

Total No. of Questions : 7]

SEAT No. :

**PD3518**

[Total No. of Pages : 2

**[6483]-101**

**M.Sc. - I**

**ENVIRONMENTAL SCIENCE**

**ENV-501-MJ: Fundamentals of Environmental Biology & Biodiversity  
(2023 Credit Pattern) (Semester - I)**

*Time : 3 Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Q.1 is compulsory.*
- 2) *Answer any 5 questions from Q.2 to Q.7.*

**Q1)** Answer any five of the following.

**[5×2=10]**

- a) How does the biosphere help support life?
- b) Why ecotone is called zone of tension?
- c) What are the environmental factors for plant growth?
- d) Why oxygen is necessary for microbial metabolism?
- e) What is the consumptive value of the biodiversity?
- f) How do climate and biomes interact?

**Q2)** a) Explain in detail with diagram and example of ecological pyramid. **[7]**

b) Differentiate between grazing and detritus food chain why would they both be present in the same ecosystem? **[5]**

**Q3)** a) How many main types of species interactions occur among organisms in an ecosystem? **[7]**

b) What are the environmental factors that affect population dynamics? **[5]**

**Q4)** a) Define Ecological succession. Explain in detail Xerosere model of succession. **[7]**

b) What are the factor affecting microbial bioremediation? **[5]**

**Q5)** a) What is the global & Indian status of biodiversity? **[7]**

b) What factors influences the carrying capacity of the environment? **[5]**

**P.T.O.**

**Q6)** a) How vegetation types in India make the country mega diverse. [7]

b) What are the major ecological functions of wetland? [5]

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

a) How do you set circadian rhythm?

b) K-selected and r-selected species.

c) Trophic levels.



Total No. of Questions : 7]

SEAT No. :

[Total No. of Pages : 2

**PD3519**

**[6483]-102**

**M.Sc. - I**

**ENVIRONMENTAL SCIENCE**

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

*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 can be detected by using AAS?
- b) Define COD & BOD.
- c) Mention any four properties of fluids.
- d) Define Radio nuclides.
- e) What are the two advantage of ICP - AES technique?
- f) What are the effects of radiation on living tissue?

**Q2)** a) Explain in detail principal, construction & working of flame photometer.[7]

b) Differentiate between Reversible & irreversible reactions. [5]

**Q3)** a) Explain in detail about the phase transformation with suitable example.[7]

b) Define X-ray, what are its applications? [5]

**Q4)** a) Explain in detail about oxygen cycle & its environmental significance.[7]

b) What are the applications of Nuclear technology. [5]

**Q5)** a) What is the principle of UV-Visible spectro photometer. Give its applications with advantage & disadvantage. [7]

b) Explain in detail about Reflection & Refraction. [5]

**P.T.O.**

**Q6) a)** Explain NAA technique in detail. **[7]**

b) What are the factors affecting solubility of gases? **[5]**

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

a) Radiant Energy

b) Polarization of light

c) X-ray diffraction



Total No. of Questions : 5]

SEAT No. :

**PD3520**

[Total No. of Pages : 2

**[6483]-103**

**First Year M.Sc.**

**ENVIRONMENTAL SCIENCES**

**ENV-503-MJ : Environmental Statistics**

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

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates:*

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

**Q1)** Answer any five of the following :

**[5×1=5]**

- a) When frequency distribution is said to be negatively skewed?
- b) State example of continuous random variable.
- c) Define the range for the continuous frequency distribution.
- d) What is time series?
- e) Give control limits for mean chart.
- f) Which of the following variables are discrete?
  - i) Temperature of patient
  - ii) Length of room
  - iii) Age on last birthday
  - iv) Number of flowers in plants

**Q2) a)** What is meant by measures of central tendency? State various measures of central tendency? Write down requirements of ideal measures of central tendency? **[6]**

- b) You are given  $\bar{X} = 40, \bar{Y} = 50, \sigma_x = 2.5, \sigma_y = 3.50$  and  $r = 0.80$ . Obtain the equation at two regression lines. Also obtain the best estimate of X when Y = 45 and that of Y when X = 55. **[4]**

**P.T.O.**

**Q3) a)** What is meant by correlation? Give the types of correlation. State any two properties of correlation coefficient? Write down mathematical formula to determine correlation coefficient by Karl Pearson's method. [6]

b) Draw ogive curve and hence find quartile deviation. [4]

|                 |    |    |     |     |     |
|-----------------|----|----|-----|-----|-----|
| Marks less than | 10 | 20 | 30  | 40  | 50  |
| No. of Students | 20 | 47 | 101 | 145 | 160 |

