

Total No. of Questions : 7]

SEAT No. :

PE-4695

[Total No. of Pages : 2

[6517]-1
M.Sc.
ENVIRONMENTAL SCIENCES
ENV-501-MJ : Fundamentals of Environmental Biology &
Biodiversity
(2023 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) Which are major abiotic components of a forest ecosystem?
- b) What is territoriality?
- c) Which is the second community in succession?
- d) Give any two reasons for migration of animals.
- e) Which factors determines the population dispersal?
- f) Write in brief about bioindicators?

Q2) a) Explain in detail about how biosphere act as an ecosystem. **[7]**

b) Define 'Wetland' and discuss ecological functions of wetlands. **[5]**

Q3) a) Discuss the energy fixation process in an ecosystem, and its flow using 'Y' shaped model. **[7]**

b) How animals communicate? Explain this behavior with examples. **[5]**

Q4) a) Discuss the important environmental challenges and adaptations of plants & animals of marine biome. **[7]**

b) Write about courtship and parental care its types and behavior traits in detail with example. **[5]**

P.T.O.

Q5) a) Explain the values of biodiversity and write about different major threats to the biodiversity. [7]

b) Draw nitrogen cycle and explain the entire process. [5]

Q6) a) Classify micro-organisms and write about association of microbes with man. [7]

b) Write in detail about five major forest types observed in India. [5]

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

a) Carrying capacity and sustainability.

b) Role of micro-organisms in bio remediation processes.

c) K-Selected and r-selected species.



Total No. of Questions : 7]

SEAT No. :

PE-4696

[Total No. of Pages : 2

[6517]-2

M.Sc.

ENVIRONMENTAL SCIENCE

ENV 502 MJ : Fundamentals of Environmental Physics & Chemistry
(NEP) (2023 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

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

Q1) Answer Any Five of the following :

[10]

- a) Define “Surfact tension”
- b) Define filtration.
- c) Define polarisation & Diffraction of light.
- d) What is rotiat energy?
- e) What is throttling process?
- f) What is the use of chemical equations in chemical reactions.

Q2) a) Expalin the elemental cycle (oxygen) & its environmental significance.[7]

- b) Explain in detail about different properties of fluid.

[5]

P.T.O.

- Q3)** a) Explain the concept of cation & anion in water with example. [7]
b) Explain “Doppler effect”. [5]
- Q4)** a) Explain principle, working, construction & applications of UV-Spectrophotometry. [7]
b) Explain in detail “Carnot cycle”. [5]
- Q5)** a) Differentiate between Nuclear fission and Nuclear fusion and give its applications. [7]
b) Define radiation & its unit, what are effect of radiation on human health & environment. [5]
- Q6)** a) Explain in detail about solubility of gases in water. [7]
b) What is Acid-base reaction? [5]
- Q7)** Write short note on any two of the following : [12]
a) Filtration and coagulation.
b) Flame photometry.
c) Elemental cycles of Carbon & Sulphur.



Total No. of Questions : 5]

SEAT No. :

PE-4697

[Total No. of Pages : 2

[6517]-3

M.Sc.

ENVIRONMENTAL SCIENCES

ENV-503 MJ : Environmental Statistics

(NEP 2023 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Answer any three questions from Q2 to Q5.

Q1) Fill in the blanks and write the sentence (any five) :

[5 × 1 = 5]

- a) Median is the average suited for _____ classes.
- b) The mean and S.D. of 100 observations are 50 and 10 respectively, the new mean = _____ and S.D. = _____, if 2 is subtracted from each observation and then it is divided by 5.
- c) Variance is the _____ value of mean square deviation.
- d) If correlation coefficient between two variables is – 0.84 and value of regression coefficient $b_{yx} = -1.2$ then $b_{xy} =$ _____.
- e) Seasonal variations are short - term variations with period _____.
- f) The distribution of variable x is normal given as

$$f(x) = \text{constant} \times e^{-\frac{1}{2}\left(\frac{x-100}{5}\right)^2} \quad -\infty < x < \infty \text{ then mean deviation} = \underline{\hspace{2cm}}$$

Q2) a) What are two methods of presentation of data? State difference between diagrams and graphs. How frequency distribution are represented through graph. [6]

b) Find third quartile (Q_3) for the following data [4]

Value	10	15	20	25	30	35	40
Frequency	5	10	25	30	20	15	2

P.T.O.

