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[3728] - 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 temperature measurements and controls. Ennumerate inversion of temperature.
- b) Explain geostrophic and gradient wind. Comment on wind measurements.
- c) Describe structure and composition of atmosphere.

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

- a) Describe hydrological cycle. Add a note on condensation and precipitation.
- b) Describe solar and terrestrial radiation.
- c) Explain the causes and effects of floods.

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

- a) What is atmosphere? Comment on the evolution of the atmosphere.
- b) Explain the model of general circulation of wind. Add a note on Jet stream.
- c) Discuss the effects of greenhouse and heat budget.

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Q4) Write notes on any two : [10]

- a) Causes of cyclones.
- b) Factors affecting wind.
- c) Dry and wet adiabatic lapse rate.
- d) Causes of drought.

SECTION - II

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

- a) What are volcanoes? Describe the types of volcanic hazards.
- b) Describe the internal structure of the Earth.
- c) Define weathering. Explain the process of soil formation.

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

- a) What are rocks? Explain the classification of sedimentary rock.
- b) Describe types of water resources. Comment on human use of surface water and its deterioration.
- c) Define minerals. Describe the following physical properties : Streak, Lustre, Hardness.

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

- a) Describe the concept of major, trace and rare earth elements.
- b) Explain Global water balance. Comment on the importance of drinking water.
- c) Describe the classification of Igneous rock.

Q8) Write notes on any two : [10]

- a) Causes of landslides.
- b) Trace elements and health.
- c) A typical soil profile.
- d) Fluctuations of the sea levels.



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[3728] - 102

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 102 : Environmental Chemistry (2008 Pattern) (Sem. - 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) Solve any two of the following :

- a) Explain various segments of environment with one or two members of each segment.
- b) What is Atmosphere? What are the constituents of atmosphere? Give a schematic representation of various segments of Atmosphere.
- c) Describe various Abiotic factors of the environment and explain their significance on sustenance of life on earth.

Q2) Solve any two of the following :

- a) Explain various functional attributes of an Ecosystem.
- b) Draw structure of DNA & RNA? Explain the significance of DNA in a living cell.
- c) Comment on the effects of organic compounds like Organonitro and organosulphur compounds on human life.

Q3) Solve any two of the following :

- a) What is a carcinogen? With suitable example explain the action of a carcinogen on human body.
- b) What is a pathogen? Explain few problems caused by different varieties of pathogens.
- c) Explain how photochemical smog is formed with suitable reaction.

P.T.O.

Q4) Solve any two of the following :

- a) What are surfactants? Give classification of surfactants with suitable examples.
- b) Give chemical structure of DDT. Write the Role and action of DDT in Mosquito control.
- c) Which is the best method for analysis of following compounds chlorinated hydrocarbon, phenoxyherbicides.

SECTION - II

Q5) Solve any two of the following :

- a) How analysis of hazardous material is carried out? What are the parameters of hazardous waste analysis.
- b) Enlist various methods of analysis and disposal of Biomedical waste.
- c) What is HPLC? Explain the principle of working of HPLC.

Q6) Solve any two of the following :

- a) Enlist various instrumental methods of analysis used in analysis of environmental pollutants.
- b) Write the merits and demerits of
 - i) X-ray Fluorescence Method.
 - ii) Colourimeter.
- c) Explain the working of the following instrument Atomic absorption spectrophotometer.

Q7) Solve any two of the following :

- a) Explain the analytical process used for estimation of CO, NO_x or SO_x from autoexhaust.
- b) Explain the principle and working of X-ray diffractometer.
- c) What are the merits and demerits of neutron activation analysis.

Q8) Solve any two of the following :

- a) Write a note on radionuclides.
- b) Explain the following terms
 - i) Gibb's energy
 - ii) Solubility Product
- c) What is polarography? Write the applications of polarography technique in various industries.



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[3728] - 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 : **[10]**

- a) Discuss the relationship between structural complexity and stability with respect to ecosystem.
- b) Comment on microbial metabolism.
- c) Discuss the impact of climate on vegetation distribution in India.

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

- a) Single Food chain does not occur in any ecosystem.
- b) Terrestrial biomass have high productivity.
- c) Microbes can also be used as antimicrobial agents.

