

Total No. of Questions : 8]

SEAT No. :

P2760

[Total No. of Pages : 2

[5033] - 101
M.Sc. (Semester - I)
ENVIRONMENTAL SCIENCE
EVSC - 101 : Environmental Biology
(2013 Pattern)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) What is an ecosystem? Explain the functional attributes of ecosystem.
- b) Explain the concept of ecological efficiency in relation with trophic levels.

Q2) Answer the following : **[10]**

- a) Discuss the role of various biological processes in maintenance of ecological balance.
- b) Explain the process of energy flow in an ecosystem with suitable diagram.

Q3) Answer the following : **[10]**

- a) What are the characteristics of r and k selected species population?
- b) Discuss the relationship between species diversity, dominance and stability of the ecosystem.

Q4) Answer the following : **[10]**

- a) Write an account on intraspecific interaction and its ecological significance.
- b) Define succession. Comment upon the statement that 'Phenomenon of succession is community controlled'.

P.T.O.

Q5) Answer the following : [10]

- a) What are the challenges and adaptations of life in aquatic biomes?
- b) What are terrestrial biomes? Discuss forest diversity in India.

Q6) Answer the following : [10]

- a) Discuss in detail ecological significance of mangroves.
- b) Which are the environmental factors that influence microbial growth?

Q7) Answer the following : [10]

- a) What is meant by ethology? Write an account on reproductive behavior observed in animals.
- b) What are various forms of communication observed in animals?

Q8) Write short notes on the following : [10]

- a) Applications of Environmental Microbiology.
- b) Biogeochemical cycles.



Total No. of Questions : 8]

SEAT No. :

P2761

[Total No. of Pages : 2

[5033] - 102

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC - 102 : Environmental Chemistry

(2013 Pattern)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Solve any five questions from the following.*
- 2) *Neat and labeled diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) What is embryo genesis. Explain the mutation and gene control during embryo genesis.
- b) Explain the working of gas chromatography.

Q2) Answer the following : **[10]**

- a) Sketch a neat labelled diagram of ion exchange chromatography.
- b) Write a short note on detector in NAA.

Q3) Explain the following : **[10]**

- a) Microbial destruction of polymer.
- b) Hydrogen bonding in biological system.

Q4) Write the answer of following : **[10]**

- a) What are the process of destruction of alkalimetals.
- b) What are the sources and effect of lead pollution.

Q5) Answer the following : **[10]**

- a) Explain the process of soil formation. Add a note on weathering of rocks.
- b) What is primary and secondary amino acids.

P.T.O.

Q6) Answer the following : **[10]**

- a) What are the merits and demerits of XRF analysis.
- b) Classify the pesticides. Add a note on biomagnification of DDT.

Q7) Write the answer of following : **[10]**

- a) Explain the role of microorganism in soil. Add a note on soil air.
- b) Enumerate the importance of enzyme in biological system with suitable examples.

Q8) Write short notes on : **[10]**

- a) Cationic and anionic detergents.
- b) Photomultiplier tubes.



Total No. of Questions : 8]

SEAT No. :

P2762

[Total No. of Pages : 2

[5033] - 103
M.Sc. (Semester - I)
ENVIRONMENTAL SCIENCE
EVSC - 103 : Essentials of Geosciences
(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat labelled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Explain the internal structure of the earth.
- b) Explain the structures exhibited by metamorphic rocks.

Q2) Write notes on the following : **[10]**

- a) Mechanical weathering.
- b) Sea floor spreading.

Q3) Explain the following : **[10]**

- a) Formation of water falls.
- b) Processes of Glacial erosion.

Q4) Answer the following : **[10]**

- a) Explain the methods of preventing soil erosion.
- b) Explain how stalactites and stalagmites are formed.

Q5) Answer the following : **[10]**

- a) Discuss the characteristics of Drainage basins.
- b) Explain unconfined and confined aquifers.

P.T.O.

Q6) Write notes on : **[10]**

- a) Physical structure of the ocean floor.
- b) Thermohaline circulation.

Q7) Explain the following : **[10]**

- a) Causes and effects of sea level changes.
- b) Properties of sea water.

Q8) Write notes on : **[10]**

- a) Causes and effects of Tsunami.
- b) Excess withdrawal of groundwater.