Q3) a) Define the normal distribution and state important properties of normal distribution. **[6]**

b) Find the missing frequency, if the arithmetic mean is 28 for the data given below. **[4]**

Profit per shop	0-10	10-20	20-30	30-40	40-50	50-60
No. of shops	12	18	27	-	17	6

Q4) a) A sample of 100 dry better cells tested to find the length of life, produced the result $\bar{x} = 12$ hrs $\sigma = 3$ hrs. Assuming that data are normally distributed, what percentage of battery cells are expected to have life . **[6]**

i) More than 15 hours

ii) Less than 6 hours

b) What is dispersion? State the methods of measures of dispersion. Which measure of dispersion is best? **[4]**

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

a) Regression analysis techniques.

b) Test of significance for goodness of fit

c) Skewness and Kurtosis



Total No. of Questions : 5]

SEAT No. :

PE-4698

[Total No. of Pages : 2

[6517]-4

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 505 MJ : Fundamentals of Atmospheric Sciences

(2023 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Answer any Three questions from Q.2 to Q.5*
- 3) *Q.2 to Q.5 carry equal marks.*

Q1) Answer any five of the following:

[5 × 1 = 5]

- a) List any two weather parameters?
- b) What is term Thermohaline?
- c) What is Hadley's Cell?
- d) What is derosal?
- e) What is Fronts?
- f) What is Walker Circulation?

Q2) a) Write detail note on plume Behaviour.

[6]

b) Explain exploitation of Hydrocarbons.

[4]

Q3) a) Describe vertical stratification of water column.

[6]

b) Explain Atmospheric Instability.

[4]

Q4) a) What is Greenhouse effects? Describe it.

[6]

b) What are various longterm climatic effects.

[4]

P.T.O.

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

[10]

- a) Modification of Air masses.
- b) National Air Quality Standards.
- c) Intercontinental Transport of air pollutants.



Total No. of Questions : 5]

SEAT No. :

PE-4699

[Total No. of Pages : 2

[6517]-5
M.Sc.
ENVIRONMENTAL SCIENCES
ENV 506 MJ : Fundamentals of Geo Sciences
(2023 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

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

Q1) Answer any five of the following :

[5 × 1 = 5]

- a) State Darcy's Law
- b) Draw a diagram of Internal Structure of earth.
- c) What is aquitard?
- d) What is surface runoff?
- e) What is storativity of aquifer?
- f) Give examples of Aeolian landforms.

Q2) a) Explain in detail Hydrological cycle.

[6]

b) Explain landslides and slope failures.

[4]

P.T.O.

- Q3)** a) Discuss in detail the physical and chemical properties of soil. [6]
b) Discuss in detail urban geology. [4]
- Q4)** a) Discuss in detail process and agents of weathering. [6]
b) Discuss methods of groundwater recharge. [4]
- Q5)** Write short notes on any two of the following : [10]
a) Drainage Basin
b) Soil classification
c) Mass wasting



Total No. of Questions : 5]

SEAT No. :

PE-4700

[Total No. of Pages : 2

[6517]-6

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 507 MJ : Sustainable Development

(NEP) (2023 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Answer any Three questions from Q.2 to Q.5*
- 3) *Q.2 to Q.5 carry equal marks.*

Q1) Answer any five of the following:

[5]

- a) Define Sustainable Development.
- b) What is UN?
- c) What is 3rd Sustainable Development Goal?
- d) What is Soil Pollution?
- e) Define Ecosystem.
- f) What is Sustainability conflicts.

Q2) a) Write note on WCED.

[6]

b) Explain environmental dimensions to sustainable development.

[4]

Q3) a) What are current natural challenges in sustainable development?

[6]

b) Explain UN's efforts in Sustainable Development.

[4]

Q4) a) Explain UN SDG's structure.

[6]

b) Terrestrial Ecosystem.

[4]

P.T.O.

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

[10]

- a) Ecosystem restoration - Developmental needs
- b) Conflicts in rural sustainable Development with respect to sustainability.
- c) Village Social hierarchy.



Total No. of Questions : 5]

SEAT No. :

PE-4701

[Total No. of Pages : 2

[6517]-7

M.Sc.

ENVIRONMENTAL SCIENCE

ENV 508 MJ : Environmental Education

(NEP) (2023 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

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

Q1) Answer Any Five of the following :

[5 × 1 = 5]

- a) Define sustainability?
- b) What is sustainable development?
- c) Define Environmental Education?
- d) What is 3 R's?
- e) What is mass media?
- f) What is mean by competence

Q2) Answer the following :

- a) What is the significance of EE and ESD in achieving sustainable development? **[6]**
- b) What are the traditional and community based approaches to teaching and learning in EE and ESD? **[4]**

P.T.O.

