Total No. of Questions : 8] **[Total No. of Pages : 2**

P1258

[3628]-1

M.Sc.

ENVIRONMENTAL SCIENCE

ENP - 101 : Fundamental of Environmental Science

(Old)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates :

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) Describe the ancient agenda for environment as reflected in Sanskrit. Add a note on environmental ethics.

Q2) Explain the composition of atmospheric gases. Describe thermal structure of atmosphere.

Q3) Describe the physical properties of ocean water. Add a note on evaporation, condensation and precipitation.

Q4) Write short note on any two:

a) Role of planners in decision making in Environmental awareness.

b) Different view regarding origin of atmosphere.

c) Hydrosphere.

d) Scope of Environmental Science.

SECTION - II

Q5) What is habitat? Explain its types and significance. Add a note on aquatic habitat.

Q6) What is biogeochemical cycle? Explain nitrogen cycle in detail.

P.T.O.

Q7) Explain the need of conservation of natural resources. Add a note on sustainable development.

Q8) Write short note on any two:

a) Sub division of ecology.

b) Ecotone and edge effect.

c) Food chain and food web.

d) Ecosystem evolution.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P1259

[3628]-2

M.Sc.

ENVIRONMENTAL SCIENCE

ENP - 102 : Environmental Chemistry

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates :

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) a) Describe the biological synthesis of DNA.

b) What are surfactants? Give its classification with suitable examples.

Q2) a) Discuss in brief about protein structure.

b) Describe biochemical cycle. Explain anyone in detail.

Q3) a) What are hydrocarbon? Give suitable examples and explain the effect of hydrocarbon on environment.

b) Define the term - COD, pathway of pollutants, TLV and DO.

Q4) a) Explain in brief the various modes of polymer decay.

b) Discuss the properties of water in detail.

SECTION - II

Q5) a) Differentiate between GC and HPLC. Give their application in environmental science.

b) Describe the working of photo multiplier tube.

Q6) a) Explain the nature of current - voltage curve obtained.

b) Explain the principle of AAS. Draw a block diagram and explain its essential components.

P.T.O.

Q7) a) What are pesticide? Give classification of pesticides with suitable examples.

b) Explain principle of Isotope dilution analysis. Give its applications in environmental science.

Q8) a) Explain the principle of ion exchange chromatography. Give an account of cation exchanger and axion exchanger.

b) Give an account of detectors used in colorimeter.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P1260

[3628]-3

M.Sc. (Sem. - I)

ENVIRONMENTAL SCIENCE

ENV - 103 : Environmental Biology (Old)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates :

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) Describe the significance of microorganisms in environmental science. Mention different methods for the cultivation of microorganisms and add a note on their growth.

Q2) Describe major biotic elements of terrestrial biomes. Mention the significance of climatic and edaphic factors associated with the biome.

Q3) What is biological diversity? Mention the floral and faunal biodiversity of India.

Q4) Write notes on any two of the following:

a) Community Structure.

b) Niche specialization and overlap.

c) Antimicrobial organisms.

d) Population fluctuation and community stability.

SECTION - II

Q5) What are Wetlands? Mention the objectives of RAMSAR convention. Briefly explain the threats and conservation issues of Indian Wetlands.

P.T.O.

Q6) What are Protected Areas? Explain their role in wild life conservation. Add a note on human animal conflict in wild life management.

Q7) What is biotechnology? Describe its role in the conservation with suitable examples.

Q8) Write short notes on any two of the following:

a) National forest policy.

b) Tools for data collection.

c) CBD.

d) Quarantine regulations.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P1262

[3628]-31

M.Sc.

ENVIRONMENTAL SCIENCE

ENP - 301 : Environmental Planning : Rural & Urban

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates :

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) Describe in detail socio-economic factors involved in transportation and accessibility.

Q2) Write scope and importance of environmental planning in rural development with examples.

Q3) "Environmental policies and acts helps for sustainable development" - Justify.

Q4) Attempt any two of the following:

a) Comment on development verses environmental parameters.

b) "Development is not possible without exploitation of natural resources" Comment.

c) Impact of water pollution.

SECTION - II

Q5) Define sustainable development. Add a note on natural resource development plan.

Q6) Write in brief the techniques for conflict management.

P.T.O.

Q7) Explain various methods for risk analysis. Add a note on pollution audit.