**Q4) a)** What is dispersion? Distinguish between the absolute and relative measures of dispersion. State different measures of dispersion. State the importance of coefficient of variation. [6]

b) The mean annual salary of all employees in a company is Rs. 25,000/-. The mean salaries of male and female employees are Rs. 27,000 and Rs. 17,000 respectively. Find the ratio as well as percentage of male and female employed by the company. [4]

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

- a) Normal probability distribution
- b) Regression analysis techniques.
- c) Population growth model.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 1

**PD3521**

**[6483]-104**

**M.Sc. - I**

**ENVIRONMENTAL SCIENCE**

**ENV-505-MJ: Fundamentals of Atmospheric Sciences  
(2023 Credit Pattern) (Semester - I)**

*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) Define air masses.
- b) What is AQI?
- c) What is the concept of lapse rate?
- d) What is insolation?
- e) What is solar constant?
- f) What is condensation?

**Q2)** a) Define Aerosols. Add note on role of aerosols in earth system. **[6]**

b) What are the consequences of Global warming? **[4]**

**Q3)** a) Explain the term local wind and geo-trophic wind. **[6]**

b) Comment on 'Indian Monsoon'. **[4]**

**Q4)** a) Give in brief cloud classification and characteristics. **[6]**

b) Discuss the Earth's radiation budget. **[4]**

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

- a) Hadley cell
- b) 'ITCZ'
- c) EI - Nino



Total No. of Questions : 5]

SEAT No. :

PD-3522

[Total No. of Pages : 2

[6483]- 105

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 506 MJ : Fundamentals of Geosciences

(2023 Pattern)(Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

- 1) Question.1 is compulsory.
- 2) Solve any three questions from Question No.2 to Question No.5.
- 3) Question No.2 to Question No.5 carry equal marks.

**Q1) Attempt any Five of the following :**

- a) Give example of 2 minerals derived from Metamorphic Rock. [1]
- b) What do you mean by water logging condition. [1]
- c) Which factors are responsible for formation of sedimentary Rock. [1]
- d) Give one example on Earth related to Sea Floor Spreading. [1]
- e) Define Mass Wasting [1]
- f) Give name of any 2 Coastal Erosional Landforms. [1]

**Q2) Answer the following :**

- a) Explain in detail about Darcy's Law [6]
- b) Explain in short about various spheres of Earth formed after it's origin.[4]

**Q3) Answer the following :**

- a) Write a Note on different erosional & depositional landforms. [6]
- b) Explain with diagram Penck model of Erosion. [4]

**Q4) Answer the following :**

- a) Enlist different 12 types of soil texture. Explain the characteristics of each texture. [6]
- b) Define Watershed. Write different characteristics of watershed. [4]

P.T.O.



**Q5)** Write a short note on Any Two of the following :

**[10]**

a) Types of Aquifers

**[5]**

b) Davis Cycle

**[5]**

c) Physico-chemical properties of soil

**[5]**



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 1

**PD3523**

**[6483]-106**

**First Year M.Sc.**

**ENVIRONMENTAL SCIENCE**

**ENV-507-MJ: Sustainable Development  
(2023 Credit Pattern) (Semester - I) (NEP)**

*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 ecology?
- b) What is mean by SDGs?
- c) What is 8<sup>th</sup> sustainable Development goal?
- d) What is water pollution?
- e) Write any two examples of non renewable resources.
- f) Write any one need of sustainable Development.

**Q2) a) Explain societal Dimention to sustainable Development. [6]**

b) Why sustainable Development needed for present generation. [4]

**Q3) a) What are current political challanges in sustainable Development. [6]**

b) Write note on sustainable economy. [4]

**Q4) a) Explain UN SDGs governance. [6]**

b) WCED - explain it. [4]

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

- a) Marine Ecosystem
- b) Conflicts in rural sustainable Development with respect to rural culture & tradition.
- c) Smart Infrastructure



Total No. of Questions : 5]

SEAT No. :

PD-3524

[Total No. of Pages : 2

[6483]-107

M.Sc.

ENVIRONMENTAL SCIENCES

ENV-510 RM : Research Methodology

(2023 Pattern) (Semester - I)

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates :*

- 1) *Question1 is compulsory.*
- 2) *Answer any 3 questions from Q.2 to Q5*

**Q1) Answer any Five of the following :**

**[5]**

- a) What is research?
- b) What is meant by research design.
- c) Major elements of citation.
- d) Information sources in research.
- e) Define Empirical research.
- f) Components of a research paper.