Total No. of Questions : 8]

SEAT No. :

P2763

[Total No. of Pages : 2

[5033] - 104

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC 104 - Environmental Statistics

(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Your are advised to attempt not more than 5 questions.*
- 2) All questions carry equal marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) a) Define the following terms :

- i) Population
 - ii) Stratified random sampling
 - iii) Null hypothesis
 - iv) Histogram
 - v) Critical region
- b) Differentiate between mean, mode, median as measures of central tendency.

Q2) a) Compute standard deviation for following data :

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Village	1	9	28	22	15	12	10

- b) Explain the term skewness and kurtosis.

P.T.O.

- Q3)** a) Discuss properties of Normal distribution
 b) $\Sigma x = 93$, $\Sigma y = 28$, $\Sigma x^2 = 999$, $\Sigma y^2 = 90$, $\Sigma xy = 293$, $n = 10$.
 Compute the correlation coefficient between y and x .

- Q4)** a) What is 'level of significance'? Explain its relation with critical region.
 b) Calculate arithmetic mean for the following frequency distribution.

Class interval	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	8	17	45	13	9	4

- Q5)** a) Discuss applications of statistical models in Environmental science.
 b) Discuss method of calculation for one way ANOVA.

- Q6)** a) Discuss Chi-Square test as goodness of fit.
 b) Draw histogram for following frequency distribution.

Number of spikes	20-22	23-25	26-28	29-31	33-34	35-37
Number of plants	5	9	17	20	18	8

- Q7)** a) Explain use of linear regression models in Environmental science.
 b) Discuss population growth model with suitable example.

Q8) Write short notes on the following :

- a) Type I and type II error.
 b) Probability mass function.



Total No. of Questions : 8]

SEAT No. :

P2764

[Total No. of Pages : 2

[5033] - 201

M.Sc. (Semester - II)

ENVIRONMENTAL SCIENCE

EVSC - 201 : Environmental Pollution & Control - I : Water & Soil

(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Neat diagrams must be drawn wherever necessary.*
- 2) Figures to the right indicate full marks.*
- 3) All questions carry equal marks.*
- 4) Your are advised to attempt not more than 5 questions.*

- Q1)* a) What are the point sources of river water?
b) What are the Biological pollution and how they pollute the water bodies?
- Q2)* a) What are the BIS standards for drinking water?
b) Explain the various methods for water sample collection.
- Q3)* a) How does saturated hydraulic conductivity study are important in Ground water.
b) Differentiate between artificial recharge and induced infiltration.
- Q4)* a) What are the guidelines for disposal of sewage in sea?
b) What are problems associated with oil extration in marine environment?
- Q5)* a) Explain in brief reutilization of waste water.
b) Explain in brief the factors required in stabilization of ecosystem.

P.T.O.

- Q6)** a) How does mining activities effects deterioration of soil?
b) Describe various methods used in waste water disposal on land in India.
- Q7)** a) Discuss various processes biological transformation of heavy metals.
b) Discuss the specifications for disposal of waste water on land for irrigation.
- Q8)** a) Explain the problems related to dumping of over barden in an iron ore mining.
b) Describe one case study related to disposal of fly ash in Maharashtra.



Total No. of Questions : 8]

SEAT No. :

P2765

[Total No. of Pages : 2

[5033] - 202

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC 202 - Biodiversity and Natural Resources

(2013 Pattern)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Evaluate role of traditional livestock in the modern times.
- b) Describe in brief current status of marine resources.

Q2) Answer the following : **[10]**

- a) Describe skills and resources needed for the rapid assessment of biodiversity.
- b) Explain with examples role of plants in traditional medicine.

Q3) Answer the following : **[10]**

- a) Describe role of animals in conservation of natural ecosystems.
- b) Explain how domesticated gene-pool is useful in human nutrition.

Q4) Answer the following : **[10]**

- a) Write in brief forest diversity of Oriental region.
- b) Describe participation of youth in resource conservation.

Q5) Answer the following : **[10]**

- a) Describe any two environmental costs of human conflict.
- b) Describe terms and purpose of montreal protocol.

P.T.O.

Q6) Answer the following : **[10]**

- a) Explain any two main objectives of convention on Biodiversity.
- b) Explain establishment of National Biodiversity Authority.

Q7) Answer the following : **[10]**

- a) Comment on economic development and its impact on environment.
- b) Explain joint forest management.