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

- a) Explain methods of cultivation of micro-organism.
- b) Mention the negative association of microorganism with plant.
- c) Discuss the energy flow within ecosystem.

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

- a) Population flux.
- b) Ecological niche.
- c) India's Biogeographic history.

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SECTION - II

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

- a) Explain the importance of wetlands.
- b) Describe the ecological status of forests in India.
- c) Explain the concept of endemism. Describe the status of endemic plants of western Ghats.

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

- a) What is ex-situ conservation. Explain any one method of ex-situ conservation.
- b) What are protected areas? Explain its role in conservation.
- c) Explain the tool for data collection and analysis.

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

- a) What is marine biology? Explain the characteristics of open sea environment.
- b) Explain the national forest policy.
- c) Comment on human - animal conflict.

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

- a) Biodiversity Act.
- b) Extinct species from India.
- c) Global agreements and national concerns.



P1170**[3728] - 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)** Attempt any two of the following :**[5 each]**

- a) Explain :
 - i) Simple random sampling.
 - ii) Stratified sampling.
- b) For the following data draw less than ogive curve and hence locate the median.

Length of leaf (in cms)	No of leaves
0-3	6
3-6	8
6-9	28
9-12	32
12-15	25
15-18	15

- c) Following data relates to the number of larvae observed on the leaves of a plant.

2, 6, 5, 6, 7, 8, 9, 4, 4, 3, 1, 6

Calculate the mean, median and mode of the data.

Q2) Attempt any two of the following :**[5 each]**

- a) In Bombay Natural History society bird ringing project various body measurements were recorded for many birds. The following table shows the distribution of using length of coots.

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Length (in mm)	180-190	190-200	200-210	210-220	220-230
No. of coots	111	56	26	27	52

compute variance of the data.

- b) In a collection of 15 rats, 9 are males and 6 are females. It is desired to select a sample of 5 rats for same study. What is the probability that there will be at least one female rat in the sample?
- c) Following data relates to heights of fathers and their sons (measured in cms). Calculate the correlation coefficient between them.

Height of father (x)	65	66	60	69	56	54	67
Height of son (y)	67	68	55	72	63	70	52

Q3) Attempt any one of the following : **[10 each]**

- a) The prices of teak were collected during the years 1977 - 1984 as follows.

Year	1977	1978	1979	1980	1981	1982	1983	1984
Price (Thousand Rs / cubic meter)	2	2.5	2.75	3	3.5	4	4.5	5.2

Fit the line of regression of price on the year. Also estimate the price of teak for the year 1990.

- b) State the probability mass function of binomial and Poisson distribution. Also state their important properties.

Q4) Write notes on any two of the following : **[5 each]**

- a) Skewness.
- b) Properties of regression coefficients.
- c) Two real life situations of normal distribution.

SECTION - II

Q5) Attempt any two of the following : **[5 each]**

- a) State the properties of normal distribution.
- b) Explain chi-square test for goodness of fit.
- c) What are the components of a time series? Discuss any one of them.

Q6) Attempt any one of the following : **[10 each]**

- a) A sample of 390 males was selected to find association between their occupation and occupation of their fathers. It revealed following information?

Son's occupation Father's occupation	Agriculture	Business	service	other
Agriculture	33	18	25	19
Business	15	29	26	30
Service	15	16	38	16
Other	17	25	31	37

Test whether son's occupation is independent of father's occupation. Use 1 % l.o.s.

- b) Life expectancy in years in 10 regions of India in 1950 and 12 regions of India in 1980 was as follows :

Year 1950	37, 39, 36, 35, 44, 45, 50, 41, 44, 42
Year 1980	44, 45, 47, 43, 42, 50, 52, 48, 51, 43, 46, 49

Test whether the average life expectancy in the two years was equal. Use 5% l.o.s.

Q7) Attempt any two of the following :

[5 each]

- Explain the following terms :
 - Matrix.
 - Level of significance.
 - Hypothesis.
 - Time series.
 - Linear equation.
- A soft drink machine is designed to regulate average discharge of 50ml per cup. If the amount of drink is normally distributed with a standard deviation of 5 ml; what fraction of cups will contain more than 55 ml?
- Explain F-test for testing the equality of two population variances.

