy b) Nuclear energy
c) Heat energy d) Electrical energy
- 3) Which of the following is the cause of soil pollution?
a) Ozone b) Aerosol
c) Acid rain d) None of the above
- 4) The uses of CFCs are _____.
a) Insulators b) Aerosol propellants
c) Refrigerants d) All of the above
- 5) The ozone layer is present in _____.
a) Mesosphere b) Thermosphere
c) Stratosphere d) None of the above
- 6) Which of the following statements is correct?
a) Atmosphere is the major reservoir for plants
b) Nitrogen is the most abundant nutrient for plants
c) Nitrogen cycle is a sedimentary cycle
d) All
- 7) Nitrogen is absorbed by the plants in the form of _____.
a) Ammonium b) Nitrites
c) Nitrates d) All
- 8) Nitrogen fixation is the conversion of _____.
a) N₂ to N b) N₂ to NH₃
c) N₂ to NO₃⁻ d) N₂ to urea
- 9) Important enzymes involved in nitrogen fixation are _____.
a) Nitrogenase and hydrogenase
b) Nitrogenase and hexokinase
c) Nitrogenase and peptidase
d) Nitrogenase and hydrolyze

- 10) Symbiotic nitrogen-fixing cyanobacteria are not present in _____.
 a) *Azolla* b) *Gnetum*
 c) *Anthoceros* d) *Cycas*

B) Fill in the blanks. 06

- 1) Methods by which rusting of iron can be prevented are _____ and _____.
- 2) The tendency for water molecules to form weak bonds and stick to each other is called _____.
- 3) Chelatometry is a type of volumetric analysis wherein the _____ is used to determine the endpoint of the titration.
- 4) Radioactivity is the spontaneous release of _____ from an unstable atom to get to a more stable state.
- 5) Animal waste decay by the action of bacteria which create _____ and _____ products rich in nitrogen, and useful for plants to use again.
- 6) _____ bacteria in the soil can break down the ammonia into the gaseous form of nitrogen, which is not available for use by plants or animals.

Q.2 Answer the following 16

- a) Write in brief on Molar solution. Molarity and normality.
- b) Discuss the major and micro nutrients of soil.
- c) Give informative account on pesticides.
- d) Discuss the effect of modern agro technology on quality of soil.

Q.3 Answer the following 08

- a) Write on unsaturated and saturated hydrocarbon. 08
- b) Describe the chemistry of oil and water base paints. 08

Q.4 Answer the following 08

- a) Discuss the chemical properties of soil. 08
- b) Explain the detergents, polymers, drugs and dyes in brief. 08

Q.5 Answer the following 10

- a) Discuss the Nernst distribution law and thermodynamics law. 10
- b) Discuss electrochemical theory of corrosion. 06

Q.6 Answer the following 10

- a) Discuss the air sampling techniques with its methodology. 10
- b) Briefly discuss the Potentiometry and Colorimetry. 06

Q.7 Answer the following 08

- a) Draw a sketch on GC. Discuss its process in detail. 08
- b) Briefly explain the various techniques of chromatography. 08

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**M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE**

Computer Applications in Environmental Science (MSC20103)

Day & Date: Friday, 21-07-2023
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question no. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

10

- 1) Bioinformatics is an interdisciplinary field that develops?
 - a) methods and software tools for biological data
 - b) Understand software tools for biological data
 - c) Connects software tools for GIS
 - d) Technology tools for organisms
- 2) Among the following is not the area of web design.
 - a) Interface design
 - b) Search engine optimization
 - c) Proprietary software
 - d) ISO practices & method
- 3) Which models use an empirical method to convert rainfall volume into runoff volume.
 - a) Hydrological models
 - b) Groundwater models
 - c) Rainwater models
 - d) Agronomic models
- 4) Database Management System _____.
 - a) Collection of internal data
 - b) Collection of programs to access data
 - c) Collection of data describing one particular enterprise
 - d) All of the above
- 5) Which of the following is important software in GIS?
 - a) ARC sensor
 - b) ARC GIS
 - c) ARC EVS
 - d) ARC network
- 6) Interface design is the example of an area of _____.
 - a) Web design
 - b) Web Updates
 - c) Web problem
 - d) Web search
- 7) The development of efficient algorithms for measuring sequence similarity is an important goal of _____.
 - a) Information analysis
 - b) Biomodeling
 - c) Bioinformatics
 - d) Biotechnology
- 8) The first laptop was invented in the year _____.
 - a) 1982
 - b) 1991
 - c) 1981
 - d) 1972
- 9) Which device is not consider as output device of computer?
 - a) Joy stick
 - b) Head phone
 - c) Plotter
 - d) Projector

- 10) Structured set of data held in a computer, especially one that is accessible in various ways _____.
- a) Data file
 - b) Manu
 - c) Database
 - d) Bank

B) Fill in the blanks OR Write True / False. 06

- 1) Magnetic disk is considered removal storage media. (True / False)
- 2) VIRUS stands for Very Important Record User Searched. (True / False)
- 3) Intersection of column and row on worksheet is called as column. (True / False)
- 4) Memory processing unit is called brain of any computer system. (True / False)
- 5) In third generation did multiprogramming start. (True / False)
- 6) First super computer developed in India is PARAM. (True / False)

Q.2 Answer the following. 16

- a) Write in short characteristics of computer?
- b) Describe various input and output devices of computer?
- c) What is an operating system?
- d) Software used in Environmental Science?