**Q2) a) What are the characteristics of research.**

**[6]**

b) What are research objectives what should be their characteristics?

**[4]**

**Q3) a) What are the threats and challenges to good research.**

**[6]**

b) Differentiate between fundamental and applied research.

**[4]**

*P.T.O.*

**Q4) a)** What is plagianism? What are it's causes & consequences. **[6]**

b) What are the components of budget in a research proposal? **[4]**

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

a) Types of scientific reports.

b) Bibliography.

c) Transdisciplinary research.



Total No. of Questions : 5]

SEAT No. :

**PD3525**

[Total No. of Pages : 1

**[6483]-108**

**M.Sc. - I**

**ENVIRONMENTAL SCIENCE**

**ENV-508 MJ : Environmental Education**

**(2023 Credit Pattern) (Semester - I)**

*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.

- a) What do you mean by Environmental Education? [1]
- b) What is environmental awareness? [1]
- c) Define pollution? [1]
- d) What is mass media? [1]
- e) Give full form of ESD? [1]
- f) What is formal education. [1]

**Q2)** Answer the following.

- a) Explain in detail importance of EE and ESD? [6]
- b) How can textbooks be used to promote EE? [4]

**Q3)** Answer the following.

- a) What is the role of ESD in environmental protection? [6]
- b) How can civil society efforts contribute to environmental protection?[4]

**Q4)** Answer the following.

- a) What is role of educator and facilitator in ESD? [6]
- b) What is the importance of action learning in ESD? [4]

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

- a) Role and use of traditional and New media. [5]
- b) Teaching learning approaches in EE & ESD. [5]
- c) Communication campaigns. [5]



Total No. of Questions : 7]

SEAT No. :

**PD3526**

[Total No. of Pages : 2

**[6483]-201**

**First Year M.Sc.**

**ENVIRONMENTAL SCIENCE**

**ENV551-MJ: Water and Soil Pollution: Management & Mitigation  
(2023 Credit Pattern) (Semester-II) (NEP)**

*Time : 3 Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) Question 1 is compulsory.
- 2) Solve any 5 questions from Q.2 to Q.7.
- 3) Q.2 to Q.7 carries equal mark.

**Q1)** Answer any five of the following.

**[10]**

- a) Give standard limit of total hardness.
- b) What is groundwater infiltration zone?
- c) Give any two effects of ballast water on marine ecosystem.
- d) What is BOD?
- e) How waste dumping affects air quality?
- f) What is fluorosis?

**Q2)** a) Explain in details drinking water standards.

**[7]**

b) Write a detailed note on characteristics of agriculture waste.

**[5]**

**Q3)** a) Describe strategies used for bioremediation of groundwater.

**[7]**

b) Give detailed account of the pesometer based groundwater monitoring.[5]

**Q4)** a) Discuss social, economic & environmental impacts of off shore drilling.[7]

b) Explain the types, sources & consequences of marine water pollution.[5]

**P.T.O.**

**Q5) a)** Discuss classification of hazardous waste. Highlight its potential impacts on soil pollution. [7]

b) Explain in detail causes & effects of dumping overburden. [5]

**Q6) a)** Explain importance of coastal aquifers. Discuss factors affecting sustainability of aquifers. [7]

b) Write a note on modern technologies used for freshwater management?[5]

**Q7)** Answer any two of the following. [12]

a) Health impacts of water pollution.

b) Induced Infiltration.

c) Microsomes.



Total No. of Questions : 7]

SEAT No. :

**PD3527**

[Total No. of Pages : 2

**[6483]-202**

**First Year M.Sc.**

**ENVIRONMENTAL SCIENCES**

**ENV-552 MJ : Air, Noise & Radiation Pollution:**

**Management & Mitigation**

**(2023 Credit 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) What is dB meter?
- b) Describe 'Absorbed Dose'
- c) Provide the NAAQS for a 24-hour period for the following criteria pollutants :  $PM_{10}$ ,  $PM_{2.5}$ ,  $NO_x$  &  $SO_x$
- d) What is meant by atmospheric stability?
- e) What is working principle of wet scrubber?
- f) Describe Half-life period.

