

Total No. of Questions : 7]

SEAT No. :

PE5553

[Total No. of Pages : 2

[6517]-101

F.Y.M.Sc.

ENVIRONMENTAL SCIENCES

**EVSUT - 111 : Environmental Biology and Biodiversity
(2019 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Answer any five questions from Q.2 to Q.7.*

Q1) Answer any five of the following.

[5×2=10]

- a) Define ecotone.
- b) In succession cycle, who are pioneers? Briefly explain their role.
- c) Which are two common sub-types observed in herbivores?
- d) Write any two reasons for Migration observed in birds/animals.
- e) Explain the term ethnology.
- f) Write in brief about food web with example.

Q2) a) Discuss the concept of 'biosphere as an eco-system'.

[7]

b) Explain the concept of carrying capacity and sustainability.

[5]

Q3) a) Describe nitrogen cycle with the help of diagram and discuss its environmental significance.

[7]

b) Define wetlands and discuss its ecological functions.

[5]

Q4) a) Describe the grassland ecosystem of terrestrial biome with the help of its climatic features and plant, animal characteristics.

[7]

b) Write a note on ecological niche and key stone species.

[5]

P.T.O.

- Q5)** a) Write in details about values of biodiversity. [7]
b) What is bio-indicator? Explain the role of bio-indicators in pollution control. [5]
- Q6)** a) Classify micro-organisms. Write in detail about their association with man. [7]
b) Give detailed account of Indian biodiversity and compare it with global diversity. [5]
- Q7)** Write a short notes on any two of the following. [12]
a) Threats to biodiversity and strategy for its conservation.
b) Which environmental factors influences/affects microbes growth? How?
c) Write a note on ecological pyramid.



Total No. of Questions : 7]

SEAT No. :

PE-5554

[Total No. of Pages : 2

[6517]-102

M.Sc. (Part - I)

ENVIRONMENTAL SCIENCE

EVSUT - 112 : Environmental Physics & Chemistry

(2019 Pattern) (4 Credits) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any Five questions from Q.2 to Q.7.

Q1) Answer any Five of the following:

[5 × 2 = 10]

- a) Define the trace element?
- b) Define the term sedimentation?
- c) Define the term Seismology?
- d) Define the term carbon dating?
- e) Define the term Adiabatic lapse rate?
- f) Define the term buoyancy?

Q2) a) What are major & minor element? Explain the methods of analysis of major & minor elements. [7]

b) Explain the principle & working of X-ray diffractions. [5]

Q3) a) What is chemical equilibria? Comment on acid base reaction? [7]

b) Calculate the molecular & equivalent weight of ferric sulphate. [5]

Q4) a) Explain the reversible & irreversible reactions of water. [7]

b) Comment upon application of nuclear material to nuclear energy. [5]

P.T.O.

- Q5)** a) Explain polarized light plane polarized light and partially polarized light. [7]
b) What is thermodynamics? Explain the law of thermodynamics. [5]
- Q6)** a) What is fluid & fluid mechanics? Explain in detail. [7]
b) What is COD? Explain its Environmental significance. [5]
- Q7)** Solve any two of the following.
- a) Coagulation [6]
b) ICPAES [6]
c) Organic Functional groups [6]



Total No. of Questions : 7]

SEAT No. :

PE-5555

[Total No. of Pages : 2

[6517]-103

M.Sc.

ENVIRONMENTAL SCIENCE

EVSUT 113 : Earth Ocean and Atmospheric Sciences

(2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *Q. 1 is compulsory*
- 2) *Answer any five questions from Q. 2 to Q. 7.*

Q1) Answer Any Five of the following :

[5 × 2 = 10]

- a) What is significance of recharge area for aquifers.
- b) What is vadose water.
- c) What is significance of O horizon of soil
- d) Role of Evapo-transpiration in Hydrogen cycle. Explain
- e) What cause generation of ocean currents.
- f) Define aerosols.

Q2) a) Describe the green house effect.

[7]

b) Explain how volcanic eruptions shape earth.

[5]

P.T.O.