Q.3 Answer the following. 08

- a) Write an account on components of operating system? 08
- b) What are various modes of data communication and networks? 08

Q.4 Answer the following. 08

- a) Write a note on importance of Information Technology? 08
- b) Discuss the importance of computer aided programmes in Geoinformatics? 08

Q.5 Answer the following. 08

- a) Add a note on history of computer? 08
- b) Discuss the importance of computer graphics? 08

Q.6 Answer the following. 08

- a) Write a note on uses of compact disc? 08
- b) Explain LAN and give note on LAN? 08

Q.7 Answer the following. 08

- a) Write applications of computer in hydrology? 08
- b) Explain in detail basics of computer and its development? 08

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M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE
Environmental Geo-Climate (MSC20108)

Day & Date: Saturday, 22-07-2023
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question no. 1 and 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to Q. No. 7.
 3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) 10

- 1) _____ is a form of sedimentary rocks?
 - a) Sandstones
 - b) Gypsum
 - c) Limestone
 - d) All the above
- 2) Atmospheric convection is the result of _____.
 - a) heating of earth surface
 - b) Temperature difference
 - c) different lapse rate
 - d) All of the these
- 3) A boundary where plates move away from each other is called _____.
 - a) Divergent
 - b) Convergent
 - c) Transform
 - d) shear boundaries
- 4) Earth quakes occur at this boundary _____.
 - a) Asthenosphere
 - b) Convergent
 - c) Transform
 - d) divergent
- 5) Which sequence of process occurs in the correct order _____.
 - a) Erosion, transportation, weathering
 - b) weathering, erosion, transportation
 - c) Erosion, weathering, transportation
 - d) None of these
- 6) The center of a cyclone is a calm area. It is called the _____ of the storm.
 - a) Arm
 - b) Heart
 - c) Eye
 - d) Head
- 7) SMOG is a combination of _____.
 - a) Smoke & fog
 - b) Smoke & Light
 - c) Fog & Light
 - d) Smoke & Fire
- 8) Tropical cyclone which originates and intensify over warm tropical oceans develop in the region between the _____.
 - a) Tropics of cancer & Antarctic circle
 - b) Tropics of cancer & Arctic circle
 - c) Tropics of Capricorn & tropic of cancer
 - d) Tropics of Capricorn & Arctic circle
- 9) Agents of fog formation do not include _____.
 - a) Diurnal temperatures of short ranges
 - b) Winter seasons
 - c) High relative humidity
 - d) Rapid radiations

- 10) Which one among the following forces is most powerful in determining movement of wind including its velocity?
- a) Gravitational force
 - b) Centrifugal force
 - c) Frictional force
 - d) Pressure gradient force

B) Fill in the blanks OR Write True / False - 06

- 1) Roaring forties are the southern latitudes where westerlies are prevalent. **True / False**
- 2) Horse latitude are found between trade winds and westerlies. **True / False**
- 3) Chlorine can be used for water disinfection. **True / False**
- 4) The core of the earth is made-up of silicon. **True / False**
- 5) The main contributors of acid rains are carbon dioxide and carbon monoxide. **True / False**
- 6) Nitrogen gas which is responsible for climate change. **True / False**

Q.2 Answer the following 16

- a) Write note on stratosphere?
- b) Explain process of soil formation.
- c) Write importance of carbon cycle.
- d) Describe the term heat budget.

Q.3 Answer the following.

- a) What is temperature inversion? Explain phenomenon of urban heat islands. **08**
- b) What is relative humidity? Explain its significance in air pollution dispersion. **08**

Q.4 Answer the following.

- a) Explain adiabatic and dry adiabatic lapse rate. **08**
- b) Discuss in detail global warming. **08**

Q.5 Answer the following.

- a) Explain in detail significance of drinking water standards in maintaining the quality of drinking water. **08**
- b) What is cyclone? Explain in brief thunderstorms. **08**

Q.6 Answer the following.

- a) Difference between chemical fertilizers and biofertilizers. **08**
- b) Discuss the impact of anthropogenic activities on ground water quality and availability. **08**

Q.7 Answer the following.

- a) Explain in detail cyclone and anti-cyclones. **08**
- b) Explain in brief floods and droughts. **08**

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M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE
Biodiversity and Conservation (MSC20201)

Day & Date: Wednesday, 19-07-2023
 Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) Q. No.1 and 2 are compulsory.
 2) Attempt any Three questions from Q.No.3 to Q.No.7
 3) Figures to the right indicate full marks.