Q8) Write short notes on any two of the following:

a) On site and Off site management strategies.

b) Regulatory requirement for public participation.

c) Checklist method for EIA.

Total No. of Questions : 8] **[Total No. of Pages : 1**

P1263 **[3628]-32**

M.Sc.

ENVIRONMENTAL SCIENCE

ENP - 302 : Environmental Management Legislation and Policy

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates :

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) Explain the principles and elements of environmental management system.

Q2) Explain salient features of Basel conviction in relation with transboundry movement of hazardous waste.

Q3) Discuss the National environment policy and its implementation.

Q4) What is effect of development on environment. How sustainable development can be achieved? Justify.

SECTION - II

Q5) Explain in detail the Environment (protection) act, 1986.

Q6) Explain the provision in the Indian laws to compensate the victims of environment and protection.

Q7) Discuss in detail the Indian law on control of noise pollution.

Q8) Write short notes on - any two:

a) Nairobi declaration.
b) Kyoto Protocol.
c) CITES.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P1264

[3628]-33

M.Sc.

ENVIRONMENTAL SCIENCE

ENP - 303 : Effect of Pollutants on Biota

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates :

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) Explain the process of biomagnification with suitable examples.

Q2) Discuss the specifications for disposal of sewage and effluent on land for irrigation and groundwater recharge.

Q3) Describe the methods involved in estimation of pollution levels.

Q4) Write short notes on any two of the following:

a) Inorganic pollutants.

b) Drinking water standards.

c) Characteristics of industrial solid wastes.

d) Effects of pollution on economy.

SECTION - II

Q5) What are mangroves? Describe their role in marine ecosystem and add a note on the impacts of marine pollution on mangroves.

Q6) Discuss the deterioration of soil due to mining with suitable examples.

P.T.O.

Q7) Explain the process of biomagnification with the example of mercury accumulation in marine food chain.

Q8) Write short notes on <u>any two</u> of the following:

a) Impact of solid dump in marine system.

b) Remedial measures of oil spillage.

c) Specifications for industrial waste disposal in sea.

d) Toxic organic compounds.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P1261

[3628]-4

M.Sc.

ENVIRONMENTAL SCIENCE

ENP - 104 : Environmental Geoscience (Old)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates :

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) Give various types of Natural hazards. Add a note on any one man made hazards with suitable example to India.

Q2) Explain the effects of high level nuclear waste generated from nuclear reactor on hydrosphere and Biosphere.

Q3) What are Electromagnetic Radiation? Add a note on scattering, diffusion and reflection with reference to Remote Sensing.

Q4) Write notes on any two of the following:

a) Composition of Seawater.

b) Droughts.

c) Hurrcanes.

SECTION - II

Q5) Explain the various environmental hazards associated with volcanoes. Add a note on mitegation factors used to reduce volcanic hazards.

Q6) Give the importance of REE, major and trace element in Environmental studies.

P.T.O.

Q7) Discuss which energy protect the environment.

Q8) Write notes on <u>any two</u> of the following:

a) Food Web.

b) Soil Profile.

c) Recent development in Environmental Science.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P338

[3628]-21
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 201 : Statistical Methods & Computer based modelling in Environmental Science (Old)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) a) Describe any two measures of dispersion and explain the method of computing any one of them.

b) Obtain the regression equation ($y = a + bX$) for the following data.

X :	3	5	7	9	11	17	19	20
Y :	5	6	10	12	14	14	18	19

Q2) The data on milk yield at First Lactation and Second Lactation period of Chitale Cow is given below.

First Lactation	22	24	27	09	10	05	17
Second Lactation	17	14	13	12	14	06	08

Compute Coefficient of Correlation and interprete it.

Q3) a) A box having 10 red and 8 black pencils. If two balls are selected randomly what is the probability that both the selected a pencils are black?

b) Explain the concept of dispersion? Explain.

Q4) Write short notes on - any two :

a) Ogive curve.

b) Critical region of statistical test.

c) Sample space.

P.T.O.

SECTION - II

Q5) Discuss any four computer applications in environmental modeling with respect to the data required, softwares used and computational convenience.

Q6) Explain the common functions and commands used in MS-WORD and MS-EXCEL. Compare both with respect to advantages and limitations in application.

Q7) In the experiment with five treatments provide the level of two way analysis of variance. Explain the test procedure for testing the independence of two attributes.