- Q3)** a) Explain process of desertification. [7]
b) Land capability classification is significant for soil conservation. Justify. [5]
- Q4)** a) Discuss in detail the earth's radiation budget. [7]
b) Elaborate on the role of depositional processes in formation of land forms. [5]
- Q5)** a) Discuss in detail the characteristics of drainage basin [7]
b) Soil humus plays important role in soil genesis. Explain. [5]
- Q6)** a) Discuss in detail spheres of Earth. [7]
b) Discuss hemispheric transport of Air pollution. [5]
- Q7)** Write short notes on any two of the following : [2 × 6 = 12]
a) The energy system and its balance [6]
b) Vertical stratification of water column with respect to temperature and pressure. [6]
c) Metamorphic Rock [6]



Total No. of Questions : 7]

SEAT No. :

PE-5556

[Total No. of Pages : 2

[6517]-104

M.Sc.

ENVIRONMENTAL SCIENCES
EVSUT-114 : Environmental Statistics
(2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 is compulsory.*
- 2) *Answer any 5 questions from Q2 to Q7.*
- 3) *Statistical tables/graph paper will be provided in request.*
- 4) *Use of non-scientific calculator is allowed.*

Q1) Answer any five of the following :

[5 × 2 = 10]

- a) State various graphical presentation of data. Which measures of central tendency will be determined from graphs?
- b) Define width of class interval. How to determine the number of classes for collected data by investigator?
- c) What is meant by skewness of distribution? State the types of Skewness.
- d) A student obtained the two regression lines as $2x - 5y - 7 = 0$ and $3x + 2y - 8 = 0$. Do you agree with him?
- e) The mean and S.D. of 100 observations are 50 and 10 respectively. Find the new mean and standard deviation (S.D.) if 2 is subtracted from each observation.
- f) If C.V. = 40 and variance = 400 then find arithmetic mean? How C.V. is useful for comparison of two distributions?
- f) What do you understand by dispersion? How range is calculated for grouped frequency distribution.

Q2) a) What is regression? Write down equations of two regression lines? Why there exist two lines of regression lines? State any three properties of regression coefficients. **[7]**

- b) The mean and standard deviation of 20 items are found to be 10 and 2 respectively. At the time of checking it was found that one item 8 was incorrect. Calculate mean and standard deviation if the wrong item is omitted. **[5]**

P.T.O.

Q3) a) What is meant by correlation? Give the types of correlation. Describe the scatter diagram method to study correlation. [7]

b) Mean and variance at 12 items are 22 and 9 respectively. Later on it was found that an item 32 was wrongly taken as 23. Compute the correct mean and coefficient at variation. [5]

Q4) a) What is time series? Describe in brief various components of time series. State various methods to measure trend in time series? [7]

b) The equations $40X - 18Y - 214 = 0$ and $8X - 10Y + 66 = 0$ are the lines of regression of X on Y and Y on X respectively. [5]

Find

i) Mean values of X and Y

ii) Correlation coefficient between X & Y.

Q5) a) What is measure of central tendency? State various measures of central tendency. Show that the sum of the deviations of given set of observations from their mean is zero with example. [7]

b) The scores made by candidates in a certain test are normally distributed with mean 50 and S.D. 10. What percentage of the candidates receives scores less than 40. [5]

Q6) a) What is test of significance? Define Type - I & Type - II error. Explain t-test to see difference between means of two samples. [7]

b) Draw $\bar{X}$ - chart and comment on the state of control of the process for 10 samples of size 5 each. [5]

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean ($\bar{X}$)	43	49	37	44	45	37	51	46	43	47

(Given for $n = 5$, $A_2 = 0.58$)

Q7) Write short note on any two of the following : [12]

a) Normal Probability distribution

b) Population Growth Model

c) R-mode and ϕ -mode factor analysis



Total No. of Questions : 7]

SEAT No. :

PE-5458

[Total No. of Pages : 2

[6517]-201

First Year M.Sc.

ENVIRONMENTAL SCIENCE

EVSUT-121 : Water & Soil Pollution : Management & Mitigation

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 compulsory.*
- 2) *Answer any questions from Q.No.2 to Q.No.7*

Q1) Answer any five of the following:

[10]

- a) Which inorganic pollutants responsible for water pollution?
- b) What is ex-situ techniques of groundwater remediation?
- c) Mention any four remedial measures of fresh water pollution?
- d) What is oil extraction?
- e) What are the sources of soil pollution?
- f) Define Bio-Slurpping.