Q8) Write short notes on : **[10]**

- a) Exsitu conservation of plants.
- b) Role of animals in conservation of natural ecosystem.



Total No. of Questions : 8]

SEAT No. :

P2766

[Total No. of Pages : 2

[5033] - 203
M.Sc. (Semester - II)
ENVIRONMENTAL SCIENCE
EVSC - 203 : Atmospheric Sciences
(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*
- 4) All questions carry equal marks.*

- Q1)* a) Differentiate between weather and climate.
b) Discuss factors controlling horizontal distribution of temperature.
- Q2)* a) Explain methods of pressure measurement.
b) Discuss evolution of atmosphere with any one theory.
- Q3)* a) Write in brief about atmospheric moisture circulation.
b) Discuss types of lapse rate and its relationship with atmospheric stability.
- Q4)* a) Explain La-Nina phenomena.
b) What are atmospheric transport models? Explain any one with suitable example.
- Q5)* a) What is scattering? Add a note on types of scattering.
b) Explain process of Evaporation.
- Q6)* a) Explain characteristics and effects of 'Hurricanes'.
b) Discuss net radiation heat budget.

P.T.O.

- Q7)* a) Discuss types of 'plume behaviour'.
b) Discuss characteristics of gradient wind.

Q8) Write short notes on :

- a) Jet streams
b) Global warming



Total No. of Questions : 8]

SEAT No. :

P2767

[Total No. of Pages : 2

[5033] - 204
M.Sc. (Semester - II)
ENVIRONMENTAL SCIENCE
EVSC - 204 : Remote Sensing and GIS
(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Neat diagrams must be drawn wherever necessary.*
- 2) Figures to the right indicate full marks.*
- 3) All questions carry equal marks.*
- 4) You are advised to attempt not more than 5 questions.*

Q1) a) Describe the interaction of the solar radiation with the earth's atmosphere.

b) Explain briefly the different types of scattering.

Q2) a) Explain the electromagnetic spectrum.

b) Describe the satellite orbits and its characteristics.

Q3) a) Write a brief account on LISS sensors.

b) Describe the elements of image interpretation.

Q4) a) Describe the interaction of EMR with vegetation.

b) Write a brief account on SPOT series of satellites.

Q5) a) Explain the data models used for spatial data.

b) Explain the concept datum and its importance.

Q6) a) Describe the basic geometric characteristics of aerial photographs.

b) Enumerate the steps involved in the generation of thematic maps.

P.T.O.

- Q7)** a) Explain the role of RS and GIS in forest cover mapping.
b) Explain the buffer analysis in GIS and its application.

Q8) Write short notes on :

- a) Topology
b) Map projection system



Total No. of Questions : 8]

SEAT No. :

P2768

[Total No. of Pages : 2

[5033] - 301

M.Sc.

ENVIRONMENTAL SCIENCE

**EVSC - 301 : Environmental Impact Analysis and Environmental Audit
(2013 Pattern)**

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Solve any five questions from the following.*
- 2) *Neat and labeled diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Define EIA. What are the objectives and advantages of conducting on EIA?
- b) Explain the role of scoping as per EIA notification 2006.

Q2) Answer the following : **[10]**

- a) What are the principles of National Environmental policy 2006?
- b) Describe the necessity for accreditation of consultants carrying out EIA.

Q3) Explain the significance of : **[10]**

- a) Description of Environmental setting.
- b) Environmental risk assessment.

Q4) Answer the following : **[10]**

- a) Describe the role of meteorological data in EIA studies. How is it collected.
- b) Explain scaling-weighting techniques.

Q5) Answer the following : **[10]**

- a) Explain the significance of cost benefit analysis in EMP.
- b) Give the advantages and limitations of public consultation in the EIA process.

P.T.O.

Q6) Answer the following : **[10]**

- a) Explain important environmental and social issues in development of a river valley.
- b) Describe the plain for control of air pollution and water pollution from mining industry.

Q7) Answer the following : **[10]**

- a) Describe consumption, pollution, solid waste and disposal audit with reference to environmental audit.
- b) What are the tools required for conducting an environmental audit?

Q8) Write short notes on : **[10]**

- a) Social impact assesment.
- b) ISO 14000.



Total No. of Questions : 8]

SEAT No. :

P2769

[Total No. of Pages : 2

[5033] - 302

M.Sc.

