

Total No. of Questions :8]

SEAT No. :

P2183

[Total No. of Pages :2

[5330] - 101

M.Sc. (Environmental Sciences)

EVSC - 101 : ENVIRONMENTAL BIOLOGY

(2013 Pattern) (Semester - I)

*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 the concept of biosphere as an eco-system.
- b) How energy flows through food chains and food web, explain with suitable examples.

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

- a) Describe the patterns of survivorship and populations dispersion.
- b) Comment on parasitism and commensalism.

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

- a) Write a note on climax stage of succession and theories associated with it.
- b) Explain animal behaviour with respect to foraging and modes of communication.

**Q4)** Write a detailed note on following: [10]

- a) Predation and anti-predation behaviour.
- b) Territoriality and circadian rythem.

**P.T.O.**

**Q5)** Comment on following: [10]

- a) Climatic characteristics observed in tropical belt and forests of the region.
- b) Zonation observed in marine ecosystem.

**Q6)** Write a note on following: [10]

- a) Role of mangroves in coastal eco-system.
- b) Wetlands, its types and functions.

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

- a) Discuss the role of micro-organisms in bio-remediation process.
- b) Discuss adaptations of plants and animals of aquatic biomes.

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

- a) Environmental factors that affects growth of microbes.
- b) Major forest types of India.



Total No. of Questions : 8]

SEAT No :

**P 2184**

[5330]-102

[Total No. of Pages : 2

M.Sc.

**ENVIRONMENTAL SCIENCE  
EVSC 102 : Environmental Chemistry  
(2013 Pattern) (Semester - I)**

*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) How colorimeter is useful in various analysis of pollutants.
- b) Explain the polarography technique in detail.

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

- a) Working principle of Gas chromatography.
- b) Principle and merits of ICPAES.

**Q3)** Explain in brief the merits and demerits of [10]

- a) X-ray fluorescence.
- b) X-ray diffraction.

**Q4)** Explain the principle with neat diagram of [10]

- a) HPLC.
- b) AAS.

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

- a) What are the sources of lead in environment. Add a note on its effect on human body.
- b) Classify the surfactants with suitable examples.

**P.T.O.**

**Q6)** Explain in brief. [10]

- a) Hydrogen bonding in biological system.
- b) Carcinogenic effects of aflatoxins.

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

- a) Classify the pesticides. Add a note on biomagnification of DDT.
- b) Briefly explain the soil formation process. Add a note on soil profile.

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

- a) Structure of DNA
- b) Types of mutation.

**X      X      X**

Total No. of Questions : 8]

SEAT No :

**P 2185**

[Total No. of Pages : 2

**[5330]-103**

**M.Sc.**

**ENVIRONMENTAL SCIENCE**

**EVSC 103: Essentials of Geosciences**

**(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) Explain the concept of uniformitarianism with suitable examples.
- b) Enumerate the causes of volcanoes and describe central type of volcano.

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

- a) Internal structure of the earth.
- b) Formation of sand dunes.

**Q3)** Write notes on : [10]

- a) Cycle of erosion.
- b) Karst topography.

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

- a) Classification of soil.
- b) Land capability classification

**P.T.O.**

**Q5)** Diagrammatically describe the following: [10]

- a) Hydrological cycle.
- b) Types of aquifers.

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

- a) Waves and tides.
- b) Thermohaline circulation.

**Q7)** Give the causes and effects of : [10]

- a) Sea level changes.
- b) Desertification.

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

- a) Impact of mining on the environment.
- b) Thunderstorms and cyclones.



Total No. of Questions : 8]

SEAT No :

**P 2186**

[5330]-104

[Total No. of Pages : 2

M.Sc.

**ENVIRONMENTAL SCIENCE**  
**EVSC - 104 : Environmental Statistics**  
**(2013 Pattern) (Semester-I)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Solve any Five Questions from the following.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of statistical tables/Electronic pocket calculator is allowed.*
- 4) *All questions carry equal marks.*

**Q1)** Define the following terms with examples: [2×5=10]

- a) Cumulative frequency.
- b) Positive correlation.
- c) Range.
- d) Quartiles.
- e) Absolute Dispersion.