- Q.1 A) Choose correct alternative. (MCQ) 10**
- 1) In situ conservation of biodiversity involves _____.
 a) facilitating gene flow
 b) introduction of new genetic stock
 c) translocation of animals
 d) all of these
 - 2) The biggest threat to a species is _____.
 a) loss of habitat
 b) low reproductive rates
 c) Diseases
 d) alien, invasive species
 - 3) The major types of flora and fauna found in aquatic ecosystem are determined primarily by:
 a) Light
 b) pH
 c) Temperature
 d) Salinity
 - 4) The movement of individuals into and out of population is caused by birth, death, immigration and emigration such a state denotes _____.
 a) Regulation of population
 b) Population density
 c) basic biotic school
 d) population turnover
 - 5) The Biological Diversity Act came in force in India _____.
 a) 2002
 b) 2004
 c) 2006
 d) 2000
 - 6) _____ is the basic unit of classification and a taxonomic rank.
 a) Genus
 b) Species
 c) Class
 d) Order
 - 7) _____ is defined as the number of species represented in a specific region, landscape or ecological community.
 a) Coevolution
 b) Commensalism
 c) species richness
 d) population density
 - 8) _____ is the forest cover to be maintained as per the National Forest Policy (1988).
 a) 67% for hills & 33% for plains
 b) 37% for hills & 11%for plains
 c) 17% for hills & 23% for plains
 d) None of these
 - 9) _____ is not generally seen in biodiversity hotspots.
 a) Endemism
 b) Species richness
 c) Loss of diversity
 d) Lesser interspecific competitions

- 10) Synecology means study of the ecology of _____.
 a) one species
 b) a community
 c) pathogenic organism
 d) symbiotic species

- Q.1 B) Fill in the blanks OR Write True / False - 06**
- 1) Extinction occurs when the death of the last individual in a species occurs. (True / False)
 - 2) Seed bank is an example of an ex-situ conservation. (True / False)
 - 3) Western Ghats is one of the most prevalent hotspots of biodiversity in India. (True / False)
 - 4) Biodiversity refers to the biological variety and variability of life on Earth. (True / False)
 - 5) The species whose population has been reduced to a acritical level is called as endangered. (True / False)
 - 6) An ex-situ conservation method for endangered species is Cryopreservation (True / False)
- Q.2 Answer the following. 16**
- a) Explain the concept of biodiversity and patterns?
 - b) Discuss the biological invasion?
 - c) Elaborate the Alpha, Beta and Gama diversity?
 - d) What is Genepool? explain in detail?
- Q.3 Answer the following.**
- 1) Discuss the Biodiversity Action Plan? **08**
 - 2) Explain in detail the affecting factors of biodiversity? **08**
- Q.4 Answer the following.**
- a) Give an account of bio-geographic zones of India? **08**
 - b) What is Biosphere reserve? Write a short account of protected areas network of India? **08**
- Q.5 Answer the following.**
- a) Explain the concept of Biodiversity Hotspot? **08**
 - b) Discuss the importance of Western Ghats with respect to its faunal species characteristics? **08**
- Q.6 Answer the following.**
- a) Discuss In-situ and Ex-situ conservation methods for the protected area? **08**
 - b) Describe in detail Red Data Book? **08**
- Q.7 Answer the following.**
- a) Write an account on Biological Diversity Act 2002? **08**
 - b) Write short note on Exotic species and types of forest ecosystem? **08**

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**M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE**

Water and Wastewater Engineering (MSC20202)

Day & Date: Sunday, 23-07-2023
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) Question no. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ)

10

- 1) If the depletion of oxygen is found to be 5 ppm after incubating a 2.5% solution of sewage sample for 5 days at 21° C, BOD of the sewage is ____?
 - a) 50 ppm
 - b) 100 ppm
 - c) 150 ppm
 - d) 200 ppm
- 2) The maximum depth of sedimentation tanks is kept _____.
 - a) 3 m
 - b) 3.5 m
 - c) 6 m
 - d) 4.5 m
- 3) For the COD test of sewage, organic matter is oxidized by $K_2Cr_2O_7$ in the presence of _____.
 - a) H_2SO_4
 - b) HCl
 - c) HNO_3
 - d) None of these
- 4) Pick up the correct statement from the following:
 - a) Hydrogen sulphide gas in excess, may cause corrosion of concrete sewers.
 - b) 4 ppm of DO is ensured before discharging the treatment sewage in river.
 - c) Solubility of oxygen in sewage is 95% of that of distilled water.
 - d) All the above
- 5) Chlorine is used in the treatment of sewage to _____.
 - a) help grease separation
 - b) acid flocculation
 - c) increases the BOD
 - d) cause bulking of activated sludge
- 6) Composting and lagooning are the methods of _____.
 - a) Sludge digestion
 - b) Sludge disposal
 - c) Sedimentation
 - d) Filtration
- 7) Which of the chemical used for dichlorination?
 - a) Carbon dioxide
 - b) Bleaching powder
 - c) Sulphur dioxide
 - d) Chloromines
- 8) The overflow rate of plain sedimentation tank is about ____ L/H/m².
 - a) 500-750
 - b) 1000-1250
 - c) 1250-1500
 - d) only 1500

- 9) In septic tanks _____.
- a) Free board of 0.3m may be provided
 - b) The baffles or tees are extended up to top level of scum
 - c) The clear space between the baffle top and covering slab is about 7.5 cm
 - d) All of these
- 10) Primary treatment of sewage consists of removal of _____.
- a) Large suspended organic solids
 - b) Sand and grit
 - c) oil and grease
 - d) floating materials

B) Write True / False**06**

- 1) Fresh sewage is generally highly decomposed.
- 2) In a trickling filter biological action is used.
- 3) No treatment of the sewage is given if dilution factor is more than 500.
- 4) To maintain aerobic biological activity, the moisture content of the compost mass should be about 55%.
- 5) In normal conditions, the period for sludge digestion is 30 days.
- 6) The temperature affects the solubility of gases in sewage.