Q8) Write short notes on any four of the following :

a) One way ANOVA.

b) Pearson Correlation Coefficient.

c) Validation of model.

d) Air Pollution Forecasting.

e) Statistical functions available at MS-EXCEL.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P339

[3628]-22
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 202 : Water and Wastewater Engineering
(Old)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) State and explain biological characteristics of water. How are these determined in the laboratory?

Q2) a) Design a plain sedimentation tank to treat 10MLD water assuming horizontal velocity of 0.2 m/min. The depth of the tank is restricted to 3 m. Note that larger dimensions make the structure unstable.

b) What are the advantages of rapid sand filters over slow sand filters.

Q3) What is the role of disinfection in water treatment and what are the various disinfectants used? Elaborate the mechanism and advantages of any one method.

Q4) Write short notes on (any four) :

a) Detritus tank.

b) Reverse osmosis.

c) Aeration.

d) Population forecasting.

e) Intake well.

P.T.O.

SECTION - II

Q5) What are the objectives of wastewater treatments? Explain the role of different units in the primary treatment of wastewater.

Q6) a) Describe in detail the various stages in the growth curve of microorganisms. Explain the role of microorganisms in wastewater treatment.

b) Explain root zone technology as a bioremedial method of sewage treatment.

Q7) a) Explain the importance of determination of solids in sewage. How do you determine suspended solids in a given simple of wastewater.

b) Explain the major sources of wastewater generation.

Q8) Write short notes on (any four) :

a) Rotating Biological Contactor.

b) Grit Chamber.

c) Sludge bulking.

d) Sludge Volume Index.

e) Oxidation Pond.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P340

[3628]-23
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 203 : Introduction to Environmental Pollution (Air, Noise, Radiation & Solid Waste) (Old)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) What are the units of measurements of radiation absorption? Add a note on linear mass atomic and electronic absorption coefficient.

Q2) What are the internal and external radiation hazards? Add a note on ICRP recommendations.

Q3) a) Describe the methods used for disposal of solid waste.

b) Explain the 3-R principle.

Q4) Write notes on any two of the following :

a) Nuclear power-solution or problem.

b) Consequences of solidwaste pollution.

c) Chernobil disaster.

SECTION - II

Q5) Write the historical perspective of atmospheric pollutants. Add a note on natural air pollutants.

Q6) a) Describe the effects of air pollution on plants.

b) Add a note on emissions from gasoline and diesel powered vehicles.

P.T.O.

Q7) a) Explain the types of water pollution depending on nature of pollutants and their sources.

b) Describe the methods of analysis of water pollutants.

Q8) Write notes on any two of the following :

a) Properties of waste water.

b) Control of exhaust emissions.

c) Anthropogence air pollutants.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P341

[3628]-24
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 204 : Watershed Management
(Old)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) What is micro planning? Discuss the significance of micro planning in successful implementation of watershed development.

Q2) What is sustainable development? Discuss the watershed development as example of sustainable development.

Q3) Describe the hydrological and topographic features and their significance in watershed development.

Q4) Write notes on any four :

a) Participatory Rural Appraisal.

b) Watershed Committee.

c) Entry point activity.

d) Area treatment.

e) Organic fertilizers.

SECTION - II

Q5) What is Entry Point Activity? Discuss the significance of Entry Point Activity for the watershed program.

Q6) Mention the steps involved in Post Project Management of watershed with the responsibilities and role of stakeholders.

P.T.O.

Q7) Describe the inter relationship of agroforestry and sustainable development. Add a note on selection of species for agroforestry.

Q8) Write notes on any four of the following :

a) Role of exotics in silviculture.

b) Roofwater harvesting.

c) Multipurpose trees.

d) Watershed budget.

e) Funding for watershed development.

Total No. of Questions : 12] **[Total No. of Pages : 2**

P342

[3628]-201
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 201 : Environmental Economics
(New)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 8 questions of which at least 4 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) What is economical growth? Explain the methods with which it can be measured.

Q2) Define sustainable development and explain the approaches for sustainable development.

Q3) What are precautionary principles? Discuss their necessity in environmental economic.

Q4) Discuss the impact of market failure on environment.

Q5) Define Natural Resources. How they are significant in environmental economics?

Q6) Which are environmental services considered for the environmental economics.

SECTION - II

Q7) Discuss the short term and long term effect of climate changes with respect to Indian scenario.

Q8) What is vulnerability? Explain the population vulnerability.

P.T.O.