**Q2)** a) What is ogive curve? How it is drawn? Which measure of central tendency is calculated by ogive curve. [5]  
b) Find the missing information from the following: [5]

	Group-I	Group-II	Group-III	Combined
Number	50	?	90	200
Std. deviation	6	7	?	7.746
Mean	113	?	115	116

**Q3)** a) What is measure of central tendency? State various measures of central tendency and explain any one of them. [5]  
b) Twelve persons gambled on a certain night. Seven of them lost at an average rate of Rs. 105. While the remaining five gained at an average of Rs. 130. Is the information given above correct? If not, why? [5]

**P.T.O.**

- Q4)** a) What is correlation? State formula of Karl Pearson's coefficient of correlation. State any three properties of correlation coefficient. [5]
- b) For a distribution of 100 observations, the sum of the deviations from 4 is -11 and the sum of squares of these deviations is 257. Find the mean and the standard deviation. [5]

- Q5)** a) What is dispersion? Which measure of dispersion is the best? Why? [5]
- b) Given the following information: [5]

	Price (Rs.)	Amount demanded (thousand units)
Average	10	35
S. D.	2	5

Correlation coefficient = 0.8. Obtain the regression equation of amount demanded on price and estimate the likely demand when price is Rs. 12.5.

- Q6)** a) What is regression? State meaning of regression coefficient and explain properties of regression coefficient. [5]
- b) If after the settlement the average weekly wages in a factory is increased from Rs. 80 to Rs. 120 and S.D. is increased from Rs. 10 to Rs. 15. Hence, after the settlement the wage has become higher and more uniform. Comment. [5]

- Q7)** a) Describe graphical presentation methods for frequency distribution. [5]
- b) Find the number of pairs of observation from the following data: [5]
- $r = 0.50, \Sigma xy = 120, \sigma y = 8, \Sigma x^2 = 90$  where  $x = X - \bar{X}$  and  $y = Y - \bar{Y}$ .

- Q8)** a) What are methods of data collection? State methods of sampling and describe any one of the sampling procedure in brief. [5]
- b) In frequency distribution the coefficient of skewness based on quartiles is 0.60. If sum of upper and lower quartiles is 100 and median is 38. Find the value of upper quartile? [5]



Total No. of Questions : 8]

SEAT No. :

**P2187**

[5330]-201

[Total No. of Pages : 2

M.Sc.

## **ENVIRONMENTAL SCIENCE**

### **EVSC - 201 : Environmental Pollution and Control - I : Water and Soil (2013 Pattern) (Semester - II)**

*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 are the sources of marine pollution.
- b) Give the importance of water sampling in analysis.

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

- a) What are the sources of ground water pollution. Add a note on health hazards.
- b) Explain the primary treatment of waste water with its significance.

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

- a) What are the guidelines for disposal of hazardous waste in marine environment.
- b) What is the impact of offshore drilling on marine environment.

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

- a) Explain the pedogenesis. Add a note on weathering of rocks.
- b) Sketch a neat diagram of soil profile with its significance in each zone.

**P.T.O.**

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

- a) What are the importance of sampling and preservation of water samples in analysis studies.
- b) What is biological water pollution. Add a note on entrophication.

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

- a) Explain the terms soda city, alkaline soil and saline soil.
- b) What are the biological effects of ionizing radiation.

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

- a) Explain the various methods of solid waste disposal.
- b) Briefly write the application and impact of fly ash in agriculture.

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

- a) Soil conservation methods.
- b) Compaction and dewatering of Sludge.



Total No. of Questions : 8]

SEAT No :

**P 2188**

[5330]-202

[Total No. of Pages :2

M.Sc.

## **ENVIRONMENTAL SCIENCE**

### **EVSC - 202 : Biodiversity, Forestry and Natural Resources (2013 Pattern ) (Semester-II)**

*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) Give a detailed account of Indian and global biodiversity and its present usage.
- b) Explain the importance of plants in research and technological inventions.