Q3) Answer the following :

- a) What is the current status of EE and ESD in Indian school systems. **[6]**
- b) What is the importance of teacher orientation for EE and ESD? **[4]**

Q4) Answer the following :

- a) What are the policies and approaches to public awareness in the context of EE, ESD and CEPA? **[6]**
- b) What is the role of educator and facilitator in EE and ESD? **[4]**

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

- a) Communication campaigns.
- b) Critical thinking.
- c) Evaluation of EE and ESD programmes.



Total No. of Questions : 5]

SEAT No. :

PE-4702

[Total No. of Pages : 2

[6517]-8

M.Sc.

ENVIRONMENTAL SCIENCES

ENV-510 RM : Research Methodology

(NEP 2023 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Answer any three questions from Q2 to Q5.
- 3) Q2 to Q5 carry equal marks.

Q1) Answer any five from the following :

[5]

- a) What do you mean by copyright?
- b) What is transdisciplinary approach of research?
- c) Give any two citation style used in reference citation.
- d) Give any two names of antiplagiarism softwares.
- e) What do you mean by degerit water sampling.
- f) Name any four primary sources or Literature survey.

Q2) a) Define Research. Give its objectives & characteristics.

[6]

b) Give detailed outline or scientific power point presentation.

[4]

Q3) a) What are the categories or literature review? Give its purpose and importance.

[6]

b) What is research design? Give its type & characteristics.

[4]

P.T.O.

- Q4)** a) What is mixed method research approach. Explain its various types. **[6]**
b) What is purpose of scientific research writing? Give types of formats used for scientific writing. **[4]**

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

- a) Inter disciplinary Research
- b) Correlational research design
- c) Data interpretation



Total No. of Questions : 7]

SEAT No. :

PE-4703

[Total No. of Pages : 2

[6517]-21

M.Sc.

ENVIRONMENTAL SCIENCES

ENV 551 MJ : Water & Soil Pollution : Management &
Mitigation
(2023 Pattern) (Semester - II)

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) What are the major sources of ground water pollution?
- b) Define BOD and COD and how they are measured?
- c) What is acid rain? Mention its effects on the environment.
- d) List four advantages of using constructed wetlands for wastewater treatment.
- e) What are the causes of land degradation.
- f) Explain the process of thermal remediation.

Q2) a) How does Freshwater get polluted? Describe in detail biological pollutants and their impact on human health. [7]

b) What is the need for water quality standards. Give information on water quality standards. [5]

Q3) a) What is ground water restoration? Explain Ex-situ techniques used in groundwater remediation. [7]

b) What are coastal aquifers? What causes saltwater intrusion into coastal aquifers? [5]

Q4) a) Explain in detail the role of microorganisms in heavy metal transformation. [7]

b) Discuss the specification of effluents to be disposed on land. [5]

P.T.O.

Q5) a) Define marine pollution. Explain in detail the impact of deep mining and oil extraction on oceans. [7]

b) What is the yield of an aquifer? Add a note on slug and pumping tests. [5]

Q6) a) Define sustainable development. Explain its principles. [7]

b) What are the benefits of rainwater harvesting? [5]

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

a) What is industrial solid waste? Add a detailed note on different waste disposal methods.

b) What are the wastes generated in paper and pulp industry and how do they cause pollution?

c) Describe various policies and laws for environmental protection.



Total No. of Questions : 7]

SEAT No. :

PE-4704

[Total No. of Pages : 2

[6517]-22

M.Sc.

ENVIRONMENTAL SCIENCE

ENV-552 MJ : Air, Noise & Radiation Pollution : Management & Mitigation

(2023 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Answer any 5 questions from Q2 to Q7.

Q1) Answer any five of the following :

[5 × 2 = 10]

- a) Give the composition of the earth's atmosphere.
- b) What is the effect of gaseous pollutants on human health?
- c) Enlist the NAAQS for any 4 criteria pollutants.
- d) Define radioactivity and give its units.
- e) Describe A Weighted sound level.
- f) Explain the working principle of cyclone.