Q9) Explain the criticism on environmental Cuznet curve.

Q10) "Stringent environmental policies encourage foreign direct investment". Justify the statement.

Q11) Define sustainability indicators. Explain their significance in policy instruments.

Q12) Define marginal analysis. Discuss its utility in environmental economics.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P343

[3628]-202
M.Sc.
ENVIRONMENTAL SCIENCE
ENP - 202 : Water and Wastewater Engineering
(New)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Discuss the term hardness in detail. Elaborate one method of water softening. **[16]**

Q2) a) Design a plain sedimentation tank to treat 10 MLD water assuming horizontal velocity of 0.2 m/min. The depth of tank is restricted to 3 m. Note that the larger diameter make the structure unstable. **[8]**

b) Explain in detail the mechanism of chlorination. List down the characteristics of good disinfectant. **[8]**

Q3) a) Describe the water budget on the earth. Add a critical note on availability of water and conservation need. **[8]**

b) Enlist various purposes for which water is being used in domestic and industrial sectors. **[8]**

Q4) Write notes on following (any two) : **[16]**

a) Electro-dialysis.

b) Aeration.

c) Water quality standards.

P.T.O.

SECTION - II

Q5) a) What are the objective of wastewater treatment? Describe the effluent standards for land disposal. **[8]**

b) Draw a typical flow sheet showing unit operations of wastewater treatment plant. **[8]**

Q6) Describe with the help of neat labeled diagram activated slidge process with respect to following. **[16]**

a) F/M.

b) Recirculation of sludge.

c) SVI.

Q7) a) Explain in detail the significance of DO, BOD and COD in wastewater treatment. Write note on treatability index. **[8]**

b) Explain the major sources of wastewater generation in food process. **[8]**

Q8) Write notes on any two of the following : **[16]**

a) Oil and grease trap.

b) Oxidation Ditich.

c) Rotatary Biological Contactors (RBC)

Total No. of Questions : 8] **[Total No. of Pages : 2**

P344

[3628]-203
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 203 : Environmental Pollution : Water & Soil
(New)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) a) What is marine pollution? Discuss point and non-point sources of marine pollution.

b) Describe the biological parameters of assessment towards determining water pollution level.

Q2) a) Give an account of various pollutants responsible for water pollution.

b) Describe various methods involved in estimation of parameters for pollution level.

Q3) a) What are characteristics of agricultural waste?

b) Describe pesticide pollution in water.

Q4) Write a note on any two of the following :

a) Drinking water standards.

b) Effect of water pollution on health.

c) Effect of oil pollution in marine water.

SECTION - II

Q5) a) Discuss the types and sources of soil pollution.

b) Describe the 3R principle of solid waste management.

P.T.O.

Q6) a) What are biological effects of ionising radiations?

b) What are specifications for disposal of effluent on land for irrigation?

Q7) a) What are specifications for disposal of fly ash and lime sludge on land?

b) Discuss types and sources of radioactive pollution.

Q8) Write notes on any two of the following :

a) Scintillation counter.

b) Classification of solid waste.

c) Consequences of soil pollution.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P345

[3628]-204
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 204 : Environmental Law, Ethics and Policy
(New)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) What are the developments in international environmental laws after Stockholm Conference, 1972.

Q2) Explain the function and duties of state pollution control board? Add a note on hazardous waste management rules.

Q3) Write important rules and notification of Environmental Protection Act, 1986.

Q4) Write short notes on - any two.

a) Rio +5.

b) Nairobi declaration.

c) Montreal Protocol.

SECTION - II

Q5) Discuss the regulation principles for handling, storage and transportation of hazardous wastes.

Q6) Mention various types, sources of biomedical wastes. Review the guidelines provided for the disposal of biomedical wastes.

P.T.O.

Q7) Discuss the temporal and spatial perspectives of development process. Integrate the concept of sustainable development in the development model.

Q8) Write notes on any 2 of the following :

a) Cost-benefit analysis.

b) Municipal solid wastes.

c) Environmental audit.

✷✷✷

Total No. of Questions : 8] **[Total No. of Pages : 2**

P346

[3628]-401
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 401 : Advances in Pollution Control Technology

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) Interpretate of chemical wastewater characteristics for treatment studies with special reference DO, BOD, COD and heavy metals.

Q2) Write an elaborate note on secondary wastewater treatment processes.