**Q2)** a) Provide a comprehensive overview of the approaches for handling radioactive waste **[7]**

b) What are the national standards of noise for various zones/area? **[5]**

**Q3)** a) What is Noise pollution? Write in brief about control strategies to reduce industrial noise pollution? **[7]**

b) Discuss the issues related to air pollution caused by thermal power plants and the strategies for mitigating these effects. **[5]**

**Q4)** a) Elaborate on the methodology for sampling & estimating ambient fine particulate matter. **[7]**

b) What methods can be employed to minimize noise in the transmission path? **[5]**

**P.T.O.**



- Q5)** a) Define air pollution, add note on effects of air pollution on human health. [7]  
b) Which are the notable air pollution episodes? Write in brief about any one of them. [5]
- Q6)** a) Examine the biological hazards linked to ionizing radiation and provide an analysis of the chernobyl disaster. [7]  
b) Write a note on ICRP recommendations. [5]
- Q7)** Write short notes on any two of the following. [12]  
a) Semi-conductor detector  
b) Ozone hole  
c) Catalytic convertor



Total No. of Questions : 5]

SEAT No. :

**PD3528**

[Total No. of Pages : 1

**[6483]-203**

**M.Sc. - I**

**ENVIRONMENTAL SCIENCE**

**ENV-553-MJ: Environmental Law**

**(2023 Credit Pattern) (Semester - II) (NEP)**

*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 Act recognizes the forest rights and occupation of forest dwelling tribal communities?
- b) Give constitution of Central 200 Authority?
- c) Which Act prohibits use of stream or well for disposal of polluting water?
- d) Wildlife Protection Act provides how many schedules?
- e) Why was Pitambar Pant Committee constituted in 1972?
- f) What is Montreal Protocol?

**Q2)** a) With the help of rules, explain the handling and management of biomedical waste. **[6]**

b) Discuss in detail Eco-sensitive Zones. **[4]**

**Q3)** a) Write in detail the Agenda discussed in the Earth Summit held at Rio in 1992. **[6]**

b) Discuss important provisions of Hazardous Waste Rule. **[4]**

**Q4)** a) How Wildlife (Protection) Act - 1972 is helpful for conservation of wildlife and wild habitat? **[6]**

b) Discuss the objectives and significant provisions of Biological Diversity Act, 2002. **[4]**

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

- a) MARPOL
- b) Paris Climate accord
- c) International Solar Alliance



Total No. of Questions : 5]

SEAT No. :

**PD3529**

[Total No. of Pages : 2

**[6483]-204**

**M.Sc. - I**

**ENVIRONMENTAL SCIENCE**

**ENV 560 MJ : Water and Waste Water Technology**

**(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]**

- a) Define water requirement for domestic purpose.
- b) Name a parameter that indicates the physical quality of water.
- c) Name the chemicals used in the disinfection process of water.
- d) What does 'BIS' stand for in the context of water quality standards.
- e) Mention one method of population forecasting.
- f) What is the principle of Aeration in water treatment.

**Q2)** a) Explain the process of Aeration in water treatment mention the importance of aeration and its types. **[6]**

b) Explain the process of flocculation and sedimentation in water treatment plant. **[4]**

**Q3)** a) Explain the process of demineralization with appropriate diagram. **[6]**

b) Explain the process of nitrification and denitrification. **[4]**

**P.T.O.**

**Q4) a)** Explain the detailed process of municipal water treatment plant with appropriate diagram. **[6]**

b) Explain the arithmetic increase method and geometrical increase method with formulae. **[4]**

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

a) Explain the various parameters impacting the water demand of any city.

b) Explain the need of water quality standards for domestic purposes.

c) Outline the process of flocculation and the types of flocculant's used.



Total No. of Questions : 5]

SEAT No. :

PD-3530

[Total No. of Pages : 2

[6483]-205

M.Sc.

ENVIRONMENTAL SCIENCES

ENV 561 MJ : Water & Waste Water Technology - II (Advanced)  
(2023 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]

- a) Name any two types of anacrohic digestion systems.
- b) Define Chemical Oxygen Demand (COD).
- c) What are the primary sources of wastewater pollution?
- d) Define eutrophication.
- e) Name any two chemical treatment methods for wastewater.
- f) What is the significance of oil & grease removal in wastewater treatment.

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

- a) Describe the stages involved in modern wastewater treatment plant. [6]
- b) Explain the importance of public health perspectives in wastewater management. [4]

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

- a) Draw a flowchart for Dairy industry in wastewater treatment. [6]
- b) Explain the working of fluidized Bed Reactor. [4]

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

- a) Describe the methods of collection & sewerage systems in wastewater management. [6]
- b) Write the advantages & disadvantages of septic tanks. [4]

P.T.O.

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

**[10]**

a) Aerated lagoons.

**[5]**

b) Microbial kinetics wastewater treatment.

**[5]**

c) Sustainable approaches to wastewater reuse & recycling.