Q.2 Answer the following.**16**

- a) Write a note on disinfection of water ozonization.
- b) Explain micro-filtration.
- c) Write water quality standards for drinking water by WHO.
- d) Write short note on ETP.

Q.3 Answer the following.

- a) What is Wet Air Oxidation? Describe in detail working and application of wet air oxidation in wastewater treatment. **08**
- b) Explain the working and application of stabilization ponds. **08**

Q.4 Answer the following.

- a) How continuous stirring tank (CST) is useful in wastewater treatment? **08**
- b) Explain the process and digestion aspect of continuous stirring tank reactor (CSTR) with neat labelled diagram. **08**

Q.5 Answer the following.

- a) Briefly explain the various methods of principle and design aspect of sedimentation tank. **08**
- b) Explain in brief the various methods of sludge thickening and alkaline stabilization. **08**

Q.6 Answer the following.

- a) Write note on Reverse Osmosis. **08**
- b) Explain and give note on Activated Carbon Filtration Unit. **08**

Q.7 Answer the following.

- a) Explain discharge or management of treated wastewater. **08**
- b) Explain and write note on green technologies used for sludge management. **08**

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Set **P**

**M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE**

Remote Sensing, GIS, GPS in Environmental Science (MSC20206)

Day & Date: Tuesday, 25-07-2023

Max. Marks: 80

Time: 11:00 AM To 02:00 PM

- Instructions:** 1) Q. No. 1 & 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to 7
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative.**10**

- 1) Reflectance is known as the ratio of _____.
 - a) radiant energy reflected by a substance to the energy it receives
 - b) atmospheric absorption to total sun energy
 - c) energy received to energy lost
 - d) emitted energy to atmospheric absorption
- 2) A spectral band is _____.
 - a) single wavelength
 - b) frequency of the radiant energy
 - c) a range of wavelengths
 - d) long wavelength
- 3) Which of the following is Indian Remote Sensing Satellite?

a) LANDSAT	b) Resourcesat
c) QUICKBIRD	d) EYESAT
- 4) Which region of electromagnetic spectrum is not yet fully used?

a) Visible region	b) Microwave region
c) Infrared region	d) Near infrared region
- 5) A sensor is a device that detects _____.
 - a) electromagnetic radiations
 - b) atmospheric energy
 - c) atmospheric temperature
 - d) Frequency
- 6) Supervised classification approach is _____.
 - a) Considers only spectral distance measures
 - b) minimum user interaction
 - c) requires interpretation after classification
 - d) required a training set
- 7) What is the full form of LULC?
 - a) Land under level of conversion
 - b) Land use land cover
 - c) Land used for levelling creation
 - d) Land used for land classification

- 8) Remote sensing uses which of the following waves in its procedure?
 - a) Electric field
 - b) Sonar waves
 - c) Gamma-rays
 - d) Electro-magnetic waves
- 9) Which of the following is not a principle of remote sensing?
 - a) Interaction of energy with satellite
 - b) Electromagnetic energy
 - c) Electro-magnetic spectrum
 - d) Interaction of energy with atmosphere
- 10) In visible region having wave length is _____.
 - a) 0.4 to 0.7 micrometre
 - b) 0.8 to 1.2 micrometre
 - c) 0.24 to 0.52 micrometre
 - d) 0.22 to 0.32 micrometre

Q.1 B) Write True/False.

06

- 1) Spatial and Spectral are types of resolution.
- 2) An aerial photograph in broad terms taken from any satellite based platforms.
- 3) Texture is an element of image interpretation.
- 4) Ration and Interval are not types of scales.
- 5) Egg detection is an application of Remote Sensing.
- 6) Full form of UAS is Unmanned Aircraft system.

Q.2 Answer the following.

16

- a) What is contiguity and containment?
- b) Concept of Arc, Node.
- c) Write about types of attribute data.
- d) Define Remote Sensing? Write about spatial resolution.

Q.3 Answer the following.

16

- a) Types of Cameras and Geographical Reference.
- b) Components of GIS.

Q.4 Answer the following.

16

- a) Describe the principles of Remote Sensing.
- b) Advantages of Topology.

Q.5 Answer the following.

16

- a) Write a note on History of development of remote sensing in India.
- b) Elaborate the raster data model with giving suitable examples.

Q.6 Answer the following.

16

- a) Write in details about the spectral signatures with giving suitable examples.
- b) Levels of Measurement.

Q.7 Answer the following.

16

- a) Describe the elements of image interpretation.
- b) Explain the Vector data model in detail.