Q3) Explain the discharge of pollutants from different unit operation of pulp and paper industry. Add a critical note on wastewater flow and their characteristics of pulp and paper industry.

Q4) Write notes on any three of the following :

a) Biochemical Oxygen Demand (BOD)

b) Dissolve air floatation.

c) Sludge thickening.

d) Applications of adsorptions.

SECTION - II

Q5) Waste is no longer called as a waste-rather waste is considered as wealth. Discuss the zero waste discharge concepts with special reference to Poultry Industry.

Q6) Explain in detail with suitable diagrams the magnetic and electric field separation technologies used for the segregation of various waste components from commingled municipal solid waste.

P.T.O.

Q7) Discuss the various methods used for the successful treatment and disposal of industrial hazardous waste materials.

Q8) Write notes on any three of the following :

a) Pre-treatment method for oil and grease removal.

b) Characteristics of primary sludge from ETP.

c) Pyrolysis.

d) Recovery of ammonia from urea manufacturing unit.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P347

[3628]-402
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 402 : Environmental Health & Safety

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) Mention the standards suggested for industrial health and safety. Suggest the initiatives expected from individual, process and management authorities for this.

Q2) Discuss the importance of public awareness in health and safety aspects with suitable examples.

Q3) What is the inter-relationship between health, safety and environment? Explain with suitable examples.

Q4) Write short notes on any four of the following :

a) Safety communication.

b) Minimum base risk.

c) On site disaster management.

d) Biological Safety.

e) Occupational health records.

SECTION - II

Q5) Explain the OECD guide lines for toxicity testing. Add a note on importance of chronic toxicity testing.

Q6) Explain WHO and ISI standards for safe drinking water quality. Add a note on preventive measures for water borne disease.

P.T.O.

Q7) Define and illustrate the dispersion of air pollutant in atmosphere. Add a note on meterological parameter and its impact on dispersion.

Q8) Write short note on - any two :

a) Inhalation toxicity testing.

b) Green house gases.

c) Ame's test.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P724

[3628]-101
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 101 : Environmental Geoscience
(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***
4) ***All questions are compulsory.***

SECTION - I

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

a) Describe a cyclone. Add a note on the effects of cyclones.

b) Explain dry and wet adiabatic lapse rate. Comment on temperature controls.

c) Describe pressure measurements and distribution.

Q2) Answer any two of the following : **[10]**

a) Discuss electromagnetic spectrum latitudinal and seasonal.

b) Evolution and importance of atmosphere.

c) Describe hydrological cycle.

Q3) Answer any two of the following : **[10]**

a) Explain the green house effects. Comment on Global warming.

b) What is drought? Describe the causes of droughts.

c) Explain the forms of condensation and precipitation.

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

a) Jet Stream.

b) Structure and composition of atmosphere.

c) Atmospheric stability.

d) Causes affecting wind.

P.T.O.

SECTION - II

Q5) Answer any two of the following : **[10]**

a) What do you mean by environmental geochemistry. Add a note on trace elements and health.

b) Define earthquake. Explain the causes and effects of earthquakes.

c) Explain Ice sheets and fluctuations of sea levels.

Q6) Answer any two of the following : **[10]**

a) Define Weathering. Describe a typical soil profile. Add a note on importance of soil.

b) Explain mobility of trace elements. Add a note on classification of trace elements.

c) What are rocks? Describe the agents of metamorphism.

Q7) Answer any two of the following : **[10]**

a) Explain types of water resources. Add a note on origin and composition of sea water.

b) Define mineral. Explain the classification of minerals.

c) Describe the Internal structure of the Earth.

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

a) Streak and Luster of minerals.

b) Global water balance.

c) Tsunamis.

d) Classification of sedimentary rocks.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P725

[3628]-102
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 102 : Environmental Chemistry
(2008 Pattern) (Semester - I)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***
4) ***All questions are compulsory.***

SECTION - I

Q1) Attempt any two of the following : **[10]**

a) Describe various segments of environment with sketch.

b) What are abiotic factors of the environment? Explain their significance on sustenance of life on earth.

c) Give a schematic representation of various segments of atmosphere with explanation.

Q2) Solve any two : **[10]**

a) Explain the structure of DNA & RNA with figure.

b) What is the role of water as prime supporter of life.

c) What are enzymes? Explain with suitable examples.

Q3) Attempt any two : **[10]**

a) What is the effect of organic compounds on human life.

b) Explain the action of a carcinogen on human body.

c) What is photochemical smog? How it is formed & what are bad effects of photochemical smog on human life.