**[5]**



Total No. of Questions : 5]

SEAT No. :

**PD3531**

[Total No. of Pages : 2

**[6483]-206**

**M.Sc. - I**

**ENVIRONMENTAL SCIENCE**

**ENV 562 MJ : Environmental Management**

**(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]**

- a) What are the key tools of environmental management?
- b) Compare circular Economy and Linear Economy.
- c) What are the barriers to implementing EMS in industries?
- d) List four key inputs considered in life cycle inventory analysis.
- e) Explain the concept of “design for environment”.
- f) What are the main objectives of environmental management.

**Q2) a)** Describe the “Plan, Do, Check, Act” model in Environmental Management system. **[6]**

b) What are the potential economic benefits for a company implementing an EMS? **[4]**

**Q3) a)** Explain the four stages involved in conducting a life cycle Analysis (LCA). **[6]**

b) Discuss the limitations of using life cycle Analysis as an environmental management tool. **[4]**

**P.T.O.**

**Q4) a)** Discuss the role of stakeholder engagement in the development & implementation of environmental management system. **[6]**

b) “Sustainable development is a journey, not a destination”. Explain this statement in the context of environmental management. **[4]**

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

a) (Principle - Based) - The pollutor pays principle & its implementation.

b) Integrated waste management system.

c) The role of international environmental agreements in global environmental governance.





Total No. of Questions : 5]

SEAT No. :

**PD3532**

[Total No. of Pages : 1

**[6483]-207**

**First Year M.Sc.**

**ENVIRONMENTAL SCIENCE**

**ENV - 563 - MJ : International Environmental Law**

**(2023 Credit Pattern) (Semester - II) (NEP)**

**Time : 2 Hours]**

**[Max. Marks : 35**

**Instructions to the candidates:**

- 1) Question No.1 compulsory.
- 2) Answer any three from Q.2 to Q.5.
- 3) Q.2 to Q.5 carry equal marks.

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

- a) Rio conference was held on which dates?
- b) What is world charter for nature?
- c) What is sustainable development?
- d) What is MARPOL?
- e) State any one principle of International Environmental Law.
- f) What is term precautionary principles?

**Q2) a) Explain paris agreement. [6]**

b) What is montreal protocol? Explain it. [4]

**Q3) a) Write note on National environmental Policy 2006 of India. [6]**

b) Explain Basel convention in brief. [4]

**Q4) a) Describe CITES. [6]**

b) Importance of UNEP. [4]

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

- a) Importance of International solar alliance.
- b) Objectives & Appendices of CITES.
- c) What are benefits of International environmental law?



Total No. of Questions : 7]

SEAT No. :

**PD3533**

[Total No. of Pages : 2

**[6483]-301**

**S.Y.M.Sc.**

**ENVIRONMENTAL SCIENCE**

**ENV-601-MJ: Environmental Impact Assessment and  
Environmental Audit  
(2023 Credit Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Q.1 is compulsory.*
- 2) *Answer any 5 questions from Q.2 to Q.7.*

**Q1) Answer any five of the following questions: [5×2=10]**

- a) Write any two major advantages of EIA process.
- b) Impact due to vibration is observed in which projects? How?
- c) Write in brief, why EIA study should be comprehensive?
- d) What is 'terms of reference' (ToR)? Why it is important in EIA study?
- e) Define environmental audit. Why it is important?
- f) Which is the main feature of 'overlay method' of impact assessment?

**Q2) a) What is social impact assessment? Add a note on methodology used for social impact assessment. [7]**

b) Discuss in detail, guiding principles of EIA. [5]

**Q3) a) Prepare a checklist of major impact causing activities of township project and identify impacts accordingly. [7]**

b) How EIA process evolved? How it is linked with Rio conference of 1992? [5]

**Q4) a) What is environment management plan (EMP)? Explain it with suitable examples of project or activity. [7]**

b) Explain the 'Matrix' method of impact assessment. [5]

**Q5) a) Discuss the impact of coal based thermal power plants on air environmental & ecology. Also suggest appropriate measures to prevent, control and mitigate those impacts. [7]**

b) Is the EIA process too complex and doesn't produce results? What is your view on this statement? [5]

**P.T.O.**

**Q6)** a) Explain the basic structure of environmental audit. Elaborate consumption and pollution audit. [7]

b) Explain the process of public hearing - as per EIA notification 2006. [5]

**Q7)** Write a note on any two of the following.

a) Final appraisal of the project [6]

b) Post project monitoring and its importance [6]

c) ISO 14000 [6]



Total No. of Questions : 7]

SEAT No. :

[Total No. of Pages : 2

**PD3534**

**[6483]-302**

**S.Y.M.Sc.**

**ENVIRONMENTAL SCIENCE**

**ENV-602-MJ: Remote Sensing & GIS**

**(NEP 2023 Credit Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

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

**Q1)** Answer any five of the following.

**[5×2=10]**

- a) What do you mean by raster data?
- b) Give any four applications & RS & GIS in wildlife study.
- c) What is image rectification.
- d) Give any four names of satellite sensors.
- e) What are the types of satellite orbits?
- f) What do you mean by passive remote sensing.