Q2) a) What are the strategies used to control air pollution? Explain any one in detail. [7]

b) Explain the difference between point and non point sources of air pollution. [5]

Q3) a) Write about the equipments used for controlling gaseous pollution with their working principle. [7]

b) Explain the working of incineration and its role in air pollution control. [5]

P.T.O.

- Q4)** a) What is noise pollution? What are the different impacts of noise on humans? [7]
b) Explain how noise can be controlled by design. [5]
- Q5)** a) Write in detail about the health hazards associated with radiation. What are the protection measures used? [7]
b) Write in detail about respirable dust samples. [5]
- Q6)** a) Describe the sampling and estimation of ambient Nox. [7]
b) Write a note on scintillation counter. [5]
- Q7)** Write short notes on any two : [12]
a) AERB classification.
b) Source Path Receiver concept.
c) Bhopal gas tragedy.



Total No. of Questions : 5]

SEAT No. :

PE-4705

[Total No. of Pages : 2

[6517]-23

M.Sc.

ENVIRONMENTAL SCIENCES

ENV - 553 MJ : Environmental Law

(2023 Credit Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question 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) What is the purpose of the forest (conservation) Act, 1980?
- b) Mention any two environmental protection acts in India.
- c) What is the main goal of the paris climate agreement?
- d) Define - Extended Producer Responsibility (EPR).
- e) Name any one law related to biodiversity conservation in India.
- f) What is the objective of the coastal regulation zone notification 2018?

Q2) a) Discuss the legal principles underlying the water (Prevention and control of pollution) act 1974. [6]

b) What are the major challenges in implementing environmental laws in India? [4]

Q3) a) Explain the legal provisions of the Biological Diversity Act, 2002. [6]

b) What are the objectives and significance of the energy conservation Act, 2001? [4]

P.T.O.

- Q4)** a) Describe the importance and rules of E-Waste Management in India. **[6]**
b) What are the key elements of the kyoro protocol and it's impact on global climate policy? **[4]**

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

- a) CITES
- b) Basel Convention
- c) Agenda 21



Total No. of Questions : 5]

SEAT No. :

PE-4706

[Total No. of Pages : 2

[6517]-24

M.Sc.

ENVIRONMENTAL SCIENCES

ENV 560 MJ : Water & Wastewater Basic

(2023 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

Q1) Answer any five of the following :

[5 × 1 = 5]

- a) Why is aeration necessary before sedimentation?
- b) Mention any two methods used in water softening.
- c) What is the primary function of filtration in water treatment?
- d) What is the graphical projection method useful for short term prediction?
- e) Define Reverse Osmosis.
- f) What is per capita water demand?

Q2) a) Discuss the major physical & chemical parameters used in water quality analysis. [6]

b) Write in short about how activated carbon helps in odor & color removal in water. [4]

Q3) a) Explain the need for water quality standards for domestic & industrial purpose. [6]

b) Write a note on coagulation and flocculation process. [4]

Q4) a) Describe the process of nitrification and denitrification in wastewater treatment. [6]

b) Explain the geometrical progression method for population forecasting. [4]

P.T.O.

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

[10]

- a) BIS drinking water standards.
- b) Seasonal variation in water demand.
- c) Purpose of demineralization in water treatment.



Total No. of Questions : 5]

SEAT No. :

PE-4707

[Total No. of Pages : 2

[6517]-25
M.Sc.
ENVIRONMENTAL SCIENCE
ENV 562 MJ : Environmental Management
(2023 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

- 1) *Q. 1 is compulsory.*
- 2) *Solve any three questions from Q. 2 to Q. 5.*
- 3) *Questions 2 to 5 carry equal marks.*

Q1) Solve Any Five of the following :

[5]

- a) What is EMS ?
- b) What is 'CHECK' in EMS?
- c) Define circular economy?
- d) What is ISO 14000?
- e) Name one key step in conducting LCA
- f) State one key objective of environmental design.

Q2) a) Write note on EMAS-European union.

[6]

b) Explain purpose of EMS.

[4]

P.T.O.

- Q3)** a) Explain motivation in environmental design. [6]
- b) What is cradle to grave variant of LCA? Explain it. [4]
- Q4)** a) Explain role of government in circular economy. [6]
- b) Explain cost associated with EMS. [4]
- Q5)** Write short note on any two of the following : [10]
- a) Importance of policies in enabling circular economy.
- b) Cradle to cradle variant of LCA.
- c) Environmental design for manufactured products.



Total No. of Questions : 5]

SEAT No. :

PE4708

[Total No. of Pages : 2

[6517]-26

First Year M.Sc.