P.T.O.

Q4) Solve any two : **[10]**

a) What are pesticides? Explain the bad effects of pesticides on human life.

b) Classify the detergents and explain how they pollute river water.

c) Explain the statement "Lead & its compounds make pollution".

SECTION - II

Q5) Solve any two : **[10]**

a) Explain the methods of destruction of hazardous materials enlisted below.

i) Chromium
ii) Aflotoxins
iii) Halogenated compounds

b) Explain with principle & sketch the working of HPLC.

c) State the merits & demerits of Neutron Activation Analysis.

Q6) Attempt any two : **[10]**

a) Explain the working of Atomic Absorption Spectrophotometer.

b) How the estimation of CO, NO_X and SO_X is carried out from autoexhaust.

c) State the merits & demerits of X-ray fluorescence and X-ray diffraction methods of analysis.

Q7) Solve any two : **[10]**

a) What is Biomedical waste & how it is disposed?

b) Draw the sketch of Gas chromatography instrument & state the applications of Gas chromatography technique.

c) Explain the term solubility product with suitable examples.

Q8) Attempt any two : **[10]**

a) What is polarography? How it is used in detecting metallic radicals in effluent water?

b) What are radionuclides? Explain with suitable examples.

c) Explain following terms :

i) Gibb's energy
ii) Chemical potential

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P726

[3628]- 103
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 103 : Environmental Biology
(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***
4) ***All questions are compulsory.***

SECTION - I

Q1) Attempt any two of the following :

a) Illustrate significance of biogeochemical cycles.

b) Explain various methods of cultivation of microbes.

c) Define biodiversity and its distribution in India.

Q2) Justify any two of the following :

a) Forest types in India are governed by climatic condition.

b) Aquatic biome contributes less in terms of productivity.

c) Climax communities are stable.

Q3) Answer any two of the following :

a) How energy conservation is achieved in ecosystem functioning.

b) Explain the role of extremophilic microorganism.

c) Discuss the association of man and microorganism.

Q4) Write notes on any two of the following :

a) Niche overlap.

b) Natality and Mortality.

c) Protected areas in India.

P.T.O.

SECTION - II

Q5) Write any two of the following :

a) What are wetland? Describe the types of wetlands.

b) Describe the distribution of semi-arid habitats of India.

c) What are endangered species? Explain the status of endangered animals in India.

Q6) Answer any two of the following :

a) What is environmental biotechnology? How it helps in conservation of species?

b) Describe any one method of wildlife management.

c) Explain how habitats and food habits influence the wildlife management.

Q7) Answer any two of the following :

a) What are mangroves? Describe their adaptations to coastal environment.

b) What is CBD? Explain the principles of CBD.

c) Explain the role of biotechnology in conservation of species.

Q8) Write short notes on any two of the following :

a) Ramsar sites.

b) Red Data Books.

c) Wildlife population in India.

d) Protected areas in India.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P727

[3628]-104
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 104 : Statistical & Research Methods
(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***
4) ***All questions are compulsory.***

SECTION - I

Q1) Solve any two of the following :

a) The data on percent coefficient of digestibility of dry matter, feed corn, silage of 13 sheeps is as follows ;

57.8, 56.2, 61.9, 54.4, 53.6, 56.4, 53.2, 64.2, 58.7, 63.1, 63.1, 62.5, 54.4;

Compute mean, median and mode.

b) The data on milk yield at first location and second location period of Thorpaskar cows is given below :

First Location	Second Location
22	27
22	20
21	16
08	09
05	13
23	20
17	18
12	16

Compute coefficient of correlation and interprete it.

c) Describe any two measures of dispersion and explain the method of computing any one of them.

P.T.O.

Q2) Answer any two of the following :

a) An urn has 7 black and 5 red balls. If two balls are selected randomly from the urn, what is the probability that both the balls use of the same colour.

b) Explain the following terms :

i) Sample space.
ii) Event.
iii) Classical approach of probability.
iv) Hypothesis.
v) Axians of probability.

c) Discuss the properties of regression coefficient.

SECTION - II

Q3) Solve any two of the following

a) Compute the correlation coefficient from the following data and test its significance :

$n = 10,\ \sum xi = 40,\ \sum yi = 60,\ \sum xi^2 = 200,\ \sum yi^2 = 400,\ \sum xiyi = 260$

b) Describe in brief the importance of statistical modeling of environmental data.

c) Define linear regression and describe the method of fitting of regression line of y on x.