**Q2) a)** How do spatial, spectral, radiometric & Temporal resolution made impact on Quality of image? **[7]**

b) What are platform's? Give its advantages & limitation. **[5]**

**Q3) a)** Discuss the role of GIS & RS in geological studies. **[7]**

b) How data acquisition & processing in differ from each other? **[5]**

**Q4) a)** What is DEM, DSM & DTM? How they are usefull in environmental studies? **[7]**

b) How traditional maps are differ from GIS maps? **[5]**

**Q5) a)** What are the challenges & limitations of Remotesensing & GIS data. **[7]**

b) Explain the concept of Hyperspectral remote sensing. Give its applications. **[5]**

**P.T.O.**

- Q6)** a) Discuss the importance of data visualization techniques in GIS. [7]  
b) What is role of Geoid, spheroid and ellipsoid shapes in GIS studies? [5]

**Q7)** Answer any two of the following. [2×6=12]

- a) LULC
- b) Components of GIS
- c) Overlap in Aerial photo



Total No. of Questions : 5]

SEAT No. :

**PD3535**

[Total No. of Pages : 2

**[6483]-303**

**M.Sc. - II**

**ENVIRONMENTAL SCIENCE**

**ENV-603-MJ : Watershed Management**

**(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.*
- 3) *Figures to the right indicate full marks.*

**Q1)** Answer any five of the following.

**[5×1=5]**

- a) Define - watershed management.
- b) Give any 4 examples of traditional water Harvesting methods.
- c) Give 2 benefits of implementing a watershed management plan in rural areas.
- d) What is Hydrological survey?
- e) What is surface springs (any 2 type).
- f) Why Rain water harvesting is important in watershed management.

**Q2)** a) What are the key elements of a watershed management plan?

**[6]**

b) Describe - problems associated with watershed management.

**[4]**

**Q3)** a) Discuss the impact of land use change on watershed hydrology.

**[6]**

b) Describe the role of community involvement in the success of watershed management programs.

**[4]**

**P.T.O.**

**Q4) a)** Describe engineering surveys involved in watershed development (any two). **[6]**

b) Give brief on - watershed functions. **[4]**

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

a) Water harvesting streams (any two).

b) Watershed features

c) Vertical distribution of ground water



Total No. of Questions : 5]

SEAT No. :

**PD3536**

[Total No. of Pages : 1

**[6483]-304**

**S.Y.M.Sc.**

**ENVIRONMENTAL SCIENCE**

**ENV-610-MJ: Environmental Resource Monitoring  
(2023 Credit Pattern) (Semester - III) (NEP)**

*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) What is soil?
- b) Write any two methods of wildlife census.
- c) Which are the weather parameters?
- d) What is dB?
- e) Which formula use to determine stack height on the basis of SO<sub>2</sub> emission?
- f) Which tools used during soil sampling.

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

b) Write in brief about handling and storing of the soil samples? **[4]**

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

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

**Q4)** a) What are the objectives of water monitoring? **[6]**

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

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

**[10]**

- a) Soil profile
- b) NAAQS
- c) Stack monitoring





Total No. of Questions : 5]

SEAT No. :

**PD3537**

[Total No. of Pages : 1

**[6483]-305**

**S.Y. 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) *Q.1 is compulsory.*
- 2) *Solve 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) Define mitigation
- b) What is ecological trajectory?
- c) What is ecological engineering?
- d) What are ecosystem services?
- e) Give examples of stressors in mangrove ecosystem.
- f) Define species redundancy.

**Q2)** a) Discuss in detail steps involved in restoration of mined land.

**[6]**

b) Gardens and parks help restore urban diversity. Justify.

**[4]**

**Q3)** a) Discuss in detail parameters for planning and design of wastewater treatment systems.

**[6]**

b) Describe the process of restoration of saline soil with suitable examples.

**[4]**

**Q4)** a) Discuss in detail restoration of Mangrove ecosystem.

**[6]**

b) Discuss in detail steps to improve aesthetics by partial restoration at industrial sites.