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Set P

**M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE**

Environmental Pollution, Monitoring and Control (MSC020301)

Day & Date: Monday, 10-07-2023

Max. Marks: 80

Time: 11:00 AM To 02:00 PM

- Instructions:** 1) Q. Nos 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose the correct alternatives from the options. 10

- 1) _____ is a component of photochemical smog, produced in the atmosphere; when oxidized volatile organic compounds combine with nitrogen dioxide.
 - a) SO₂
 - b) PAN
 - c) O₃
 - d) NO₂
- 2) The _____ is the rate at which the temperature of an air parcel changes in response to the compression or expansion associated with elevation change.
 - a) adiabatic lapse rate
 - b) environmental lapse rate
 - c) super adiabatic lapse rate
 - d) none of the above
- 3) Which of the following chemical is responsible for acute lung disease from Bhopal gas tragedy?
 - a) Methylisocyanate
 - b) Methylisocyanide
 - c) Methyl alcohol
 - d) Methyl cyanate
- 4) The pH below which the precipitation is regarded as acid rain is _____.
 - a) 8
 - b) 7
 - c) 5.6
 - d) 7.3
- 5) Polluted water has less amount of _____ content which is important for sensitive organisms.
 - a) Dissolved nutrients
 - b) Dissolved Carbon Dioxide
 - c) Dissolved oxygen
 - d) Dissolved nitrogen
- 6) The pH in soils can be raised by adding _____.
 - a) Sand
 - b) Lime
 - c) Sulphur
 - d) Nitrogen

- 7) Leachate is a _____.
- a) A liquid that has passed through com-seeps solid waste in a landfill
 - b) A gas that has passed through com-seeps solid waste in a landfill
 - c) A solid that has passed through com-seeps solid waste in a landfill
 - d) A chemical that has not passed through com-seeps solid waste in a landfill
- 8) What is the nature of sound wave?
- a) It is a transverse wave
 - b) It is a electromagnetic wave
 - c) It is a radiation
 - d) It is a longitudinal wave
- 9) What is a permissible noise level for silence zone during night time?
- a) 45dB
 - b) 40dB
 - c) 55dB
 - d) 50dB
- 10) Which one of the following can cause thermal pollution?
- a) Residential houses
 - b) Power plants
 - c) Death of marine organisms
 - d) Oil spill

Q.1 B) Fill in the blanks OR Write True or False. 06

- 1) Arsenic is the hazardous pollutant released from LED's
- 2) Hiroshima and Nagasaki is disaster occurred because of oil spill.
- 3) Noise is undesirable and unwanted sound
- 4) Acid mine drainage can be treated with limestone to turn it into a thick slurry that's easily removed from the environment.
- 5) Nitrogen content of urea is about 94 percent.
- 6) PAN stands for Peroxyacetyl nitrates

Q.2 Answer the followings. 16

- a) Describe cyclone collectors.
- b) Write a note on Bioremediation.
- c) Explain Effects of chemical residues on soil.
- d) What is compost and Explain land disposal.

Q.3 Answer the followings. 16

- a) What is Radiation Pollution? Describe its types & sources.
- b) Explain waste minimization technologies.

Q.4 Answer the followings. 16

- a) Effects of noise pollution on human health. It's standards & permissible limit.
- b) Describe land degradation & soil erosion with respect to Soil pollution.

Q.5 Answer the followings. 16

- a) What is Oil pollution and factors effecting fate of oil after spillage.
- b) Explain Thermal pollution from power plants and their control.

Q.6 Answer the followings.

16

- a) Describe National Environment policy.
- b) What is photochemical smog and particulates.

Q.7 Answer the followings.

16

- a) How recycling of waste water is done?
- b) Explain air pollution indices.

Set
No.

M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE
Environmental Microbiology, Biotechnology & Nanotechnology
(MSC020302)

Day & Date: Tuesday, 11-07-2023
 Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) Q. Nos. 1 and 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to Q. No. 7
 3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.**10**

- 1) The biological sequestering of substance at a higher concentration than that occurs in surrounding or medium is called _____.
 a) Bioaccumulation b) Biotransformation
 c) Biomagnification d) All of these
- 2) Which of the following bacteria is called as Superbug which could clean up the oil _____.
 a) Pseudomonas denitrificans
 b) Bacillus subtilus
 c) Pseudomonas putida
 d) Bacillus denitrificans
- 3) Bacteria used in biogas fermentation _____.
 a) Halophiles b) Cynobacyeria
 c) Methanogens d) Vibro bacteria
- 4) First clone animal was _____.
 a) Dolly ship b) Dog
 c) Mule d) Cat
- 5) Which of the bacteria is considered for biological leaching?
 a) Ferrobacillus terrooxidans
 b) T.thioxidans
 c) T.ferroxidans
 d) All of these
- 6) Which of the following is an example of fungal biopesticides?
 a) E.Coli b) Thuriangiensis
 c) Trichoderma sp d) None of the above
- 7) Golden rice is a transgenic crop of the future with the following improved trait _____.
 a) High vitamin A content b) High lysine content
 c) High protein content d) Insect resistance
- 8) Which organisms are used as components of biofertilizers?
 a) Blue green algae only
 b) Coliform bacteria & mushrooms
 c) N-fixing bacteria only
 d) Blue green algae & N-fixing bacteria

- 9) Which are human made chemicals that present in the environment at un naturally high concentrations?
 a) Xenobiotic compounds b) Aliphatic compounds
 c) Aromatic compounds d) Natural compounds
- 10) On which basis the bacteria are classified?
 a) Cell wall b) Pigments
 c) Nucleus d) methods of reproduction