ENVIRONMENTAL SCIENCE

**EVSC - 302 : Environmental Pollution - II : Air, Noise and Radiation
(2013 Pattern) (Credit System)**

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Enlist the natural and anthropogenic sources of air pollution.
- b) Classify the air pollutant in different category.

Q2) Answer the following : **[10]**

- a) What are the effect of air pollution on animal?
- b) Write a note on catalytic converter.

Q3) Answer the following : **[10]**

- a) Explain in detail estimation of NO₂ in are.
- b) Write principle and working of fabric filters.

Q4) Answer the following : **[10]**

- a) What is noise? Discuss the sources of noise pollution.
- b) Write in detail effect of noise pollution on human.

Q5) Answer the following : **[10]**

- a) Discuss the methods of noise pollution control at source.
- b) What are the sources of radiation?

P.T.O.

Q6) Answer the following : **[10]**

- a) Write a note on genetic effect of radiation.
- b) What is ICRP? Give its recommendation for radiation protection.

Q7) Answer the following : **[10]**

- a) Discuss any two units of radiation measurement.
- b) Sketch and label human ear.

Q8) Write short notes on : **[10]**

- a) Electrostatic precipitator.
- b) G.M. counter.



Total No. of Questions : 8]

SEAT No. :

P2770

[Total No. of Pages : 2

[5033] - 303

M.Sc. (Semester - III)

ENVIRONMENTAL SCIENCE

EVSC - 303 : Water and Waste Water Technology

(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Solve any five questions from the following.*
- 2) *Neat and labeled diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Discuss the different uses of water. Explain the term water demand.
- b) What is the significance of population forecasting? Enlist the methods used.

Q2) a) Give the BIS standards for drinking water. Explain the significance of chlorides & fluorides.

- b) Discuss the sources of water and quality.

[10]

Q3) a) Explain the principle and application of flocculation and sedimentation in water treatment.

- b) Distinguish between slow & rapid sand filters.

[10]

Q4) a) Explain the process of ultra filtration with advantages and limitations.

- b) What is the significance of iron removal from drinking water? Give the methods used.

[10]

Q5) a) Draw a flowchart of a sewage treatment plant with different units.

- b) Explain the effect of quality of life on generation of sewage & its quality.

[10]

P.T.O.

- Q6)** a) What is the importance of biological treatment in waste water treatment?
Distinguish between suspended and attached growth processes.
- b) Explain the structure and operation of trickling filter in detail.

[10]

- Q7)** a) Draw and explain with flow diagram process and sources of effluent in pulp and paper industry.
- b) Why is it necessary to determine DO, BOD & COD in waste water treatment?

[10]

Q8) Write short notes on :

[10]

- a) Phenol removal
- b) Grit chamber



Total No. of Questions : 8]

SEAT No. :

P2771

[Total No. of Pages : 2

[5033] - 304

M.Sc. (Semester - III)

ENVIRONMENTAL SCIENCE

EVSC - 304 : Environmental Law, Ethics and Policy

(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Solve any five questions from the following.*
- 2) *Neat and labeled diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer the following : [10]

- a) Write in detail about section 21 of air act - 1981 along with any other important two sections.
- b) Describe the salient features of water act 1974.

Q2) Answer the following : [10]

- a) Why the environment (protection) act - 1986 - called as an umbrella legislation?
- b) Explain any three important sections of hazardous waste management & handling rules.

Q3) Answer the following : [10]

- a) With the help of important sections/provisions of wildlife protection act-1972, discuss its role in protection of wild life.
- b) Discuss the millenium development goals (MDG) set by the united nations.

Q4) Write a short note on : [10]

- a) Fundamental rights & duties w.r. to protect environment.
- b) Kyoto protocol.

P.T.O.

Q5) Answer the following : **[10]**

- a) Give a detailed account of Rio+10 summit held in 2002.
- b) Why Rio summit (of 1992) is considered very important? Explain with the help of issues discussed in this summit.

Q6) Answer the following : **[10]**

- a) Discuss the challenges of world environmental ethics.
- b) Discuss in detail about international summit on human environment held at stockholm in 1972.

Q7) Answer the following : **[10]**

- a) Describe in detail, the principles of national environment policy - 2006.
- b) Define sustainable development and discuss how the social and economic development is integrated with environmental sustainability.

Q8) Write short notes on : **[10]**

- a) Concepts of environmental ethics.
- b) Convention on biological diversity.