**[4]**

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

**[10]**

- a) Restoration of springs
- b) Restoration of urban ecosystems
- c) Restoration of solid waste dumping sites



Total No. of Questions : 5]

SEAT No. :

**PD3538**

[Total No. of Pages : 2

**[6483]-306**

**S.Y.M.Sc.**

**ENVIRONMENTAL SCIENCES**

**ENV 614 MJ : Forestry and Wildlife Management**

**(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.

- a) What is mean by habitat management? [1]
- b) Define Ethnobotany? [1]
- c) Define social forestry? [1]
- d) What is Tribiology? [1]
- e) Give full form of NTFP's. [1]
- f) What is mean by afforestation? [1]

**Q2)** Answer the following.

- a) Explain the need and scope of forestry. [6]
- b) What is forest ecosystem? Explain Biotic and abiotic components of forest ecosystem? [4]

**Q3)** Answer the following.

- a) What is silviculture? Explain Types of forest in india? [6]
- b) Define agroforestry? Discuss scope and objectives of agroforestry? [4]

**P.T.O.**

**Q4)** Answer the following.

- a) Explain in detail objectives and principles of forest management systems? [6]
- b) Discuss soil and water conservation through forestry? [4]

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

- a) Geographical Information systems. [5]
- b) Shifting cultivation. [5]
- c) Application of Indian penal code to forestry. [5]

\* \* \*

Total No. of Questions : 7]

SEAT No. :

**PD3539**

[Total No. of Pages : 2

**[6483]-401**

**S.Y. M.Sc.**

**ENVIRONMENTAL SCIENCE**

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

*Time : 3 Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) Question 1 is compulsory.
- 2) Answer any 5 questions from Q.2 to Q.7.

**Q1)** Answer any five of the following.

**[5×2=10]**

- a) What is type based classification of solid waste?
- b) What are the components of solid waste management system?
- c) What are the key steps of Biomedical waste management?
- d) What are the characteristics of hazardous waste?
- e) Enlist the factors affecting solid waste management
- f) What are the strategies to improve solid waste management?

**Q2) a)** Explain in detail source base classification of solid waste.

**[7]**

b) What are the key components of collection system?

**[5]**

**Q3) a)** What are the different color-codes containers uses for biomedical waste collection & what type of waste goes into each?

**[7]**

b) Define sagregation. Which different methods used for sorting. Explain ore in detail.

**[5]**

**Q4) a)** Enlist in detail environmental & public health impacts of solid waste management?

**[7]**

b) What are the challenges in waste collection?

**[5]**

**P.T.O.**

**Q5) a)** Explain in detail about land filling what are its advantage & disadvantage. [7]

b) What are the benefits of using transfer station? [5]

**Q6) a)** Explain in detail about solid waste management in pulp & paper Industry.[7]

b) Why construction & demolition waste management is important? [5]

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

a) Incineration.

b) Transfer Station.

c) Composting.



Total No. of Questions : 7]

SEAT No. :

**PD3540**

[Total No. of Pages : 2

**[6483]-402**

**M.Sc.-II**

**ENVIRONMENTAL SCIENCE**

**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 5 questions from Q2 to Q7.*

**Q1)** Answer any five of the following.

**[5×2=10]**

- a) Define energy sustainability.
- b) What is the significance of the Human Development Index (HDI) in energy planning?
- c) Explain the concept of energy transformation with example.
- d) Mention the major environmental issues caused by coal mining.
- e) What is biochar?
- f) List any two advantages of solar photovoltaic cell.

**Q2)** a) Discuss various energy indicators for development and their role in sustainable energy planning. **[7]**

b) Explain the environmental impacts of fossilfuel extraction and consumption **[5]**

**Q3)** a) Describe different bioenergy conversion process with suitable example. **[7]**

b) What one the challenges in large scale biogas production and utilization? **[5]**

**Q4)** a) Explain the process of nuclear Fission and fusion reaction and their environmental implication. **[7]**

b) What safety measures are adopted in nuclear power plant to prevent radiation Hazards? **[5]**

**P.T.O.**

- Q5)** a) Describe the various methods of Harnessing solar energy. Give its applications. [7]  
b) How does solar thermal energy differ from solar photovoltaic energy. [5]
- Q6)** a) Describe the potential of wind energy in India. Explain factors affecting wind generation. [7]  
b) What are the environmental concerns related to wind energy development? [5]
- Q7)** Write short notes on any two of the following. [12]  
a) Hydro electric power generation & its impacts.  
b) Geothermal energy and its future prospects in India.  
c) Role of Energy storage systems in renewable energy integration.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 1

**PD3541**

**[6483]-403**

**M.Sc. - II**

**ENVIRONMENTAL SCIENCE**

**ENV-653-MJ: Environmental Design & Planning**

**(2023 Credit 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]**

- a) What are ecoindices?
- b) Explain the concept of carrying capacity.
- c) What are sustainable materials. Explain with examples.
- d) What are the principles of equitable development.
- e) Explain the significance of demographic factors in environmental planning.
- f) Define Life Cycle Assessment.