Q4) Solve any two of the following :

a) Write short notes on the following :

i) Equally likely outcomes.
ii) Ogive curve.
iii) Test statistic.
iv) Critical region of a test statistics.

b) What is analysis of variance? Describe how analysis of variances is used in situations when means of several sample to determine whether they have a common value?

c) Describe in detail the statistical model used to study air pollution?

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P728

[3628]-301
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 301 : Air Pollution & Climate Change
(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***
4) ***All questions are compulsory.***

SECTION - I

Q1) Solve any two from the following : **[10]**

a) Explain the chemical composition of atmosphere.

b) Explain the carcinogenic effects of hydrocarbons. Add a note on Benzo α - pyrene.

c) What is acid rain? Add a note on formation of acid rain.

Q2) Attempt any two from the following : **[10]**

a) Explain the sources and distribution of lead in atmosphere.

b) Explain the sources of green house gases and its effect on health.

c) Explain the role of aerosol in cloud seeding.

Q3) Solve any two from the following **:** **[10]**

a) What are the point sources of air pollutants in thermal power plants.

b) What are the alternative methods for control of air pollution in fermentation industry.

c) What are the reasons for formation ozone hole in atmosphere.

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

a) Monitoring methods for SO_x.

b) Alternative fuels.

c) Losangels' smog.

P.T.O.

SECTION - II

Q5) Solve any two from the following : **[10]**

a) Explain the principle and working of cyclone.

b) What are the types of ESP. Add a note on their uses.

c) Explain the functions of fabric filters.

Q6) Attempt any two from the following : **[10]**

a) Explain the Frendulich-Langmuir therome of adsorption.

b) What are the factors responsible for adiabetic lapse rate.

c) Write salient features of UNFCCC.

Q7) a) Explain the role of IPCC in controlling global warming action plan. **[10]**

b) What is carbon sequestering?

c) Write salient features of kyoto protocol.

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

a) Zoning of air pollution.

b) Tray Scrubber.

c) Vapour incineration.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P729

[3628]-302
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 302 : EIA and Environmental Auditing
(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***
4) ***All questions are compulsory.***

SECTION - I

Q1) Solve any two from the following : **[10]**

a) Define the objectives of environmental indices.

b) Define the term - socio-economical, cultural and biological environment in relation to EIA study.

c) Explain in brief simple matrices methodology.

Q2) Attempt any two from the following : **[10]**

a) Explain the generic topical outline for an EIA Report.

b) What are an important features of EIA notification 2006.

c) Define the specification of public participation.

Q3) Solve any two from the following **:** **[10]**

a) Briefly explain the steps involve in prediction and assessment of noise environment.

b) Define strategic and structural errors in EIA report.

c) Explain the overlays methods of EIA analysis.

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

a) Delphi method.

b) Objectives of public participation.

c) Importance of base line data in EIA studies.

P.T.O.

SECTION - II

Q5) Solve any two from the following : **[10]**

a) Describe the role of different stake holders in the process of EIA.

b) Explain the importance of consumption audit in agrobase industry.

c) Enlist the different tools for environmental management.

Q6) Attempt any two from the following : **[10]**

a) What are the criteria for appropriate procedure selection in environment management planning.

b) Why the environmental budgeting is important in EMS.

c) Explain the environmental auditing procedure in sugar industry.

Q7) Solve any two from the following : **[10]**

a) Discuss the provisions of environmental audit under Environmental Protection Act 1986.

b) Explain the salient features of ISO 14000.

c) Explain the importance of inventory data in dam project.

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

a) Signatoury audit.

b) Energy audit.

c) Role of CPCB in EIA.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P730

[3628]-303
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 303 : Remote Sensing & GIS
(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***
4) ***All questions are compulsory.***

SECTION - I

Q1) Solve any two from the following : **[10]**

a) What are the basic principle of remote sensing.

b) Explain various types of Aerial photography.

c) Explain the operating principle of Thermal Infrared line scanner.

Q2) Attempt any two from the following : **[10]**

a) Write about the relief displacement in aerial photography.

b) Explain about Across-Track and Along-Track scanning.

c) Give a brief review of Landsat Satellite Programme.

Q3) Answer any two from the following **:** **[10]**

a) Describe unsupervised method of digital image processing.

b) Discuss about application of remote sensing in forestry.

c) What is meant by Image Transmission and compression.