Q2) a) What are biological water pollutants? Mention its sources and some ways to control of it. **[7]**

b) What is artificial recharging? How do we implement it? **[5]**

Q3) a) What is Biosurfactant? How it is useful tool for the Bioremediation? **[7]**

b) What are the impacts of disposal of municipal solid waste on land? **[5]**

Q4) a) How mining activities responsible for soil erosion? Mention in short any case study related to it. **[7]**

b) What are booms and skimmers? How do we collect spilled oil with the help of it? **[5]**

P.T.O.

- Q5)** a) How do coastal processes results in salt water intrusion? What are its effects? [7]
b) What does ballast water mean? How it will destroy the local ecosystem? [5]
- Q6)** a) What is marine water pollution? What are its main types and mention any four sources of it. [7]
b) What is the difference between in-situ and ex-situ bioremediation? [5]
- Q7)** a) What are the three zones of ground water explain it in detail. Mention any five ways which can pollute ground water? [7]
b) What are the types of agricultural waste? How does it affect the soil? [5]



Total No. of Questions : 7]

SEAT No. :

PE-5459

[Total No. of Pages : 2

[6517]-202

First Year M.Sc.

ENVIRONMENTAL SCIENCE

EVSUT-122 : Air, Noise & Radiation Pollution

Management & Mitigation

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Answer any five question from Q.No.2 to Q.No.7.*

Q1) Answer any Five of the following:

[5×2=10]

- a) Give the atmospheric composition of air.
- b) What is principle of wet scrubber?
- c) What is radiation pollution?
- d) How CO affects on human health?
- e) What is Lea in noise?
- f) Define half-life.

Q2) a) How air pollution dispersion affected by weather parameters? **[7]**

b) Write a note on strategies used to control the vehicular pollution. **[5]**

Q3) a) Explain in detail about determination of SO₂ in ambient air. **[7]**

b) Write a note on Bhopal gas tragedy. **[5]**

Q4) a) What are the sources of noise pollution? What are the national standards of noise? **[7]**

b) Write in brief about vertical thermal structure of atmosphere. **[5]**

P.T.O.

- Q5)** a) Write in detailed about management of radioactive waste. [7]
b) Write in brief about mitigation measures of noise pollution. [5]
- Q6)** a) What is principal and working of 'cyclone'? Give the advantages of cyclone as air pollution control equipment with labelled diagram. [7]
b) Write in brief about radiation measurement units. [5]
- Q7)** Write short notes on any two of the following: [12]
a) Scintillation counter
b) Polar stratospheric cloud formation
c) Noise monitoring methods



Total No. of Questions : 7]

SEAT No. :

PE-5460

[Total No. of Pages : 2

[6517]-203

First Year M.Sc.

ENVIRONMENTAL SCIENCE

EVSUT-123 : Environmental Law, Ethics & Policy

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Answer any 5 question from Q.No.2 to Q.No.7.*

Q1) Answer any five of the following:

[5×2=10]

- a) State the article 48A & 51A(g).
- b) Write any two principles of Rio declaration.
- c) What is meant by “Techno centric View”.
- d) Mention three role of CBD.
- e) Explain how policy as a instrument is important in Environment Protection.
- f) Write any four functions of MPCB.

Q2) a) What is the concept of Eco sensitive zone and legal measures to prevent it. **[7]**

b) Write a short note on Ram Bar Convention. **[5]**

Q3) a) What are the outcomes of Air Act of 1981; Roles and Power of CPCB & SPCB in prevention and Control of Air Pollution. **[7]**

b) Explain the role of NGT in Environmental Protection. **[5]**

Q4) a) Discuss Hazardous Waste Rule and its role in Environment Protection. **[7]**

b) Write a short note on Basel Convention & Obligations under it. **[5]**

P.T.O.

- Q5)** a) Discuss the silent features of Indian Forest Act, 1927. [7]
b) Explain the role of UNEP in Environment Protection. [5]
- Q6)** a) What is Ethical dilemma & challenges in Environment Protection. [7]
b) Discuss the role of NBA in environment protection and conservation.[5]
- Q7)** a) Explain the role of various International Organizations in achieving Sustainable Development. [7]
b) What are the important aspects to enhance and protect environment through EPA 1986. [5]



Total No. of Questions : 7]

SEAT No. :

PE-5461

[Total No. of Pages : 2

[6517]-204

First Year M.Sc.

ENVIRONMENTAL SCIENCE

EVSUT-124 : Water and Wastewater Technology

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Attempt any five questions from Q.No.2 to Q.No.7.