Total No. of Questions : 8]

SEAT No. :

P2772

[Total No. of Pages : 2

[5033] - 305
M.Sc. (Semester - III)
ENVIRONMENTAL SCIENCE
EVSC - 307 : Man and Environment
(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Explain population regulation in detail.
- b) What are effects of pesticides on non-target species?

Q2) Answer the following : **[10]**

- a) Write a note on scope of Human Ecology.
- b) Explain the effect of environment on human culture and livelihood.

Q3) Answer the following : **[10]**

- a) Explain the various types of land use.
- b) Comment on Rehabilitation issues in detail.

Q4) Write a short note on : **[10]**

- a) Law of limiting factor.
- b) Principles of equitable development.

Q5) Answer the following : **[10]**

- a) What are the characteristics of rural subsistence economy.
- b) Enlist and comment on physio-chemical factors in environment.

P.T.O.

Q6) Answer the following : **[10]**

- a) Explain the impact of mining on environment.
- b) Enumerate national planning parameters for rural areas.

Q7) Answer the following : **[10]**

- a) Explain the laws of population growth.
- b) What are effects of environmental degradation.

Q8) Write short notes on : **[10]**

- a) Principles of ecology.
- b) Biological growth curves.



Total No. of Questions : 8]

SEAT No. :

P2773

[Total No. of Pages : 2

[5033] - 306

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC 308 - Environmental Education

(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Neat diagrams must be drawn wherever necessary.
- 2) Figures to the right indicate full marks.
- 3) All questions carry equal marks.
- 4) You are advised to attempt not more than 5 questions.

- Q1)** a) What are the main objective of current policies in India for Environmental Education? [4]
b) Enlist the principles of UNESCO for ESD at international level. [4]
c) What is the traditional approach for teaching learning EE? [2]
- Q2)** a) What is the meaning of quality education? [4]
b) Write a short note on Text books on EE. [4]
c) Define ESD. [2]
- Q3)** a) How collaborative learning is helpful in effective sustainable development. [4]
b) Enlist guiding principles of environmental education under Agenda 21. [2]
c) Write a short note on deliberative and participatory techniques of teaching learning process. [4]
- Q4)** a) What are the policies and approaches under CEPA. [5]
b) Discuss the elements of multilateral environmental agreements. [5]
- Q5)** a) What is ment by term "School in Community"? [4]
b) Discuss the evolution of EE in Indian school system. [4]
c) What is the meaning of collaborative learning. [2]

P.T.O.

- Q6)** a) Justify the statement “Public awareness leads to sustainable development”. [4]
b) Enlist the policies design for environmental conservation. [4]
c) What is “Nai Taleem” objectives? [2]
- Q7)** a) Explain-How traditional and modern techniques are useful in teaching learning process. [4]
b) Discuss the competence for education for sustainable development.[4]
c) Enlist the techniques to enhance system thinking and critical thinking under teaching learning approaches. [2]
- Q8)** a) Discuss the role of facilator in EE & ESD. [5]
b) Enlist and discuss the modern means of education and public awareness EPA. [5]



Total No. of Questions : 8]

SEAT No. :

P2774

[Total No. of Pages : 2

[5033] - 307

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC - 309 : Environmental Biotechnology

(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labelled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) What is Biomining? Discuss applications of it.
- b) Discuss role of microorganisms in solid waste management.

Q2) Answer the following : **[10]**

- a) Briefly mention Nomenclature system of microorganisms.
- b) Discuss in short 'Bacterial Growth Curve'.

Q3) Answer the following : **[10]**

- a) Discuss applications of Biotechnology in wasteland Management.
- b) What are biosensors? Add a note on types of biosensors.

Q4) Answer the following : **[10]**

- a) Discuss benefits of Biopesticides.
- b) Write a note on phylogenetic classification.

Q5) Answer the following : **[10]**

- a) Discuss concept of Integrated Pest Management.
- b) Explain applications of biotechnology in Biodiversity conservation.

P.T.O.

Q6) Answer the following : **[10]**

- a) What are air pollution indicators? Explain with suitable examples.
- b) Write a short note on Biosafety.

Q7) Answer the following : **[10]**

- a) Discuss types of Nutrient media used for bacterial growth.
- b) Mention applications of Biosensors in Environmental Monitoring.