Q8) Attempt any one of the following :

[10 each]

- Discuss the logistic growth model used in population studies.
- Solve the following system of linear equations :

$$4x_1 + 2x_2 + 12x_3 = 24$$

$$2x_1 + 4x_2 + 9x_3 = 18$$

$$9x_1 + 12x_2 + 3x_3 = 12$$



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[3728] - 201

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 201 : Environmental Economic

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) Briefly explain the interlinkage between the economics and environment. **[10]**

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

- a) Types of subsidies and its importance.
- b) Role of Economic instruments in environmental programmes.
- c) National versus international policy programme.

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

- a) What are the impact of over exploitation of non-renewable energy resources.
- b) Enlist the various methods for cost-benefit analysis.
- c) Explain various approaches for sustainable development.

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

- a) Methods for environmental growth measurement.
- b) Carbon credit.
- c) Effectiveness of environmental laws.

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SECTION - II

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

- a) What are short term impacts of climate change?
- b) Establish the relationship between sustainable development and economic reforms.
- c) Differentiate between regional and population vulnerability.

Q6) Justify the statement any two : **[10]**

- a) Sustainable developments needs strategic planning.
- b) Environmental Quality significantly affects foreign Direct Investment.
- c) Economic development is a necessary evil.

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

- a) Enlist significant issues of sustainable development.
- b) What are stringent environmental policies?
- c) Mention the long term impacts of climate change in India.

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

- a) Foreign Direct Investment.
- b) Environmental Kuznet's Curve.
- c) Adaptation options to climate change.



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[3728] - 202

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 202 : Water & Wastewater Engineering

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 from the following :

- a) Explain the demographic method for population forecasting.
- b) State the requirements for domestic consumption.
- c) Explain the Indian standards for safe drinking water.

Q2) Explain any two from the following :

- a) Explain the types and principle of screen chamber.
- b) Explain the technique for iron removal from water.
- c) Sketch a labelled diagram of Jack-well.

Q3) Answer any two from the following :

- a) Briefly explain the various methods of chlorination.
- b) Describe the theory of flocculation.
- c) What are the basic design aspects consider in commissioning of surface aerator.

Q4) Write short notes on any two :

- a) Microfiltration.
- b) Reverse osmosis.
- c) Adsorption.

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SECTION - II

Q5) Answer any two of the following :

- a) Draw a treatment flow diagram for a sewage treatment plant showing points where you will collect samples for assessing performance of the individual units.
- b) What is the importance of microorganisms in effluent treatment.
- c) What is the impact of quality of life on sewage quality and quantity.

Q6) Attempt any two of the following :

- a) Discuss the reasons for providing screen chamber and grit chamber as the first units in ETP.
- b) The sewage of a town is to be discharged into a river. The quantity of sewage is 12 million litres and BOD is 300mg/L. If the river discharge is 250 L/s and BOD of river water is 6 mg/L, find the BOD of diluted water.
- c) Compare the advantages of activated sludge process with trickling filter.

Q7) Attempt any two of the following :

- a) What are the characteristics of effluent from pulp and paper industry. Draw flow sheet of ETP.
- b) What are the advantages and drawbacks of anaerobic digestion? Which wastes are suitable for anaerobic digestion?
- c) Write about the role of root zone technology in bioremediation.

Q8) Write short notes on any two :

- a) Diurnal variation in sewage flow.
- b) Removal of cyanide and phenols.
- c) Aerated lagoons.



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[3728] - 203

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 203 : Environmental Pollution - I : Water & Soil

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 from the following :

- a) Elaborate on various sources of water pollution.
- b) What are the biological pollutants? How do they pollute water bodies?
- c) Discuss the specifications mentioned on the waste disposal in marine system.

Q2) Justify the statement (Any two) :

- a) Agricultural runoff is a major contributor to river pollution.
- b) Radioactive pollution is irreversible.
- c) Quality standards are necessary for water analysis.

Q3) Answer any two of the following :

- a) Differentiate between temporal & spatial sampling with the merits & demerits.
- b) What are the consequences of water pollution on economic activities?
- c) Discuss the impact of inorganic pollutants on water quality.

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

- a) Ballast water.
- b) Heavy metal pollution.
- c) Drinking water standards.

SECTION - II

Q5) Attempt any two of the following :

- a) Define soil and describe the sources of soil pollution.
- b) What is solid waste? Describe the sources of solid waste in detail.
- c) What is radiation? Explain sources of radiation pollution.