Q1) Answer any five of the following:

[5×2=10]

- a) Define a Arithmetical progression and geometrical progression forecasting.
- b) What is nitrification and denitrification?
- c) Write a need of water quality standards for domestic purpose.
- d) Write a importance of screen chamber and grit removal in ETP.
- e) What is difference between sewage and effluent?
- f) Write a importance of waste water treatment plant.

Q2) a) Explain a various source of fresh water. Write down the quality of surface and ground water. [7]

b) Draw the water treatment flow chart and brief the process. [5]

Q3) a) Explain a various solids present in water and write down its impact on human health. [7]

b) Write a process of (Galvanizing industry and its wastewater characteristics). [5]

P.T.O.

- Q4)** a) Write a role of microbes in wastewater treatment, brief the aerobic and anaerobic microbes. [7]
- b) Write a note (any two): [5]
- i) Sedimentation of water
 - ii) Collection and Pumping of water
 - iii) Chlorination
- Q5)** a) Write down the water born disease and its importance of public health perspective, also write its impact on Socioeconomics. [7]
- b) Write a note (any two): [5]
- i) Rotating biological contactors
 - ii) Fluidized bed reactor
 - iii) CSTR reactor
- Q6)** a) What are primary and secondary sludge? Explain sludge disposal method via composting and sludge cake. [7]
- b) Draw a flow diagram for pulp and paper industrial ETP and Gives the appropriate lable. [5]
- Q7)** a) If the inlet effluent has a 1200 mg/l BOD. Primary treatment unit are reduced BOD upto 60% at anaerobic treatment. Calculate the inlet BOD of effluent @ aeration tank and design the volume of aeration tank by considering MLSS-3000 mg/l at flow 400m³/day and F/m = 0.2. [7]
- b) Write down the specification of treated waste water disposal of irrigation on land. [5]



Total No. of Questions : 7]

SEAT No. :

[Total No. of Pages : 2

PE5557

[6517]-301

S.Y.M.Sc.

ENVIRONMENTAL SCIENCE

EVSUT 231 : EIA & Environmental Audit

(2019 Pattern) (Semester-III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any 5 questions from Q.2 to Q.7.*

Q1) Answer any five of the following.

[5×2=10]

- a) What is the main purpose of Environmental Impact Assessment (EIA)?
- b) What are the key components of Environmental Audit?
- c) Explain the term 'baseline data' in the context of EIA.
- d) How does public participation enhance the EIA process?
- e) Define the term 'scoping' in EIA. Why is it important?
- f) Discuss any two flows of EIA process.

Q2) a) Discuss the Environmental impacts of large-scale dam projects and their socio-economic implications. **[7]**

b) Evaluate ecological impacts of the mining sector and suggest mitigation strategies. **[5]**

Q3) a) Explain the role of EIA in mitigating the effects of urbanization on the environment. **[7]**

b) How can EIA contribute to sustainable resource management? Provide examples. **[5]**

Q4) a) What methodologies are used for social impact assessment (SIA)? Discuss their relevance. **[7]**

b) Explain the difference between qualitative and quantitative impact assessments. **[5]**

P.T.O.

Q5) a) Identify and analyze the potential environmental impacts of a new highway construction project. [7]

b) Assess the potential impacts of climate change on infrastructure projects. [5]

Q6) a) Discuss the significance of monitoring and evolution in EIA process. [7]

b) What role do environmental guidelines play in the EIA process? [5]

Q7) Write short notes on any two of the following. [12]

a) The importance of stake holder engagement in the EIA process.

b) Strategies for minimizing waste generation in EIA projects. (Industrial projects).

c) The relationship between EIA and environmental policy development.



Total No. of Questions : 7]

SEAT No. :

PE-5558

[Total No. of Pages : 2

[6517]-302

M.Sc. (Part - II)

ENVIRONMENTAL SCIENCE

EVSUT - 232 : Remote Sensing & GIS

(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any Five questions from Q.2 to Q.7

Q1) Answer any Five of the following:

[5 × 2 = 10]

- a) How does Remote Sensing is differ from Traditional Surveying?
- b) What are main component of Remote Sensing?
- c) What is passive remote sensing?
- d) What is Temporal resolution of Images?
- e) What is supervised classification?
- f) Give name of first indian sattelite launched in space.