Q8) Answer the following : **[10]**

- a) Write a note on Bioindicators for water quality evaluation.
- b) Discuss mechanism of phytoremediation.



Total No. of Questions : 8]

SEAT No. :

P2775

[Total No. of Pages : 2

[5033] - 308

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC - 310 : Environmental Resource Monitoring

(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Define air pollution and add a note on its effects.
- b) How one can control industrial air pollution? Explain.

Q2) Attempts the following : **[10]**

- a) What is weather? Give its importance in brief.
- b) Explain in brief elements of weather.

Q3) Answer the following : **[10]**

- a) What is noise? What are the sources of it?
- b) How one can measured the noise pollution? Explain.

Q4) Attempt the following : **[10]**

- a) What are the steps in control of odour? Explain.
- b) Write in brief water quality standards.

Q5) Answer the following : **[10]**

- a) Why water quality is important explain in brief.
- b) What are the aims of quality monitoring?

P.T.O.

Q6) Attempt the following : **[10]**

- a) Justify “Rivers are life line”.
- b) What is soil pollution?

Q7) Answer the following : **[10]**

- a) What is importance of forest?
- b) What is importance of wild life?

Q8) Write short notes on : **[10]**

- a) Importance of Remote sensing.
- b) Scope of Wetlands.



Total No. of Questions : 8]

SEAT No. :

P2776

[Total No. of Pages : 2

[5033] - 401

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC - 401 : Environmental Toxicology, Health and Safety

(2013 Pattern)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Briefly explain the guidelines for ISO 18000.
- b) Explain the procedure for risk identification and mitigation strategies.

Q2) Briefly explain : **[10]**

- a) Toxicity of lead (pb).
- b) Importance of mock drill in safety measures.

Q3) Attempt the following : **[10]**

- a) Explain the procedures for handling; storage and disposal of Biomedical waste.
- b) Explain the public awareness and participation in preventive measures of risk management.

Q4) Answer the following : **[10]**

- a) What is biotransformation. Add a note on orsenic toxicity.
- b) Explain the causes of epedmics of water borne disease.

Q5) Attempt the following : **[10]**

- a) What is biological Warfare? What are the threat of it human being.
- b) Explain the standards of indoor air quality in working environment.

P.T.O.

Q6) Answer the following : **[10]**

- a) What is significance of urban sanitation programme for urban environment.
- b) What are the metabolic effects of Zn on animals.

Q7) Attempt the following : **[10]**

- a) Explain the threats of biological warfare.
- b) Explain the role of public participation in hygienic issues.

Q8) Write short notes on : **[10]**

- a) Polio eradication programme.
- b) Ergonomics and occupational environment.



Total No. of Questions : 8]

SEAT No. :

P2777

[Total No. of Pages : 2

[5033] - 402

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC - 402 : Restoration Ecology & Watershed Management

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *All questions carry equal marks.*
- 3) *Your are advised to attempt not more than 5 questions.*

Q1) Answer the following : **[10]**

- a) Define ecological restoration and add a note on its importance.
- b) What are the standard guidelines for restoration of protected areas.

Q2) Explain the following : **[10]**

- a) Explain with suitable example of restored waste dumping site and explain the steps needed to be taken before and after complete filling dumping areas.
- b) Explain the various causes of degradation of mangrove ecosystem along the coastal regions of Maharashtra.

Q3) Justify the following : **[10]**

- a) "Ecological restoration is known as practical approach for conservation of ecosystem". Justify.
- b) "Loss of grassland ecosystem lead to the extinction of cheeta from Asia". Justify.

Q4) Write notes on the following : **[10]**

- a) Degraded forest ptaches and its restoration.
- b) Eco-restoration of open cast mines.

P.T.O.

Q5) Discuss the following : **[10]**

- a) Define watershed management. Discuss the objective associated with watershed management.
- b) Discuss atleast two instrument used for survey in watershed.

Q6) Answer the following : **[10]**

- a) What are topographic survey? Describe drainage line survey in watershed.
- b) Describe the methodology for groundwater investigation.

Q7) Explain the following : **[10]**

- a) Draw and describe at least two traditional water harvesting structures.
- b) Explain the various steps involved in project monitoring associated with watershed management.

Q8) Write notes on the following : **[10]**

- a) Vertical distribution of ground water.
- b) Biological measures required in water harvesting in stream.