B) Fill in the blanks OR Write True/False. 06

- 1) Zoogloea ramigera is accumulates from factory waste.
 a) True b) False
- 2) Nitrosomonas european have been used to oxidized ammonia and to prevent algal growth.
 a) True b) False
- 3) Antibiotic development is an intervention of environment biotechnology.
 a) True b) False
- 4) Bioleaching is a competitive and sustainable alternative for environment.
 a) True b) False
- 5) Rhizobium is symbiotic nitrogen bacteria.
 a) True b) False
- 6) Inherent capacity of plant that enables it to prevent the entry of pathogens is called as plant resistance.
 a) True b) False

Q.2 Answer the following. 16

- a) Write a note on bio-trickling?
 b) Explain ex-situ remediation of soil?
 c) What do you mean by phytoremediation?
 d) What are procaryotes? Given an example?

Q.3 Answer the following. 08

- a) Explain in detail nature and functions of microorganisms in soil environment? 08
 b) Give an account of genetically modified microorganisms with their applications in environment? 08

Q.4 Answer the following. 08

- a) Explain in detail biomethylation and how microbes can be useful in treating polluted soil? 08
 b) Elaborate phytoremediation technology for soil decontamination as well as for wastewater treatment? 08

Q.5 Answer the following. 08

- a) Discuss in detail about scope of environmental microbiology in environmental science? 08
 b) Write a detail note on sequestrating carbon dioxide? 08

Q.6 Answer the following. 08

- a) Write note on environment and nano technology? 08
 b) Discuss in detail the different microbial methods used for wastewater treatment? 08

Q.7 Answer the following.

- a)** Write note on degradation of xenobiotic compounds? **08**
- b)** Explain ultrastructure of microbial cell and write note on Gram positive and Gram Negative bacterial membrane? **08**

Seat No.	
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M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE

Statistical Methods in Earth & Environmental Science (MSC020306)

Day & Date: Wednesday, 12-07-2023

Max. Marks: 80

Time: 11:00 AM To 02:00 PM

- Instructions:** 1) Q. Nos. 1 and 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to Q. No. 7
 3) Figure to right indicate full marks.

Q.1 A) Fill in the blanks by choosing correct alternatives given below. 10

- 1) Find the mode and median of the 9 consecutive number – 12, 7, 8, 14, 21, 23, 27, 7 and 11.

a) 12,9	b) 7,9
c) 7,12	d) 11,9
- 2) The degree of peakedness is called _____.

a) Kurtosis	b) Skewness
c) Symmetry	d) Dispersion
- 3) By which other name is the Chi-Square goodness of fit test known?

a) Two sample Chi-Square	b) Wilcoxon
c) One Sample Chi-Square	d) Directional Chi-Square
- 4) What is the expected number of heads appearing when a fair coin is tossed 3 times?

a) 2.1	b) 3.2
c) 1.5	d) 4.1
- 5) Any hypothesis which is tested for the purpose of rejection under the assumption that it is true is called _____.

a) Null hypothesis	b) Statistical hypothesis
c) Alternative hypothesis	d) Composite hypothesis
- 6) Which method of analysis does not classify variables as dependent or independent?

a) Regression analysis	b) Analysis of variance
c) Discriminant analysis	d) Cluster analysis
- 7) If the variance of 15 observations is 4. If each observation is increased by 9, the variance of resulting observation is _____.

a) 2	b) 4
c) 3	d) 5
- 8) The median of a series of numerical value is _____.

a) equal to the average	b) a number
c) A graph or chart	d) A frequency table
- 9) What type of data do you need for a Chi-Square test?

a) Ordinal	b) Interval
c) Categorical	d) Scales

Q.6 Answer the following

- a) Data on waxy endospermic plants were recorded in maize. Calculate standard deviation for the following data? **08**

Waxy Endospermic plants	7	8	9	10	11	12
No. of plants	13	13	18	17	15	14

08

- b) Explain scattered diagram method for studying correlation.

Q.7 Answer the following

- a) Difference between correlation and regression. Add a note on regression analysis and its applications. **08**

- b) Explain mode in central tendency and calculate the mode of data given. In a class of 30 students marks obtained by students in Environmental Science out of 50 as tabulated as below: **08**

Marks obtained	No. of Students
10-20	25
20-30	40
30-40	38
40-50	31

Seat No.	
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M.Sc. (Semester-IV) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE

Environmental Virology, Toxicology and Bio-safety (MSC020401)

Day & Date: Monday, 10-07-2023

Max. Marks: 80

Time: 03:00 PM To 06:00 PM

- Instructions:** 1) Question No.1 and 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to Q. No. 7.
 3) Figure to right indicate full marks.