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

- a) Discuss the importance of traditional livestock resources.
- b) Write in detail about traditional knowledge system and their evaluation.

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

- a) Discuss the measures for conservation of biodiversity and approaches to its sustainable utilization.
- b) Elaborate on, nature, scale and intensity of threats to biodiversity.

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

- a) Role of wild and domesticated gene-pool in human nutrition.
- b) Importance of animal in modern economy.

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

- a) Discuss the economic value of natural eco-systems.
- b) Explain, the environmental cost of human conflict.

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

- a) Discuss the role of CITES in conservation of bio-resources.
- b) Elaborate on, laws and policies for conservation of forestry.

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

- a) Explain the role of micro-organisms in providing solutions for environmental problems.
- b) Discuss the importance of eco-tourism in conservation.

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

- a) Forest nursery.
- b) Social forestry.



Total No. of Questions : 8]

SEAT No :

**P 2189**

[5330]-203

[Total No. of Pages : 2

M.Sc.

**ENVIRONMENTAL SCIENCE  
EVSC - 203 : Atmospheric Sciences  
(2013 Pattern) (Semester-II)**

*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 masses. Give their classification.
- b) What are the consequences of global warming?

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

- a) Explain the biogeochemical cycles in brief.
- b) Write a note on the elements of weather.

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

- a) What is scattering? Add a note on the types of scattering.
- b) Explain the process of wet deposition fluxes with suitable example.

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

- a) Explain land and sea bridge.
- b) What are aerosols? Explain the role of aerosols in the earth system.

**P.T.O.**

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

- a) Explain the formation of geostrophic wind.
- b) What is the difference between El-Nino and La-Nina.

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

- a) Discuss the radiation budget of earth.
- b) Explain the significance of air quality index.

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

- a) Write about the thermal structure of the atmosphere.
- b) Define pressure and write about the instruments used in measuring pressure.

**Q8) Write short notes on the following (any two):** [10]

- a) Walker circulation.
- b) Plume behaviour.
- c) Lightning.



Total No. of Questions :8]

SEAT No. :

**P2190**

[5330]-204

[Total No. of Pages : 2

M.Sc.

**ENVIRONMENTAL SCIENCE**  
**EVSC-204 : Remote Sensing and GIS**  
**(2013 Pattern) (Semester-II)**

*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 the Active and Passive Remote sensing.
- b) Explain the Interaction of EMR with Atmosphere.

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

- a) Explain the types of platform.
- b) Explain the pushbroom and whiskbroom scanning system.

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

- a) Explain the interpretation key of Aerial photographs.
- b) Discuss the characteristics of cylindrical projection.

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

- a) Comparison between Raster and vector data.
- b) Explain the digitizing error and correcting.

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

- a) Discuss the application of Buffering analysis with suitable examples.
- b) Discuss the characteristics of PAN sensors.

**P.T.O.**

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

- a) Explain Geometric characteristics of Aerial photographs.
- b) Explain the GIS components.

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

- a) Explain the Advantage and disadvantage of vectors methods.
- b) Explain the vector based overlays operations.

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

- a) Image filtering
- b) Topology



Total No. of Questions :8]

SEAT No. :

P2191

[Total No. of Pages :2

[5330] - 301

M.Sc. (Environmental Sciences)

EVSC - 301 : ENVIRONMENTAL IMPACT ANALYSIS &  
ENVIRONMENTAL AUDIT  
(2013 Pattern) (Semester - III) (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 importance of E/A as a tool for decision makers.
- b) What are the four stages for accord of environmental clearance under E/A notification 2006.

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

- a) Write about the significance of meteorological data in prediction of impacts.
- b) What are the different elements of ecological survey?

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

- a) Discuss the importance of public consultation in E/A. At what stage should the consultation be done.
- b) What are the common errors found in E/A reports.

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

- a) Methods of Impact analysis.
- b) Scoping.
- c) Socioeconomic study.