Total No. of Questions : 8]

SEAT No. :

P2778

[Total No. of Pages : 2

[5033] - 403

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC - 403 : Waste & Hazardous Waste Management

(2013 Pattern)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *All questions carry equal marks.*
- 4) *Your are advised to attempt not more than 5 questions.*

Q1) a) What is solid waste? Give the source based classification of solid waste. [5]

b) What are the factors affecting generation and composition of municipal solid waste. [5]

Q2) a) Discuss the role of transfer stations in solid waste management system. [5]

b) Write a note on disposal of municipal solid wastes in India. [5]

Q3) a) Discuss the solid waste management in mining industry. [5]

b) What are the different types of agricultural wastes and how are they managed. [5]

Q4) a) What is meant by recycling? Explain the importance of recycling in solid waste management. [5]

b) Write a note on recovery of resources from wastes. [5]

Q5) a) Discuss the merits and demerits of landfilling wastes. [5]

b) Explain the process of incineration. [5]

P.T.O.

- Q6)** a) What is the role of NGO's in solid waste management? [5]
b) Define biomedical waste and its significance. [5]
- Q7)** a) Give the different sources of hazardous wastes. Write a note on their collection & segregation. [5]
b) Discuss the storage of hazardous wastes. [5]
- Q8)** a) What are the different components of e-waste? How are they recovered? [5]
b) Write a note on radioactive wastes. [5]



Total No. of Questions : 8]

SEAT No. :

P2779

[Total No. of Pages : 2

[5033] - 404

M.Sc. (Semester - IV)

ENVIRONMENTAL SCIENCE

EVSC - 404 : Renewable and Non-Renewable Energy

(2013 Pattern)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Discuss the impact of energy use pattern in India, on the environment.
- b) Write a note on Renewable Energy Integration.

Q2) Write a note on the following : **[10]**

- a) Physicochemical characteristics of petroleum.
- b) Environment problems associated with coal mining.

Q3) Answer the following : **[10]**

- a) Explain in brief the conversion process of biomass into biomass energy.
- b) Write a note on energy production from solid wastes.

Q4) Answer the following : **[10]**

- a) Compare between Nuclear fission & Nuclear fusion.
- b) Write a note on Fuel Fabrication and Fuel Cycle.

Q5) Answer the following : **[10]**

- a) Briefly discuss the design of solar collectors and concentrators.
- b) Explain the concept of energy in buildings.

P.T.O.

Q6) Answer the following : **[10]**

- a) Explain briefly the power generation process from wind mills.
- b) Discuss the factors considered for selecting sites of wind mills.

Q7) Answer the following : **[10]**

- a) Explain the principles used in generating hydroelectric power.
- b) Discuss the hazards related to generation of hydro electricity.

Q8) Write short notes on : **[10]**

- a) Sources of Geothermal & Hydrothermal energy.
- b) Prospects of Tidal and wave energy in India.



Total No. of Questions : 8]

SEAT No. :

P2780

[Total No. of Pages : 2

[5033] - 405

M.Sc. (Semester - IV)

ENVIRONMENTAL SCIENCE

EVSC 407 - Environmental Economics

(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) What is externality? Explain with suitable examples.
- b) Explain adaptation options to climate change in Indian region.

Q2) Answer the following : **[10]**

- a) Explain the design of environmental policy.
- b) What are the impacts of wildlife resource exploitation?

Q3) Answer the following : **[10]**

- a) Explain the role of incentives and subsidies in environmental protection.
- b) What are the effects of market failure?

Q4) Write short notes on : **[10]**

- a) Microfoundation of environmental economics.
- b) Total Economic Value (TEV).

Q5) Answer the following : **[10]**

- a) What is FDI? Enlist the FDI norms which does not put adverse impact on natural resources?
- b) What is contingent valuation method? Explain with suitable example.

P.T.O.

Q6) Answer the following : **[10]**

- a) Explain the economic reforms in sustainable development.
- b) Explain the interdependence of environment and economics with example.

Q7) Answer the following : **[10]**

- a) Explain the role of social cost in environmental protection, if included in total cost.
- b) What are public goods? Explain with suitable example.

Q8) Write short notes on : **[10]**

- a) Sustainable Development.
- b) Economics of fishery resource exploitation.