ENVIRONMENTAL SCIENCE

**ENV 561 MJ : Water & Wastewater Technology - II (Advanced)
(2023 Credit Pattern) (NEP) (Semester - II)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Answer any 3 questions from Q.2 to Q.5.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer any five of the following.

[5×1=5]

- a) Define a sewage and write a note on its impact on water bodies.
- b) Define BOD and COD.
- c) Explain physical and chemical properties of sewage.
- d) What is solid in wastewater? Brief it's impact on fresh water .
- e) What is rotating biological contactor?
- f) Explain unit operation and unit process.

Q2) a) What is trickling filter and draw a sketch with appropriate title? **[6]**

b) Write a note on anaerobic digestion and hybrid type digester. **[4]**

Q3) a) Draw a flow chart of Dairy industrial wastewater treatment plant. **[6]**

b) Write a note on UASBR. **[4]**

P.T.O.

Q4) a) What are the importance of preliminary and primary treatment in STP?
Explain the function of screen chamber. **[6]**

b) Explain the working of stabilization pond. **[4]**

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

a) Gives a effect of Galvanizing industrial effluent on water bodies.

b) Role of microorganism in wastewater treatment plant.

c) Moving Bed Bioreactor (MBR).



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PE4709

[6517]-27

F.Y.M.Sc.

ENVIRONMENTAL SCIENCE

ENV 563 MJ: International Environmental Law

(2023 Credit Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Answer any 3 questions from Q2 to Q5.*

Q1) Answer any five of the following.

[5×1=5]

- a) What is mean by Hazardous Waste?
- b) In which year was the stockholm conference on human environment held?
- c) Which international agreement is related to Ozone layer?
- d) Which year was the kyoto protocol adopted?
- e) What was the main outcome of stockholm conference?
- f) Which protocol regulates the movement of hazardous waste across borders.

Q2) Answer the following.

[10]

- a) Discuss the significance of the montreal protocol in ozone layer protection. **[6]**
- b) Explain how the Ramsar convention helps in biodiversity conservation.**[4]**

Q3) Answer the following.

[10]

- a) Describe the key aspects of the 'UNFCCC'and it's impact on global climate policies. **[6]**
- b) Write short note on 'World Charter for Nature'. **[4]**

P.T.O.

Q4) Answer the following. [10]

- a) Describe the paris agreement 2015 and it's significance in tackling climate change. [6]
- b) Explain the Role of the international solar Alliance in promoting sustainable energy. [4]

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

- a) Rio-declaration [5]
- b) Intergenerational equity [5]
- c) Montreal protocol [5]



Total No. of Questions : 7]

SEAT No. :

PE-4710

[Total No. of Pages : 2

[6517]-31

M.Sc.

ENVIRONMENTAL SCIENCE

ENV 601 MJ : Environmental Impact Assessment and

Environmental Audit

(2023 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) State the principle of Rio declaration associated with EIA process.
- b) What is the main purpose of any EIA study?
- c) State any two major flaw/limitations of EIA process.
- d) What is ISO 14000? Why is it important?
- e) Write in brief about screening stage of EIA process.
- f) State the framework of basic structure of an audit.

Q2) a) Discuss the causes and impact of highway project on its surrounding natural and social environment. **[7]**

- b) Suggest appropriate plan for ambient air quality (AAQ) monitoring and water quality monitoring. **[5]**

P.T.O.

- Q3)** a) Explain in detail, the generic structure of EIA report, Elaborate the aspects covered under chapter 2 and 3 according to the generic structure. [7]
- b) Write about advantages and drawbacks of public hearing process. [5]
- Q4)** a) What is 'checklist' method? Explain it in detail. [7]
- b) Which are the guiding principles of EIA? [5]
- Q5)** a) Prepare a detailed environment management plan (EMP) for an open cast iron ore mining project, considering probable impacts. [7]
- b) Discuss in detail about environmental audit and compliance audit. [5]
- Q6)** a) What are the impacts of river valley development (construction of dam/s) on land use, ecology & socio-economy of site surrounding area? [7]
- b) What is the difference in baseline data and post project monitoring. Also write about importance of both. [5]
- Q7)** Write a short note on any two of the following : [2 × 6 = 12]
- a) Pollution and hazardous waste audit.
- b) Consumption and solid waste audit
- c) History of EIA process & notifications in India.