**P.T.O.**

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

- a) Predict the impact of sugar industry on air and socioeconomic environment.
- b) Predict the impact of Iron & Steel industry on air and water environment.

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

- a) Prepare detailed EMP for a highway project.
- b) Explain the significance of environmental budgeting.

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

- a) Define environment audit? What are the differences between environmental & financial audit.
- b) What are the requirements of environmental audit in India under rule 14?

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

- a) Consumption audit.
- b) Impact of river valley project on socioeconomic.
- c) ISO 14000.



Total No. of Questions : 8]

SEAT No :

**P 2192**

[5330]-302

[Total No. of Pages : 2

M.Sc.

## **ENVIRONMENTAL SCIENCE**

### **EVSC - 302 : Environmental Pollution-II: Air, Noise & Radiation (2013 Pattern) (Semester-III)**

*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)** Attempt the following: [10]

- a) Write a note on stratospheric ozone formation and depletion.
- b) Enlist notable air pollution disasters. Write in detail about any one.

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

- a) Define air pollution . Write a note on effects of particulate pollutants on plants.
- b) Write about wet and dry deposition of air pollutants.

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

- a) Write a note in alternative fuels. How do they help to control air pollution.
- b) Explain the air pollution problems of cement industry and control measures.

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

- a) Write about the methods for monitoring of hydrocarbons.
- b) What are the principles used in control of gaseous pollutants.

**P.T.O.**

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

- a) Explain the principle and working of wet scrubber.
- b) What are the advantages and limitations of Electrostatic precipitator?

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

- a) What is noise? Explain noise control at source.
- b) What are the adverse impacts of noise.

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

- a) Write a note on ICRP recommendations.
- b) Write in detail about Chernobyl accident.

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

- a) Acid Rain & its impacts.
- b) Incineration.
- c) GM counter.



Total No. of Questions : 8]

SEAT No :

**P 2193**

[Total No. of Pages : 2

**[5330]-303**

**M.Sc.**

## **ENVIRONMENTAL SCIENCE**

### **EVSC- 303: Water and Waste Water Technology (2013 Pattern) (Semester - III)**

*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 need of water quality standards for domestic & Industrial purpose.
- b) Draw a flow diagram of water treatment plant explain its units.

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

- a) Gives the merits and demerits of tapping a flowing surface water and conventional method of its treatment to produce potable quality water.
- b) Importance of specific water requirement at pilgrimage place and recreation activities.

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

- a) Water quality standards for industrial use.
- b) Explain a demineralization and its importants.

**P.T.O.**

**Q4) Describe the following (Any two): [10]**

- a) Iron removal
- b) Sedimentation
- c) filtration

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

- a) Explain impact of future growth, development and change in quality of life on sewage quality & quantity.
- b) Write down standards of treated waste water for disposal in to surface water and on land by Central Pollution Control Board.

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

- a) Define Activated sludge Process and explain its various types.
- b) Role of microorganisms in anaerobic treatment.

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

- a) Explain Pulp & Paper Manufacturing Process with various sources of Waste Water.
- b) Explain Process of stabilization Pond & Aerated lagoon.

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

- a) Spent wash treatment
- b) UASB recenter.
- c) Primary & Secondary Clarifier.



Total No. of Questions : 8]

SEAT No. :

**P2194**

[Total No. of Pages : 2

**[5330]-304**

**M.Sc.**

**ENVIRONMENTAL SCIENCE**

**EVSC-304: Environmental Law, Ethics and Policy  
(2013 Pattern) (Semester-III)**

*Time : 3Hours]*

*[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) Discuss the need for environmental governance in India.
- b) Which are the fundamental rights conferred by the constitution of India to its citizens?

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

- a) Why do we refer to environmental protection act, 1986 as an umbrella act?
- b) What are the functions of central pollution control board to protect environment?

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

- a) What are the important provisions of wildlife protection act to protect plants and animals?
- b) Discuss role of municipalities in management of solid wastes as per solid wastes management and handling rules?