Total No. of Questions : 8]

SEAT No. :

P2781

[Total No. of Pages : 2

[5033] - 406

M.Sc. (Semester - IV)

ENVIRONMENTAL SCIENCE

EVSC 406 - Forestry and Habitat Management

(2013 Pattern) (Credit System) (Optional)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) In case of forest eco-system, which are commonly observed biotic and abiotic stresses.
- b) Discuss the impact of human activities on forest.

Q2) Answer the following : **[10]**

- a) Explain the silviculture system followed in mangrove forests area.
- b) Discuss the significance of participation of local communities in various forestry programmes.

Q3) Answer the following : **[10]**

- a) How ecological and physiological factors influences vegetation (insilviculture)?
- b) How water conservation is achieved through forestry?

Q4) Write a short notes on following : **[10]**

- a) Definition and concepts of forestry and habital management.
- b) Agro-forestry.

P.T.O.

- Q5)** a) Explain the significance of measurement of girth, diameter & height of trees.
b) Discuss the general principles of forest engineering. **[10]**

- Q6)** Answer the following : **[10]**
a) Explain the fundamentals of forest conservation act - 1980.
b) Discuss in detail about injuries/damages caused by animals to forest plants/trees.

- Q7)** Answer the following : **[10]**
a) Explain in detail, sampling methods for forest inventory.
b) Describe various methods for protection of forests against fire.

- Q8)** Write short notes on : **[10]**
a) Need and importance of wood seasoning & preservation.
b) Afforestation and forest regeneration.



Total No. of Questions : 8]

SEAT No. :

P2782

[Total No. of Pages : 2

[5033] - 407

M.Sc. (Semester - IV)

ENVIRONMENTAL SCIENCE

EVSC - 409 : Wildlife Management and Conservation

(2013 Pattern) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) Write an account on wild flora of India.
- b) Which are various legal measures taken by India for conservation of wild life.

Q2) Answer the following : **[10]**

- a) Discuss wildlife diversity in major riverine areas of India.
- b) Which are various programmes implemented by forest departments for species conservation.

Q3) Answer the following : **[10]**

- a) Discuss the functions of central zoo authority in conservation of wildlife.
- b) What is meant by ex-situ conservation? Discuss advances of it in conservation of species.

Q4) Answer the following : **[10]**

- a) Which are various priority areas for wildlife conservation India?
- b) Discuss upon the wildlife diversity associated with periyar national park.

P.T.O.

Q5) Answer the following : **[10]**

- a) What is ornithology? How these studies are useful in conservation of species?
- b) What is population ecology? Discuss its importance in wildlife management?

Q6) Answer the following : **[10]**

- a) What is importance of biodiversity registers in wildlife management?
- b) What are various advances associated with captive breeding programmes?

Q7) Answer the following : **[10]**

- a) Which are various zoogeographical regions of India?
- b) What is animal ethology? Discuss its importance in wildlife management.

Q8) Write short notes on : **[10]**

- a) Wildlife of Western Ghats.
- b) Community Conservation.



Total No. of Questions : 8]

SEAT No. :

P2783

[Total No. of Pages : 2

[5033] - 408

M.Sc.

ENVIRONMENTAL SCIENCE

EVSC - 408 : Sustainable Agriculture and Organic Farming

(2013 Pattern)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve any five questions from the following.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following : **[10]**

- a) What is significance of low-input sustainable agriculture farming?
- b) Write the demerits of monoculture crop practices in agriculture.

Q2) Answer the following : **[10]**

- a) What is role of horticulture practices in agriculture.
- b) What are the benefits of organic farming?

Q3) Write in brief : **[10]**

- a) Role of stakeholders in sustainable agriculture development programme.
- b) Holistic resource management in agriculture.

Q4) Answer the following : **[10]**

- a) Write the significance of nutrient balance in soil management.
- b) Explain the role of societal traders and institutions in sustainable agriculture.

P.T.O.

- Q5) Write in brief :** **[10]**
- a) Agro pastoralism.
 - b) Crop rotation.
- Q6) Write the significance of :** **[10]**
- a) Post harvest management practices.
 - b) Pheromones trap.
- Q7) Answer the following :** **[10]**
- a) What are the components of integrated farming system for dry land.
 - b) Briefly write the significance of cropping scheme for irrigated situation.
- Q8) Write short notes on :** **[10]**
- a) Green Manure.
 - b) Alkaline soil.