Total No. of Questions : 7]

SEAT No. :

PE-4711

[Total No. of Pages : 2

[6517]-32
M.Sc.
ENVIRONMENTAL SCIENCE
ENV 602 MJ : Remote Sensing & GIS
(2023 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 wavelength range of NIR radiation?
- b) What is long form of LIDAR?
- c) What is focal length in areal photograph?
- d) What do you mean by non spatial data?
- e) Why georeferencing is important in GIS studies?
- f) Give fullform of NavIC.

Q2) a) Explain various image enhancement techniques used remote sensing studies. **[7]**

b) Explain the concept of spectral signature. **[5]**

P.T.O.

- Q3)** a) Discuss the various applications of RS & GIS in urban planning. [7]
b) How do EMR interacts with different materials? [5]
- Q4)** a) What are key differences in between optical and microwave remote sensing? [7]
b) Explain the concept of projections. Why they are important? [5]
- Q5)** a) Describe the role of GPS in integration of GIS & remote sensing. [7]
b) Explain the different types of GIS data analysis techniques. [5]
- Q6)** a) What steps are involved in creation of GIS map? [7]
b) How can GIS and RS be integrated for study of land use change detection? [5]
- Q7)** Write a short note on any two of the following : [2 × 6 = 12]
a) Radiation law
b) Sun synchronus polar orbit.
c) Layer digitization



Total No. of Questions : 5]

SEAT No. :

PE-4712

[Total No. of Pages : 2

[6517]-33

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 603 MJ : Watershed Management

(2023 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 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) How do watershed characteristics affect water flow? (any two)
- b) How does vegetation affect watershed management.
- c) Define - Drainage line survey.
- d) Define - watershed and give it's significance.
- e) Give any two examples of water harvesting projects in India.
- f) What is Soil texture.

Q2) a) Discuss the impact of land use change on watershed hydrology. [6]

b) Describe - Hydrological survey of water shed management. [4]

Q3) a) Describe - The Role of community involvement in the Success of watershed management of program. [6]

b) How can watershed management help in improving agricultural productivity? [4]

P.T.O.

- Q4)** a) Explain vertical distribution of ground water. [6]
b) Give Brief on - Traditional Water harvesting structures. [4]

- Q5)** Write short notes on any two of the following: [10]
a) Characterization of watershed management.
b) Designing and layout of watershed management system.
c) Watershed management functions.



Total No. of Questions : 5]

SEAT No. :

PE-4713

[Total No. of Pages : 2

[6517]-34

M.Sc.

ENVIRONMENTAL SCIENCE

ENV 610 MJ : Enviornmental Resource Monitoring

(2023 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

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

Q1) Answer Any Five of the following :

[5 × 1 = 5]

- a) Which are the weather popometers?
- b) Write any two methods of water sampling?
- c) Which instruments used to collect air samples at the workplace?
- d) What is GBH in forestry?
- e) Which formula use to determine stock height on the basis of SO₂ emission?
- f) What is the forest inventory?

Q2) a) Write about AAQ sampling location selection criteria add note on principle of ambient fine dust sampled [6]

b) How to mitigate industrial noise? [4]

P.T.O.

Q3) a) Explain in detail about techniques used in wildlife monitoring. **[6]**

b) What are the general standards of trade effluent discharge in water bodies? **[4]**

Q4) a) Discuss the role of Soil analysis in environmental management. **[6]**

b) Explain in the details about water sampling techniques. **[4]**

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

a) Soil profile

b) Stack sampling

c) NAAQS



Total No. of Questions : 5]

SEAT No. :

PE-4714

[Total No. of Pages : 2

[6517]-35

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 612 MJ : Restoration Ecology

(2023 Credit Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 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) Define Bioremediation.
- b) What is reference site.
- c) What are invasive species.
- d) Define Succession.
- e) What is passive restoration?
- f) Give examples of references for restoration.

Q2) a) Threat assessment is important for successful restoration. Justify. [6]

b) Discuss role of Miyawaki method in urban biodiversity restoration. [4]

Q3) a) Discuss in detail steps involved in restoration of ground water resources.[6]

b) Why do invasive plants and animals pose a challenge to restoration.[4]

P.T.O.

- Q4)** a) Explain the process for restoration of hills. [6]
b) Explain a suitable restoration plan for lake ecosystem. [4]
- Q5)** Write short notes on any two of the following. [10]
a) Ecological Restoration
b) Role of pioneer species in restoration
c) Restoration of forest patches.