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

- a) What are hazardous wastes? Explain guidelines in management of hazardous wastes.
- b) Discuss salient features of national forest policy.

**P.T.O.**

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

- a) Which are the strategies to protect environment of our country under national environmental policy?
- b) Write an account on outcome of Stockholm conference.

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

- a) What is the role of united nations authorities to protect global environment?
- b) Discuss the salient features of national water policy.

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

- a) What are environmental ethics? Discuss various issues associated with environmental ethics.
- b) What is meant by sustainable development? Discuss important pillars of it.

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

- a) Ethical Theories Applied to Environment.
- b) Issues of Sustainable Development.



Total No. of Questions :8]

SEAT No. :

**P2195**

[5330]-305

[Total No. of Pages : 2

M.Sc.

**ENVIRONMENTAL SCIENCE**  
**EVSC-307 : Man and Environment**  
**(2013 Pattern) (Semester-III)**

*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 write the relationship between biomes and climate.
- b) Explain the significance of organizational structure in resource management.

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

- a) What is biological growth in population. Explain with suitable examples.
- b) How environmental factors influences the cultural aspects of society.

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

- a) Write in short the density dependent and density independent population regulations.
- b) Write a note on evolution theory of human ecology.

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

- a) Explain the centripetal and centrifugal forces working in human settlement.
- b) Write the ideology and social structure importance in resource management.

**P.T.O.**

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

- a) Explain the importance of demographic factors in regional planning.
- b) Write the significance of environmental factors in business growth.

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

- a) What are the obstacles came accross in human settlement programme.
- b) Write a note on rural economy and barter system.

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

- a) How non targeted organism are influenced in pest management programme?
- b) Explain the significance of sacred grooves in rural ecosystem.

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

- a) What is significance of equitable resource management in sustainable development.
- b) Write a short term and long term conservation planning for better future of human settlement.



Total No. of Questions :8]

SEAT No. :

**P2196**

**[5330]-306**

[Total No. of Pages : 2

**M.Sc.**

**ENVIRONMENTAL SCIENCE**

**EVSC-308 : Environmental Education**

**(Semester-III) (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 briefly about the importance of Environmental Education.
- b) Discuss about the concepts of education for sustainable development at International level.

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

- a) Write a note on “Nai Taleem” with reference to environment education.
- b) Describe briefly the current policies and status of environment education in Indian school systems.

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

- a) Explain the extra-curricular approaches for linking of ‘Sarva Shiksha Abhiyan’ to ESD.
- b) Write a note on ECO-clubs.

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

- a) Express your views on project based learning environmental education at college and university level.

**P.T.O.**

- b) Express views about civil society efforts in the area of natural resource management.

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

- a) Discuss about civil society efforts in the area of health and sanitation.
- b) Explain the role of an educator in environmental education.

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

- a) Describe the development and use of different approaches in the context of environmental education.
- b) Explain the role and use of traditional media in education for sustainable development.

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

- a) Explain the role and use of websites in environmental education.
- b) Explain the role and use of nature camps in education for sustainable development.

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

- a) Participatory techniques in environmental education.
- b) Deliberative techniques in ESD.



Total No. of Questions :8]

SEAT No. :

**P2197**

[5330]-307

[Total No. of Pages : 2

M.Sc.

**ENVIRONMENTAL SCIENCE**

**EVSC 309 : Environmental Biotechnology**

**(2013 Pattern) (Semester-III)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) Answer any five questions.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) All questions carry equal marks.

**Q1)** Answer the following :

- a) Explain the applications of environmental biotechnology in controlling pollution.
- b) Write about biofertilizers and their significance.

**Q2)** Answer the following :

- a) What is phytoremediation? Elaborate on the types.
- b) How do biopesticides help in controlling pollution.

**Q3)** Answer the follows :

- a) What are the different microorganisms involved in composting? Give their roles.
- b) How are microbes classified on the basis of nutrition?

**Q4)** Answer the following :

- a) Explain the microbial growth cycle.
- b) Write about the applications of genetic engineering implant.