Q2) a) Discussed the component of electromagnetic spectrum used in remote sensing. [7]

b) Explain the importance of spatial resolution in sattelite imagery. [5]

Q3) a) Explain the working of active remote sensing. Give suitable examples.[7]

b) What are advantages of using remote sensing over traditional ground based method. [5]

Q4) a) Describe the process of map digitization using GIS Techniques. [7]

b) Explain the difference between raster & vector data in GIS. [5]

P.T.O.

- Q5)** a) Discuss the role of GIS in addressing various environmental issues. [7]
b) Analyse the role of Digital elevation model in GIS. Discuss its application in various fields. [5]
- Q6)** a) Explain in detail factors given interpretability of an image. Discuss factors influencing image analysis. [7]
b) Explain the role of GPS in field studies using RS & GIS Techniques. [5]
- Q7)** Answer any two of the following. [2 × 6 = 12]
a) Drone mapping
b) Use of RS & GIS in air monitoring
c) History of Remote Sensing.



Total No. of Questions : 7]

SEAT No. :

PE-5559

[Total No. of Pages : 2

[6517]-303

M.Sc.

ENVIRONMENTAL SCIENCE

**EVSUT 233 : Restoration Ecology and Watershed Management
(2019 Pattern) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *Q. 1 is compulsory*
- 2) *Answer any five questions from Q. 2 to Q. 7.*

Q1) Answer Any Five of the following :

[5 × 2 = 10]

- a) What is the main objective of ecosystem restoration?
- b) What is watershed? Give any two principles of watershed.
- c) What is 'Reference site/ecosystem' in restoration process?
- d) Write about any two traditional methods of water harvesting.
- e) What is 'Key stone species'? Write in brief about its importance in restoration process.
- f) Write in brief about any two major problems associated with watershed management.

Q2) a) Discuss the importance of water balance and hydrologic equation. **[7]**

b) Explain the methodology of contour survey. **[5]**

P.T.O.

- Q3)** a) What is 'ecological succession? How will it be useful in restoration process? [7]
- b) Discuss the methods commonly used for restoration of urban biodiversity. [5]
- Q4)** a) Explain the useful principles in case of restoration of degraded grassland ecosystem. [7]
- b) Why 'Wetlands' are important? Also explain the methodology of restoration of Wetlands. [5]
- Q5)** a) Why bunding is one of the important activity of water shed management? Also explain different types of bunds. [7]
- b) Write in detail about watershed functions. [5]
- Q6)** a) Discuss the importance of soil and its conservation in watershed management project. [7]
- b) What is 'Live Hedg'? Why it is important in watershed project? [5]
- Q7)** Write short note on any two of the following : [2 × 6 = 12]
- a) Check dam and Gabion structure.
- b) Project monitoring and result indicators of watershed.
- c) Restorations of dumping grounds.



Total No. of Questions : 5]

SEAT No. :

PE-5938

[Total No. of Pages : 1

[6517]-304R
M.Sc.
ENVIRONMENTAL SCIENCE
EVSUT-235 : Environmental Management EMS, Life Cycle
Assessment
(2019 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q. 1 is compulsory.*
- 2) *Answer any 3 questions from Q.2 to Q.5.*

Q1) Answer any five of the following. **[5]**

- a) What do you mean by Environmental Management.
- b) What is "Check" MEM's?
- c) Write any one purpose of LCA.
- d) Write any one benefit of ED.
- e) What is mean by "Reuse" in circular economy?
- f) What is mean by "Act Model" in EMS?

Q2) a) Explain different goals of EMS. **[6]**

b) Write a note on social values of circular economy. **[4]**

Q3) a) Explain different disadvantages of linear economy. **[6]**

b) Explain Review and Stage of EMS. **[4]**

Q4) a) Explain variant of LCA cradle to gate. **[6]**

b) How do ED apply in Developmental planning? **[4]**

Q5) Write a short notes on any two of the following : **[10]**

- a) Role of government in circular economy.
- b) Principles of Environmental Design
- c) Explain the background of ISO-14000



Total No. of Questions : 5]

SEAT No. :

PE-5561

[Total No. of Pages : 2

[6517]-305

M.Sc.

ENVIRONMENTAL SCIENCE

**EVSUT-236 : Environmental Resource Monitoring
(2019 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q. 1 is compulsory.
- 2) Answer any 3 questions from Q.2 to Q.5.

Q1) Answer any five of the following.