Total No. of Questions : 5]

SEAT No. :

PE-4715

[Total No. of Pages : 2

[6517]-36

M.Sc.

ENVIRONMENTAL SCIENCES

ENV-614-MJ : Forestry and Wildlife Management

(2023 Pattern) (NEP) (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 :

- a) Define Forestry and habitat management. [1]
- b) Enlist types of Silviculture. [1]
- c) Why wood preservation is important. [1]
- d) How is the girth of tree measured? [1]
- e) What is cost benefit analysis? [1]
- f) What is mean by mining? [1]

Q2) Answer the following :

- a) Explain in detail scope, Need and terminologies of Forestry? [6]
- b) Discuss the role of etnanobotany in Forestry. [4]

Q3) Answer the following :

- a) Define silviculture. Explain Traditional and advance methods of silviculture. [6]
- b) What is social Forestry? Explain scope and objectives of Social Forestry. [4]

Q4) Answer the following :

- a) What is Environmental conservation? Explain components and principles of conservation? [6]
- b) Explain Need of wood seasoning and preservation? [4]

P.T.O.

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

- a) National Forest policy. [5]
- b) Industrialization policies. [5]
- c) Objectives of Forest Inventory. [5]



Total No. of Questions : 7]

SEAT No. :

PE-4716

[Total No. of Pages : 2

[6517]-41

M.Sc.

ENVIRONMENTAL SCIENCES

ENV 651 MJ : Solid & Hazardous Waste Management
(2023 Pattern) (Semester - IV)

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) What are the different methods of volume reduction.
- b) Define Biogasification & give its two benefits.
- c) Name any three types of hazardous waste.
- d) Mention different categories of Biomedical waste.
- e) Define solid waste. What are its components?
- f) What is the purpose of waste segregation?

Q2) a) What is the role of transfer stations in solid waste management & how do they improve efficiency? [7]

b) How does improper waste disposal impact the environment? [5]

Q3) a) Explain how climate affects different stages of solid waste management? [7]

b) Discuss the environmental & economic benefits of using pyrolysis for waste treatment. [5]

Q4) a) Define radioactive waste. What are its sources & how is it classified? [7]

b) How can individuals contribute to reducing plastic waste? [5]

Q5) a) Explain in detail solid waste management in sugar industry? [7]

b) What are the advantage & disadvantage of composting. [5]

P.T.O.

- Q6)** a) Explain in detail source based classification of solid waste. [7]
b) What are Environmental & Public health impact of improper solid waste management. [5]

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

- a) Landfilling.
- b) '3R' Principle.
- c) Composting



Total No. of Questions : 7]

SEAT No. :

PE-4717

[Total No. of Pages : 2

[6517]-42

M.Sc.

ENVIRONMENTAL SCIENCES

ENV 652 MJ : Renewable & Non-Renewable Energy
(2023 Credit Pattern) (Semester - IV)

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) What is meant by energy efficiency?
- b) Define the term "Carbon footprint".
- c) Name two significant sources of Geothermal energy.
- d) What are the environmental benefits of using biofuel?
- e) Explain the role of decentralised renewable energy system.
- f) What is the main difference between primary & secondary energy sources?

Q2) a) Discuss the global and national energy use pattern. Explain its implications for sustainability. [7]

b) What are the challenges in transitioning from non-renewable to renewable energy sources? [5]

Q3) a) Discuss different types of bioenergy & its applications. [7]

b) Explain the concept of energy plantation. Give its role in sustainable energy production. [5]

Q4) a) Describe the working of Nuclear power plant with a schematic diagram. [7]

b) Discuss the safety and environmental concern related to nuclear energy. [5]

P.T.O.

Q5) a) Explain the principal and applications of solar thermal power generation. [7]

b) What are advantages of using concentrated solar power system. [5]

Q6) a) Describe the importance of small-scale hydroelectric project in rural electrification. [7]

b) What are the social and environmental impact of large dam project. [5]

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

a) Energy storage & fuel cell technology.

b) Ocean thermal energy conversion (OTEC)

c) Role of policy and regulation in promoting renewable energy.



Total No. of Questions : 5]

SEAT No. :

PE-4718

[Total No. of Pages : 2

[6517]-43

M.Sc. (Part - II)

ENVIRONMENTAL SCIENCE

ENV - 653 MJ : Environmental Design and Planning

(2023 Credit Pattern) (Semester - IV)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 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) Enlist any two benefits of environmental design.
- b) What is Life Cycle assessment?
- c) Explain the concept of green building.
- d) What is meant by equitable development?
- e) How does Willingness to Pay impact planning?
- f) Give two domains used in environmental design for development planning.