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

a) Active and Passive methods of remote sensing.

b) Aerial photo scale, principal & conjugate principal point & overlaps.

c) Unmanned Earth Resources Satellites.

P.T.O.

SECTION - II

Q5) Solve any two from the following : **[10]**

a) What are scales of measurements?

b) Explain the process of rasterisation.

c) What are the merits and demerits of vector data model?

Q6) Answer any two from the following : **[10]**

a) Discuss the application of DTM in Environmental sciences.

b) What are the data quality issues in GIS.

c) Explain the various output of GIS.

Q7) Attempt any two from the following : **[10]**

a) Explain the term "topology" and describe the topological relationships between spatial objects.

b) Write a note on application of GIS in urban and regional planning.

c) What are the data models in DBMS?

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

a) Component of GIS.

b) Spatial data & Attribute data.

c) Network analysis.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P731

[3628]-304
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 311 : Restoration Ecology
(2008 Pattern) (Optional Paper)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***
4) ***All questions are compulsory.***

SECTION - I

Q1) Attempt any two of the following : **[10]**

a) Discuss the environmental problems associated with the solid waste dumping site.

b) Comment on the current developments in Restoration Ecology.

c) Explain the principles of river conservation.

Q2) Justify the following statements (Any Two) : **[10]**

a) Microbial treatment emerge out to be a powerful tool in hydrocarbon contaminated soil.

b) Succession plays important role in restoration.

c) Bioscrubbers extend best solution for removal of abnoxious odders.

Q3) Answer any two of the following **:** **[10]**

a) Mention the biological and abiological components considered in coastal restoration.

b) Differentiate conservation and restoration.

c) Discuss the role of pioneir species in mine soil dumps.

P.T.O.

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

a) Root Zone treatment.

b) Succession.

c) Biotic interactions.

SECTION - II

Q5) Attempt any two from the following : **[10]**

a) What is the significance of watershed management in ecology restoration.

b) What are the Hydrological characteristic of watershed.

c) Discuss the need of resource appraisal in watershed management.

Q6) Solve any two from the following : **[10]**

a) What are the goals of soil and water conservation in watershed management?

b) Explain the importance of organic farming in restoration of agro-ecosystem.

c) What are the entry point activities in watershed management.

Q7) Answer any two from the following : **[10]**

a) What are the practices of watershed development for semi-urban areas.

b) Enumerate the importance of watershed management programme in village development.

c) Discuss the role of horticulture in restoration of ecology.

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

a) Silvopastoral systems.

b) Integrated pest management.

c) Gram Panchayat.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P732

[3628]-305
M.Sc.
ENVIRONMENTAL SCIENCE
ENV - 312 : Biodiversity & Conservation
(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions carry equal marks.***
4) ***All questions are compulsory.***

SECTION - I

Q1) Attempt any two of the following :

a) Correlate the concept of centre diversity and diversification of species.

b) Discuss the significance of endemism.

c) Explain the scope of biodiversity studies.

Q2) Justify any two of the following :

a) Threatened categories are interconvertible.

b) Ecosystem offers direct and indirect services.

c) Ecosystem analysis is necessary for planning and management.

Q3) Answer any two of the following **:**

a) Compare natural and anthropogenic processes responsible for loss of species.

b) Explain the process of diversification at species level.

c) What is cultural diversity? Discuss its role in biodiversity conservation.

Q4) Write notes on any two of the following :

a) Alpha diversity.

b) Genetic drift.

c) Capacity building.

P.T.O.

SECTION - II

Q5) Write any two of the following :

a) What are the organizations primarily involved in framing the policies for management of biodiversity?

b) What Biodiversity convention? Explain the principles of CBD.

c) Describe the importance of Ramsar Convention.

Q6) Answer any two of the following :

a) Describe - How data collection and management helps in dissiminating the biodiversity information?

b) How biotechnology helps in conservation of biodiversity.

c) Explain the direct impact of biotechnology on biodiversity.

Q7) Write any two of the following :

a) Explain the necessity of biodiversity conservation.

b) Describe the social approach to biodiversity conservation with suitable example.

c) Explain the current practices for conservation of ecosystem diversity.

Q8) Write short notes on any two of the following :

a) Bioprospecting.

b) IPR's.

c) Ethical value of biodiversity.

d) Sustainable Development.

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