**P.T.O.**

**Q5)** Answer the following :

- a) Write a note on microbiological quality of potable water.
- b) Explain the use of bioindicators with examples.

**Q6)** Answer the following :

- a) What is a biosensor and what are its components? Give advantages and limitations of biosensors.
- b) What are biofuels? Write a note on their production.

**Q7)** Answer the following :

- a) Give the methods for determining bacterial count.
- b) Explain the concept of bioremediation with examples.

**Q8)** Write short notes on any two :

- a) Bioindicators
- b) Biomethanation
- c) Biosafety



Total No. of Questions :8]

SEAT No. :

**P2198**

[5330]-308

[Total No. of Pages : 2

M.Sc.

## **ENVIRONMENTAL SCIENCE**

### **EVSC-310 : Environmental Resource Monitoring (Semester-III) (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) Explain the importance and basics for environmental resource monitoring.
- b) What is weather monitoring? Explain the parameters which are include in weather monitoring.

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

- a) Explain the sampling method for ambient air monitoring.
- b) What are the important parameter is to be consider for ambient air quality and why they are important.

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

- a) Explain work zone monitoring technique.
- b) What is the importance of indoor air quality monitoring.

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

- a) What is stack gas? Explain the limits for different industries for stack gas.
- b) Explain the different stack gas parameter under OSHA.

**P.T.O.**

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

- a) Define Noise? Explain the national standard for noise.
- b) Explain the noise impact criteria with respect to investigation and assessment.

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

- a) What are the importance of frequency and parameter for ground water and surface water monitoring?
- b) Differentiate between on site test parameter and off site parameter with suitable example.

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

- a) Explain the guidelines for handling and storage of soil sample.
- b) Explain the method and process to determine the age of trees.

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

- a) Leg (h)
- b) Importance of wetlands.



Total No. of Questions : 8]

SEAT No. :

**P2199**

[5330]-401

[Total No. of Pages : 2

M.Sc.

## **ENVIRONMENTAL SCIENCE**

### **EVSC - 401 : Environmental Toxicology, Health & Safety (2013 Pattern) (Semester - IV)**

*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 are potential safety measures to be consider in chemical industry.
- b) Explain the responsibilities and mitigation strategies in risk management programme.

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

- a) Importance of indoor air quality.
- b) Biotransformation of metals.

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

- a) What are the sources of Arsenic in environment and add its impact on fauna.
- b) What is mutation? Explain its types.

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

- a) Explain the methods for assesment of toxicity.
- b) What are the causes of outburst of water borne discuses?

**P.T.O.**

**Q5)** Briefly explain: [10]

- a) Physiological effects of VOC.
- b) Carcinogenic effects of lead.

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

- a) Explain the role of NGO's in rural sanitation programme.
- b) What are the merits of public participation in safety programme?

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

- a) Explain the importance of Indoor air quality and its standards.
- b) Explain the terms-LC<sub>50</sub>, EC<sub>50</sub>, LD<sub>50</sub> Acute, chronic and subchronic toxicity.

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

- a) Ergonomics
- b) Risk Audit programme



Total No. of Questions : 8]

SEAT No :

**P 2200**

[5330]-402

[Total No. of Pages : 2

M.Sc.

## **ENVIRONMENTAL SCIENCE**

### **EVSC - 402 : Restoration Ecology & Watershed Management (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 Eco-restoration and explain its guiding principles.
- b) How succession cycle is helpful in eco-restoration process?

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

- a) What is ‘Watershed’? Enlist the principles of watershed management.
- b) Give the characteristics of different land use capability classes.

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

- a) ‘Key stone’ species are very significant in restoraty activities.
- b) Farm pond play an important role in drought prone area.

**Q4)** Write a detailed note on following: [10]

- a) Peoples participations in watershed development and management.
- b) Different types of monitoring in watershed project.

**P.T.O.**

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

- a) Discuss in detail, the process of restoration of lakes.
- b) Discuss the major reasons for undertaking eco-restoration activity.