Q2) a) What are the key principles of environmental design?

[6]

b) Discuss the internal and external drivers of environmental design.

[4]

Q3) a) Describe the considerations in life cycle stages of a product for environmental design.

[6]

b) Explain the adverse effects of lack of environmental planning.

[4]

P.T.O.

- Q4)** a) Explain the important issues in environmental planing. **[6]**
b) Discuss the role of different stakeholders in environmental planning and development. **[4]**

- Q5)** Write short notes on any two of the following. **[10]**
a) Eco indices
b) Concept of carrying capacity
c) Rate of utilization and regeneration.



Total No. of Questions : 5]

SEAT No. :

PE-4719

[Total No. of Pages : 2

[6517]-44

M.Sc.

ENVIRONMENTAL SCIENCES

ENV - 660 MJ : Industrial Health & Safety

(2023 Pattern) (Semester - IV)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 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) What are the five major hazards in the workplace?
- b) Give two examples of airborne bacteria.
- c) What are the most common target organs in toxicity?
- d) What is Risk?
- e) What is Biological Warfare?
- f) Define LD50.

Q2) a) How important are safety, health and environmental aspects in the industry?

[6]

b) Explain the various steps involved in Disaster management.

[4]

Q3) a) Write in details about the safety management measures for controlling noise pollution in industry?

[6]

b) Explain the various methods used to study toxicity.

[4]

P.T.O.

- Q4)** a) Explain mechanical hazard with appropriate example. [6]
b) Which are the factors influence toxicity? [4]

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

- a) Impacts of Anti-cancer drug on human health.
b) Mock drill
c) Risk Analysis.



Total No. of Questions : 5]

SEAT No. :

PE-4720

[Total No. of Pages : 2

[6517]-45

M.Sc.

ENVIRONMENTAL SCIENCES

ENV 662 MJ : Environmental Biotechnology &

Nanotechnology

(2023 Pattern) (Semester - IV)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

Q1) Answer any five of the following :

[5 × 1 = 5]

- a) What are enzymes?
- b) Define microbial fuel cells.
- c) What is composting?
- d) Mention one advantage of bioplastics.
- e) Define green chemistry.
- f) What is the use of biosurfactants?

Q2) Answer the following :

[10]

- a) Explain the process of wastewater treatment using microbes. [6]
- b) What are the advantages of biofertilizers? [4]

Q3) Answer the following :

[10]

- a) Describe the role of fungi in bioremediation. [6]
- b) What is the importance of biohydrogen? [4]

Q4) Answer the following :

[10]

- a) How are nanoparticles used in medicine? [6]
- b) Explain the benefits of nanotechnology in agriculture. [4]

P.T.O.

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

- a) Uses of biochar. **[5]**
- b) Importance of probiotics. **[5]**
- c) Role of genetically modified bacteria in pollution control. **[5]**



Total No. of Questions : 5]

SEAT No. :

PE4721

[Total No. of Pages : 2

[6517]-46

S.Y.M.Sc.

ENVIRONMENTAL SCIENCES

**ENV 661 MJ : Environmental Policy, Climate Change
(2023 Credit Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Answer any 3 questions from Q.2 to Q.5.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer any five of the following.

[5×1=5]

- a) What is carbon foot prints?
- b) Which are the major paths (methods) of carbon sequestration?
- c) Which fluorinated gasses (f-gasses) responsible for climate change?
- d) How to reduce grey water foot prints?
- e) Which climate change related convention was tabled & discussed in 1992's Rio summit?
- f) What is the role of IPCC in action against climate change?

Q2) a) What are the likely impacts of climate change on coastal areas and water resources? **[6]**

b) Elaborate on the concept of carbon foot print and discuss carbon credit system used in carbon trading. **[4]**

Q3) a) Discuss the climate change related actions with respect to Kyoto (1997) & Paris agreement 2015. **[6]**

b) Which are the important measures currently practiced in energy sector on climate change? **[4]**

P.T.O.

- Q4)** a) Discuss the important health issues likely due to climate change. [6]
b) In an action on climate change which measures will you suggest to your villagers? [4]

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

- a) Impact of climate change on biodiversity
- b) Acidification of seas & oceans
- c) Water foot prints