[5]

- a) What is environmental resource monitoring?
- b) How can tree age be estimated?
- c) Differentiate between sound and noise.
- d) What is GBH in forestry?
- e) What is dB?
- f) What are the challenges in environmental monitoring?

Q2) a) How is the information obtained from monitoring utilized in the formulation of policies? [6]

- b) What are the key parameters measured in weather monitoring? Discuss any one in details. [4]

Q3) a) Discuss the wildlife monitoring techniques. [6]

- b) Define Noise? Give the national standards for noise. [4]

P.T.O.

- Q4)** a) Discuss the role of soil analysis in environmental management. [6]
b) Explain the details about water sampling techniques. [4]

Q5) Write short notes on any two of the following: [10]

- a) Principle and working of ambient fine dust sampler.
- b) Remote sensing
- c) Soil profile.



Total No. of Questions : 7]

SEAT No. :

PE-5462

[Total No. of Pages : 2

[6517]-401

First Year M.Sc.

ENVIRONMENTAL SCIENCE

**EVSUT-241 : Solid & Hazardous Waste Management
(2019 Pattern) (Semester - IV)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any 5 questions from Q.No.2 to Q.No.7*

Q1) Answer any five of the following: **[10]**

- a) Define Lactate and factors responsible for lactate production (any two)
- b) Which parameters determine in ultimate analysis?
- c) What are the major constituents of solid waste?
- d) What are the purpose of source reduction?
- e) Enlist the factors affecting solid waste management.
- f) Define hazardous waste. Give any two characteristics.

Q2) a) Explain in detail solid waste management in pulp and paper industries. **[7]**

b) Explain in detail about transfer station and its benefits. **[5]**

Q3) a) What are the characteristics of hazardous waste? How does it affect on Environment? **[7]**

b) Explain in detail different types of separation technique. **[5]**

Q4) a) Explain in detail source based classification of solid waste. **[7]**

b) Explain in detail different environmental effects of improper solid waste management. **[5]**

P.T.O.

- Q5)** a) Elaborate the factors that influence the waste collection system. [7]
b) Explain in detail physical and chemical treatment of hazardous waste. [5]
- Q6)** a) Explain in detail different incineration technologies. [7]
b) What are the different steps in solid waste management system. [5]
- Q7)** Write short notes on any two of the following. [12]
a) Composting
b) Collection green
c) Recycling



Total No. of Questions : 7]

SEAT No. :

PE-5463

[Total No. of Pages : 2

[6517]-402

S.Y. M.Sc.

ENVIRONMENTAL SCIENCE

**EVSUT-242 : Renewable and Non Renewable Energy
(2019 Pattern) (Semester - IV)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Answer any five question from Q.No.2 to Q.No.7.

Q1) Answer any Five of the following:

[5×2=10]

- a) Define energy and write why energy conservation is needed?
- b) Explain the advantages of renewable energy.
- c) What are fuel cells?
- d) Explain nuclear fission with example.
- e) What is tidal energy?
- f) What is penstock?

Q2) a) Write a note on energy usage as an indicator for development. What are its environmental impacts? **[7]**

b) Write a note on the integration of renewable energy and its necessity.**[5]**

Q3) a) Explain about the process of formation of fossil fuels. Add a note on their classification with examples. **[7]**

b) Write about the ways in which solar energy can be utilized in homes. Give examples. **[5]**

Q4) a) Explain the ways of utilizing biomass energy. Differentiate between pyrolysis and gasification. **[7]**

b) What are the environmental impacts of using nuclear energy. **[5]**

P.T.O.

Q5) a) What are the different types of hydropower generation? Explain with diagrams. [7]

b) Explain the working of a wind turbine with diagram. What are the types of wind turbines? [5]

Q6) a) What is geothermal energy? How is it harnessed? Explain any one process. [7]

b) Explain the different ways of utilizing ocean energy. [5]

Q7) Write short notes on any two of the following: [12]

a) Fossil fuels and global warming

b) Decentralized energy generation

c) Nuclear fuel cycle



Total No. of Questions : 5]

SEAT No. :

PE-5464

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S.Y. M.Sc.

ENVIRONMENTAL SCIENCE

**EVSUT-244 : Environmental Toxicology, Health and Safety
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Answer any 3 question from Q.No.2 to Q.No.5.*

Q1) Answer any five of the following:

[5×1=5]

- a) What is chronic effect?
- b) What legislation covers PPE?
- c) Define LC₅₀ & LD₅₀.
- d) What is the basic definition of safety?
- e) What is the main objective of risk assessment?
- f) What is human immune system?