Q.1 A) Choose correct alternatives. (MCQ) 10

- 1) Which of the following organ does influenza virus infects?
 - a) Heart
 - b) Respiratory system.
 - c) Liver
 - d) Kidney
- 2) Viruses outside their host cells Survive as _____.
 - a) Virions
 - b) Algae
 - c) Protozoa
 - d) Bacteria
- 3) The LD 50 is best described as which of the following:
 - a) To dose at which 50% of all test animals die
 - b) The dose at which 50% of the animals demonstrate response to the chemical
 - c) The dose at which all of the test animals die
 - d) The dose at which at least one of the test animals dies.
- 4) All of the following are reasons for selective toxicity except _____.
 - a) Transport differences between cell
 - b) Biochemical differences between cell
 - c) Cytology of male neurons versus female neurons
 - d) Cytology of plant cells versus animal cells
- 5) _____ is the most fatal pollutant in water.
 - a) PO₄
 - b) Ar
 - c) CO₂
 - d) Zn
- 6) Coal mine workers are prone to victim of one of the following disease.
 - a) Pneumoconiosis
 - b) Byssinosis
 - c) Asbestosis
 - d) Silicosis
- 7) Tuberculosis is _____ diseases.
 - a) Air born
 - b) Soil born
 - c) Water born
 - d) Sewage born
- 8) Which of the following does not include in ecological monitoring in the assessment of effect of toxicants?
 - a) Bioaccumulation
 - b) Bioassay
 - c) Ecological population dynamics
 - d) Habitat protection

- 9) The disciplines which study the effect of chemicals on entire ecosystem is referred as _____.
a) Ecotoxicology b) Behavioral ecology
c) Immunotoxicology d) None of these
- 10) The impact on human health like black lung and urban emphysema are caused mainly by: _____.
a) Methane b) SO₂
c) Particulates d) All of these

B) Write True / False.**06**

- 1) SARS-CoV-2 comes under risk group - III category. (True / False)
- 2) BSC A2 biosafety cabinet is most suitable for work in Covid-19 PCR laboratory. (True / False)
- 3) All body fluids is considered biohazard. (True / False)
- 4) Bacillus subtilis is not consider a threat for bio-safety. (True / False)
- 5) In localized viral infections, the site of pathology is usually the portal of entry. (True / False)
- 6) Reservoirs of disease may be inanimate or animate. (True / False)

Q.2 Answer the following.**16**

- a) Explain replication strategies.
- b) Write note on industrial toxicants.
- c) Explain in brief intrinsic toxicity.
- d) Discuss the concept of biosafety.

Q.3 Answer the following.**16**

- a) What is toxicology? Discuss the scope of toxicology.
- b) Discuss different routes of toxicants and give detailed note on toxic materials.

Q.4 Answer the following.**16**

- a) Explain general principles and need for safety.
- b) Write note on structure of animal and plant virus.

Q.5 Answer the following.**16**

- a) Write a detailed note on maintenance and handling of laboratory animals.
- b) Explain in detailed note on LC 50.

Q.6 Answer the following.**16**

- a) Explain toxicity testing methods and write comment on non-animal toxicity test.
- b) Write note on additive synergistic and antagonistic effect.

Q.7 Answer the following.**16**

- a) Define teratogens and explain its sources, effects and prevention of it.
- b) Explain in detail safety rules for domestic and cleaning staff.

Seat No.	
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M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE
Environmental policy, Acts, and Environmental Management System
(MSC020402)

Day & Date: Wednesday, 12-07-2023
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Q. Nos. 1 and. 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7
3) Figure to right indicate full marks.

- Q.1 A) Fill in the blanks by choosing correct alternatives given below. 10**
- 1) Noise pollution has inserted as pollution in the Air Act in _____.
a) 1981 b) 1987
c) 1982 d) 2000
 - 2) _____ committee recommended the creation of separate department of Environment to coordinate issues arising out of economic development and social needs.
a) Mandal b) Trivedy
c) Tiwari d) Mehata
 - 3) UNEP stands for _____.
a) United Nations Environment Programme
b) Union Nations Environment Programme
c) United Nations Environment Protection
d) United States and Nations for Environment Programme
 - 4) Montreal protocol was developed for _____.
a) Ozone layer protection b) Soil conservation
c) Water conservation d) Air pollution
 - 5) Earth Summit was held at _____.
a) Rio b) Montreal
c) London d) Stockholm
 - 6) WHO head quarter is located at _____.
a) Geneva b) New York
c) Sweden d) Copenhagen
 - 7) The Ministry of Environment and Forest was established in _____.
a) 1980 b) 1972
c) 1985 d) 1988
 - 8) UNCED conference was held in _____.
a) Stockholm b) Geneva
c) Rio de Janeiro d) Washington
 - 9) The world wetland day is celebrated on _____.
a) February 02 b) February 28
c) June 05 d) March 21

- 10) The 2015 United Nations Climate Change conference, COP 21 held in _____.
- | | |
|----------|--------------|
| a) Paris | b) Madrid |
| c) Rome | d) Stockholm |

B) Fill in the blanks OR Write true/ false. 06

- 1) The 196 parties to the Convention on Biological Diversity finalized the negotiations for a post - 2020 global biodiversity framework.

a) True	b) False
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- 2) Ministry of Environment and Forests, Climate change (MoEFCC) has launched the report titled Governance for sustaining Himalayan Ecosystem.

a) True	b) False
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- 3) In 1974, the Central Pollution Control Board established.

a) True	b) False
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- 4) Section 2 (a) defines "Environment" under the act.

a) True	b) False
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- 5) Section 7 of the Environmental Protection Act directs that persons carrying on any industry shall not discharge any environmental pollutants in excess of standards prescribed by central government.

a) True	b) False
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- 6) To take appropriate steps in protection and improvement of human environment is the objective of the Environment Protection Act, 1986.

a) True	b) False
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Q.2 Answer the following 16

- a) Write note on Basel Convention?
- b) Explain Kyoto Protocol?
- c) Write brief note on Ethics and environment?
- d) Write note on Stockholm Conference?