**Q2)** a) What is environmental design? Explain its role in sustainable development. Add a note on its benefits. **[6]**

b) Discuss the motivation factors to implement environmental design. **[4]**

**Q3)** a) Discuss Strategies for improving water use efficiency in green buildings. **[6]**

b) Explain the important factors to be considered in an urban development plan. **[4]**

**Q4)** a) Discuss the important issues in environmental planning. **[6]**

b) Explain the importance of EIA in planning. **[4]**

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

- a) Importance of quality of life change in planning.
- b) Spatial and temporal domain in environmental design.
- c) Case study of environmental design.





Total No. of Questions : 5]

SEAT No. :

**PD3542**

[Total No. of Pages : 2

**[6483]-404**

**S.Y. M.Sc.**

**ENVIRONMENTAL SCIENCE**

**ENV 660 MJ : Industrial Health & Safety**

**(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]**

- a) Which legislation covers the use of PPE?
- b) What is chronic effect?
- c) What are the main objectives of risk assessment?
- d) Define  $LC_{50}$  and  $LD_{50}$ .
- e) Give two examples of waterborne bacteria.
- f) What is Health Hazard?

**Q2) a)** Explain the various types of PPE and why they are important?

**[6]**

b) What are various hazard reduction strategies?

**[4]**

**Q3) a)** What are the different waterborne diseases and water measures should be taken to prevent them?

**[6]**

b) Explain Biological Warfare and its impact.

**[4]**

**P.T.O.**

**Q4) a)** Write a note on safety standards and management system. **[6]**

b) What is the importance of toxicology in environmental sciences? **[4]**

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

a) Effects of Heavy metals on health.

b) Roll of NGO's in handling of hygiene issue and public awarness.

c) Mutagenesis



Total No. of Questions : 5]

SEAT No. :

**PD3543**

[Total No. of Pages : 1

**[6483]-405**

**S.Y. M.Sc.**

**ENVIRONMENTAL SCIENCE**

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

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates:*

- 1) *Quetsion 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 carbon sequestration.
- b) What is grey water footprint?
- c) Which are considered as greenhouse gasses (GHG)?
- d) What was the objective of kyoto protocol?
- e) Define carbon footprint.
- f) What is IPCC?

**Q2) a) Write in detail about impact of climate change on health. [6]**

b) Which targets are set in paris agreement 2015? How it will be achieved?[4]

**Q3) a) Discuss the important mitigation measures developed at international level for climate change. [6]**

b) What will be the impact of climate change on biodiversity? [4]

**Q4) a) Discuss the climate change related mitigation measures in the sector of energy (power) and transportation. [6]**

b) What could be an impact of climate change on Indian agriculture? [4]

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

**[10]**

- a) Carbon credits and carbon trading.
- b) Climate change and role of youth.
- c) UNFCCC.



Total No. of Questions : 5]

SEAT No. :

**PD3544**

[Total No. of Pages : 2

**[6483]-406**

**S.Y. M.Sc.**

**ENVIRONMENTAL SCIENCE**

**ENV 662 MJ : Environmental Biotechnology & Nanotechnology  
(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 Q2 to Q5.*

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

- a) What is bioremediation?
- b) Define biosensors.
- c) What are biofertilizers?
- d) What is the role of bacteria in waste water treatment?
- e) Define nanoparticles.
- f) Mention one use of green synthesis in nanotechnology.

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

- a) Explain the importance of microbes in environmental biotechnology. **[6]**
- b) Describe how composting helps in waste management. **[4]**

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

- a) Discuss the benefits of biofuels. **[6]**
- b) Explain how microbes help in soil fertility. **[4]**

**P.T.O.**

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

a) What are the advantages of biodegradable plastics? **[6]**

b) Describe the uses of nanotechnology in water purification. **[4]**

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

a) Role of algae in waste water treatment. **[5]**

b) Importance of bioethanol. **[5]**

c) Applications of biosensors. **[5]**