Q2) a) How safety, health and environment aspect are important in industry?[6]

b) Explain various steps involved in Disaster Management. [4]

Q3) a) What is relation between toxicology and environment? How is toxicity measured? [6]

b) What are the potential safety measures to be consider in chemical industry? [4]

Q4) a) Enlist the waterborne diseases. What measures should take to prevent them? [6]

b) What are various hazard reduction strategies? [4]

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Impact of Anti-Cancer drug on human health.
- b) Roll of NGO's in handling of hygiene issue and public awareness.
- c) Effects of heavy metals on health.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

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S.Y. M.Sc.

ENVIRONMENTAL SCIENCE

EVSUT-245 : Environmental Economics

(2019 Pattern) (Semester - IV)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Answer any 3 question from Q.No.2 to Q.No.5.*

Q1) Answer any Five of the following:

[5×1=5]

- a) Enlist renewable resources.
- b) What is the full form of NNP?
- c) What is subsidy?
- d) Define Green GDP.
- e) What is FDI?
- f) What are public goods?

Q2) a) Define social cost and discuss the problems associated with social cost with examples. **[6]**

b) Differentiate between renewable and non-renewable resources. **[4]**

Q3) a) Describe interlinkages between economy and the environment. **[6]**

b) What are the reasons of market failure explain in detail. **[4]**

Q4) a) Write in brief Indian perspectives of environmental economics. **[6]**

b) Explain different types of externalities with examples. **[4]**

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Valuation of resources.
- b) Foreign Direct Investment
- c) Problems of Social Cost.



Total No. of Questions : 5]

SEAT No. :

PE-5466

[Total No. of Pages : 2

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S.Y. M.Sc.

ENVIRONMENTAL SCIENCE

EVSUT-247 : Environmental Biotechnology and
Nanotechnology

(2019 Pattern) (Semester - IV)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*

Q1) Answer any five of the following: [5]

- a) State any one application of Environmental Biotechnology.
- b) Define Phytoremediation.
- c) XRD stands for?
- d) State any one example of biofuel.
- e) What is RNA?
- f) What is nano walls?

Q2) a) Write a note on Biosafety. [6]

b) Explain scope of Environmental nanotechnology. [4]

Q3) a) Explain any one chemical method for nanoparticle synthesis. [6]

b) What is molecular cloning? Explain in brief. [4]

Q4) a) How to use Biosensors in detecting environmental pollution? Explain it. [6]

b) Describe Environmental Nanotechnology - Historical perspective. [4]

P.T.O.

Q5) Write a short notes on any two of the following:

[10]

- a) Nano material applications - Risk to ecology.
- b) DNA sequencing technique - Sanger's Dideoxy method.
- c) Ex-situ bioremediation.



Total No. of Questions : 5]

SEAT No. :

PE-5467

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S.Y. M.Sc.

ENVIRONMENTAL SCIENCE

EVSUT:248-Environmental Policy, Climate Change &
Sustainability

(2019 Pattern) (Semester - IV)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q.1 is compulsory.
- 2) Answer any 3 questions from Q.2 to Q.5.

Q1) Answer any five of the following **[5×1=5]**

- a) Which two sectors considered major contributor for carbon emission?
- b) What was the CO₂ level in pre-industrial era & in 1990?
- c) How tree rings act as a climate proxies?
- d) What is the ongoing extinction event called?
- e) Which organization assesses climate change science?
- f) How does urbanization contribute to climate change.

Q2) a) Explain the role of Volcanism and plate tectonics in influencing Earth climate **[6]**

- b) Analyze the sectorial impacts of climate change on human health and agriculture. **[4]**

Q3) a) Explain the role of green house gases in Earth atmosphere. How do sources and sinks of GHGS affect climate dynamics? **[6]**

- b) What is UNFCCC? Explain its role in climate change mitigation. **[4]**

Q4) a) What are carbon credits and how do they incentivize industries to reduce carbon emissions? **[6]**

- b) What were the key outcomes of the kyoto protocol? **[4]**

P.T.O.

Q5) Write short notes on any two of the following

[10]

- a) Carbon footprint
- b) Stockholm Declaration 1972
- c) Palaeoclimatology.