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

- a) Discuss the causes of watershed deterioration.
- b) Explain criteria for selection of plant species for restoration activity.

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

- a) What is ‘soil erosion’? Discuss effects of water & wind erosion.
- b) What are the classes of water? Explain how the capillary water is useful for plant growth.

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

- a) Conservation forestry and agro-forestry.
- b) Wetlands and need of its restoration.



Total No. of Questions : 8]

SEAT No :

**P 2201**

[5330]-403

[Total No. of Pages : 2

M.Sc.

## ENVIRONMENTAL SCIENCE

### EVSC - 403 : Waste & Hazardous Waste Management (2013 Pattern) (Semester-IV)

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

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

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

b) Describe the constraints in solidwaste management. [5]

**Q2)** a) What are the different options for processing of solid waste in India. [5]

b) Describe the possible areas for improvement of solid waste management in India cities. [5]

**Q3)** a) What are the solid waste from thermal powerplants and how are they disposed. [5]

b) Write a note on composting of agricultural wastes. [5]

**Q4)** a) How does reduction help in solid waste management? [5]

b) What is meant by recovery of resources from solid wastes. [5]

**Q5)** a) Write a note on composting? What are its advantages and disadvantages. [5]

b) Draw a schematic diagram of sanitary landfill. [5]

**P.T.O.**

**Q6)** a) Discuss the role of national authorities in solid waste management. [5]

b) What are the different categories of biomedical waste. [5]

**Q7)** a) Describe the characteristics of hazardous waste. [5]

b) Discuss the site selection criteria for hazardous waste disposal site. [5]

**Q8)** a) Discuss the growing problem of electronic waste. How does recycling help in solving the problem. [5]

b) What are the sources of radioactive wastes? How are these wastes managed. [5]



Total No. of Questions :8]

SEAT No. :

**P2202**

[5330]-404

[Total No. of Pages : 2

M.Sc.

## **ENVIRONMENTAL SCIENCE**

### **EVSC-404 : Renewable and Non-Renewable Energy (2013 Pattern) (Semester-IV)**

*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 energy use pattern in India.
- b) Write a note on Energy forms and transformation.

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

- a) Physico-chemical characteristics of coal.
- b) Environmental problems associated with transportation & uses of natural gas.

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

- a) Discuss the production and uses of Bio-gas.
- b) Briefly explain the sources and types of solid-wastes.

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

- a) What are Nuclear Fuels? Discuss their environmental implications.
- b) Briefly discuss about the regulations for deep-sea burial of radioactive waste.

**Q5)** Write notes on : [10]

- a) Solar heaters and cookers.
- b) Energy storage systems and Fuel cells.

**P.T.O.**

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

- a) What is meant by “Wind Power”? Add a note on “harnessing of wind energy”.
- b) Discuss the wind energy potential in India.

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

- a) Explain the hazards of hydroelectricity generation and distribution.
- b) Discuss the impacts of Hydroelectric power generation on Bio-diversity.

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

- a) Problems and prospects of harnessing geothermal energy.
- b) High temperature and low temperature aquifers.



Total No. of Questions :8]

SEAT No. :

**P2203**

[Total No. of Pages :2

**[5330] - 405**

**M.Sc.**

**ENVIRONMENTAL SCIENCE**

**EVSC - 407 : Environmental Economics**

**(2013 Pattern) (Semester - IV)**

*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 social cost? Explain how it affect quality of environment.
- b) How interlinkage between environment and economy protect the environment.

**Q2) Attempt the following.**

**[10]**

- a) What is market failure & discuss its effect on economy.
- b) What is economic instrument? How it protect environment. Explain

**Q3) Answer following questions.**

**[10]**

- a) Incentive and subsidies are obstacles in protection of the environment.  
Justify
- b) What are the methods of valuation of Resources & Explain.

**Q4) Comment on the statement.**

**[10]**

- a) Cost-benefit analysis is tool to understand the development.
- b) Only environmental policies are not sufficient to protect environment.

**P.T.O.**

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

- a) Write in brief importance of renewable resources.
- b) What are the foundations of environmental economics?