Q.3 Answer the following 08

- a) What is IUCN? Explain its function and red data book in detail? 08
- b) Write a note on CPCB? 08

Q.4 Answer the following

- a) Explain in detail the Forest (Conservation) Act, 1980? 08
- b) Write a note on applications of RS and GIS in environmental management. 08

Q.5 Answer the following

- a) Write a note on constitutional provision regarding environmental protection. 08
- b) Explain in detail public liability insurance act, 1991 and its significance. 08

Q.6 Answer the following

- a) Explain jurisdiction under the environmental legislation of National Green Tribunal. 08
- b) Write a note on Biodiversity Act, 2002. 08

Q.7 Answer the following

- a) Discuss and write note on IUCN. 08
- b) Discuss in detail the environmental movement of Tehri Dam and Narmada Dam movement. 08

Seat No.	
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M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2023
ENVIRONMENTAL SCIENCE
Environmental Impact Assessment and Environmental Audit
(MSC020403)

Day & Date: Friday, 14-07-2023
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question no. 1 and 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to Q. No. 7.
 3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. 10

- 1) The EIA of developmental projects has so far been done on the basis of _____.
 - a) The provisions of the Environmental Protection Act 1986
 - b) The provision of the Municipalities Act, 1986
 - c) Executive order of the President
 - d) All of the above
- 2) The areas up to the 100 meters around the premises such as hospitals, educational institutions are courts are:
 - a) Silent zones
 - b) Atrophic zones
 - c) EMP - zones
 - d) Irrigation zones
- 3) Which projects of the following are being assessed for EIA study?
 - a) public investment
 - b) Irrigation & power
 - c) Administration
 - d) All of these
- 4) Which of the following is not an objective of EIA?
 - a) Recycling and reduction of waste
 - b) Assessment and international funding
 - c) Risk analysis and disaster management
 - d) All of the above
- 5) Which is the false statement regarding the EIA is:
 - a) Schedule III- Details of EAC
 - b) Schedule I - Lists of projects
 - c) Schedule II - Application forms
 - d) All the above
- 6) Which of the following is NOT correctly matched?
 - a) ISO- International Organization of Standards
 - b) EMS - Environmental Management System
 - c) WTO - Whole Trade Output
 - d) EIA - Environmental Impact Assessment
- 7) Environmental auditing helps in pollution control improves production, safety and health and conservation of natural resources by way of _____.
 - a) Placing environmental information to the public
 - b) Ensuring waste prevention and reduction
 - c) Assessing compliance with regulatory environment
 - d) All of these

- 8) The following agency which is not certifying the ISO is_____.
 a) BIS
 b) CPCB
 c) QAS
 d) All Indian Inset of Local Self-Government, Mumbai
- 9) Which of the following correct pair regarding the air quality monitoring technique is_____?
 a) NO₂ - IR absorption b) O₂ - UV photometry
 c) SO₂ - Diffusion tube d) C, N,P - Polyurethane filter
- 10) The ministry of Environment and Forests amended the EIA notification public hearing mandatory for environmental clearance on _____.
 a) January 27, 1997 b) April 03,1998
 c) April 10, 1997 d) January 27, 1996

B) Fill in the blanks OR Write True / False. 06

- 1) EIA is the process of identifying, predicting, and evaluating the likely impacts of proposed project or development to define mitigation actions to reduce negative impacts and to provide positive contributions to the natural environment and well-being. True / False
- 2) The purpose of the SCREENING step of EIA is to determine whether a full EIA needed. True I False
- 3) EIA is study of probable change in socio-economic and biophysical characteristics of environment due to proposed action. True / False
- 4) EIA is social and benefit environmental impacts. True / False
- 5) Environmental attributes are evident that order to identify, assess and predict the environmental impacts. True / False
- 6) Prediction of impact is economic. True / False

Q.2 Answer the following. 16

- a) Define and briefly discuss EIA outlining?
- b) Write importance in developmental projects of EIA?
- c) Write a brief note on environmental impacts from an irrigation project?
- d) Write a short note on role of public participation in EIA?

Q.3 Answer the following. 08

- a) Discuss the importance of ISO 14001 in detail. 08
- b) Write note on EMS. 08

Q.4 Answer the following. 08

- a) Explain in brief about EIA process in mining project. 08
- b) Explain in detail components of EIA. 08

Q.5 Answer the following. 08

- a) State the scope and applicability of Environmental Audit in developmental projects. 08
- b) Define impacts? Explain concept and types of impacts. 08

Q.6 Answer the following. 08

- a) Write a note on scope and objectives of EIA. 08
- b) Explain core values and key guiding principles for EIA. 08

Q.7 Answer the following. 08

- a) Discuss merits and demerits of EIA. 08
- b) Explain in detail use of network method in EIA. 08