**Q6) Justify the following. [10]**

- a) Adaptive change is significant in combating climate change.
- b) Carbon trading is effective too for environmental Management.

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

- a) Why non-renewable resource programme is promoted in India?
- b) What are different impact of population migration?

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

- a) Global warming
- b) sustainable development



Total No. of Questions : 8]

SEAT No. :

**P2204**

[Total No. of Pages : 2

**[5330] - 406**

**M.Sc.**

## **ENVIRONMENTAL SCIENCE**

### **EVSC-406: Forestry and Habitat Management**

**(2013 Pattern) (Semester-IV)**

*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 indicates full marks.*

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

- a) Write in brief biotic components and it's stress on forest ecosystem.
- b) What is Ethnobotany? Explain its importance with cultural and medical aspects.

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

- a) Discuss in short about the duties of Joint Forest Management and Forest dwellers programmes.
- b) Discuss the key practices used in Silvicultural.

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

- a) Explain what is regeneration of forest and its usefulness.
- b) Explain which are silvicultural practices used in Mangroves forest.

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

- a) Soil and water conservation through Forestry.
- b) Techniques required for tree improvement.

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

- a) What are the causes of forest fires and its impacts on forest biodiversity.
- b) How development activities influences on forest system.

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

- a) Discuss in brief about application of Remote Sensing and GIS forest management.
- b) Discuss in brief about economical important spacies in forest management.

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

- a) Explain the methods of processing and disposal of non-timber forest products.
- b) Explain the biological methods for forest protection.

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

- a) Wildlife Protection Act 1972 and its amendments.
- b) Women involvement in forest management.

*EEE*

Total No. of Questions : 8]

SEAT No. :

**P2205**

[Total No. of Pages : 2

**[5330] - 407**

**M.Sc.**

## **ENVIRONMENTAL SCIENCE**

### **EVSC-409: Wildlife Management and Conservation**

**(New 2013 Pattern) (Credit System) (Semester - IV)**

*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 captive breeding? Add a note on role of modern biosciences in wildlife conservation.
- b) Add a note on wildlife diversity in Corbett and Tadoba national park.

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

- a) Discuss the wildlife diversity in major riverine areas of India.
- b) What is importance of Eastern Ghats in relation with wildlife habitat?

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

- a) Discuss the role of forest departments in wildlife management.
- b) Which are the major conservation zones for wildlife in India?

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

- a) Write an account on important legal provisions of wildlife protection in India.
- b) What are protected areas? Add a note in relation with India.

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

- a) What is population ecology? Discuss its importance in wildlife management.
- b) What is mammalogy? Discuss role of these studies in wildlife conservation.

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

- a) Write an account on importance of wild habitats.
- b) Discuss zoogeographical regions of India.

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

- a) Which are various ways in community conservation of wildlife management?
- b) Discuss in detail on wildlife of Western Ghats.

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

- a) Biodiversity Registers.
- b) Zoogeography of the world.

*EEE*

Total No. of Questions : 8]

SEAT No. :

**P2206**

[Total No. of Pages : 2

**[5330] - 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 diagams must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*

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

- a) Explain the metrics of traditional formaing.
- b) Explain the Agriculture research and education.

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

- a) Discuss in brief about importance of agro ecology.
- b) Discuss about the importance of vermiculture in organic forming.

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

- a) Describe in short about intigrated pest management.
- b) Write an account on Agro-pastoralism.

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

- a) Explain the various factors required in extensive live-stock keeping.
- b) Discuss the domestic live-stock ecosystem and marketing.

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

- a) Explain how excess irrigation practice affect the nutrient balance in soil.
- b) Write an brief account on trap crops and bird perches.

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

- a) Discuss the methods of weed management in agriculture.
- b) Discuss the significance of preparation of cropping scheme for any land situations.

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

- a) Describe the macro quality analysis in organic forming.
- b) Describe in brief about green manuring.

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

- a) Enriched Farm Yard Manure.
- b) Holistic Resource Management.

*E E E*