Q6) Answer any two of the following :

- a) Define hazardous waste and add a note on its disposal technique.
- b) Define 3R principle. Explain composting of solid waste.
- c) Write in details recommendation of ICRP for radiation protection.

Q7) Attempt any two of the following :

- a) What are waste disposal methods on farm crops for irrigation purpose.
- b) What are effects of crop residue and fertilizers on soil?
- c) Describe the methods of radioactive decay.

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

- a) Municipal solid waste.
- b) Impact of mining activities on soil.
- c) Semiconductor detector.



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[3728] - 204

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 204 : Environmental Law, Ethics & Policy

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 :

- a) What was the outcome of Rio Conference?
- b) Examine Critically the role of UN authorities in protection of Global Environment.
- c) Explain the International Legal efforts to control Ozone depletion.

Q2) Answer any two of the following :

- a) What are the Fundamental Duties of the Indian citizens with respect to protection of Environment.
- b) Explain the offences and penalties under the Water Act 1974.
- c) Examine the role of Indian judiciary in protecting the environment.

Q3) Answer any two of the following :

- a) Write about the efforts for integration of development with carrying capacity of Environment.
- b) Write in brief about role of law in protection of biodiversity in India.
- c) Explain National Policy on EIA.

P.T.O.

Q4) Write notes on any two of the following :

- a) Law related to Bio-medical waste.
- b) Legal control of natural and man made growth.
- c) Cost benefit analysis.

SECTION - II

Q5) Answer any two of the following :

- a) Explain in brief the principles adopted by the Stockholm conference.
- b) Explain the rules and guidelines about disposal of municipal solid waste.
- c) Explain the rules framed by the Central Government under the provisions of the Environment Protection Act 1986.

Q6) Answer any two of the following :

- a) What are the provisions of the Air Act about offences by companies.
- b) Explain the requirement of Environmental Audit.
- c) Write in brief your views on protection of environment by laws and need for development.

Q7) Answer any two of the following :

- a) What are the provisions of India Penal Code to prevent and control pollution.
- b) “The pollution control Acts have a limited success in India Scenario”. Comment.
- c) Give your views on the future of International Laws on protection of environment.

Q8) Write notes on any two of the following :

- a) Rules as to disposal of hazardous waste.
- b) Comparison between exploitation and safe guard for conservation.
- c) Kyoto Protocol on Global warming and developing countries.



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[3728] - 301

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 301 : Air Pollution & Climate Changes

(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) Explain the atmospheric chemistry of stratosphere.
- b) Write about the carcinogenic potential of automobile exhaust.
- c) What are the effects of NO_x & SO_x pollution?

Q2) Attempt any two of the following :

- a) How is the earth's atmosphere similar to a greenhouse.
- b) What are the effects of global warming on agriculture?
- c) Write about the classification of aerosols and their adverse effects.

Q3) Attempt any two of the following :

- a) Explain the mechanism of ozone depletion.
- b) What are the sources of air pollution in pulp and paper industry? Write about its control.
- c) What is cloud seeding? Explain the types of cloud seeding.

P.T.O.

Q4) Write short notes on any two :

- a) Bhopal gas tragedy.
- b) Montreal Protocol.
- c) Acid Rain.
- d) Path of a particulate.

SECTION - II

Q5) Answer any two of the following :

- a) Explain the principle and working of wet scrubber? Also list the different types of scrubbers.
- b) What are the different types of ESP and their uses?
- c) How is fuel selection important in air pollution control.

Q6) Attempt any two of the following :

- a) Explain the mechanism of absorption with example. What are the different absorbents used?
- b) Write about control of air pollution at source.
- c) Write a note on pulsejet cleaning.

Q7) Attempt any two of the following :

- a) Explain the methods for monitoring of sulphur dioxide.
- b) What is the clean Development Mechanism?
- c) Write a note on UNFCCC.

Q8) Write short notes on any two :

- a) Certified Emission Reduction.
- b) Condensation.
- c) Control of air pollution by site selection.
- d) Monitoring of trace elements in air.



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[3728] - 302

M.Sc.

ENVIRONMENTAL SCIENCE

**ENV - 302 : EIA & 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) What are the importance of basic data collection for EIA studies.
- b) Explain the Network methodologie and its importance in EIA.
- c) What are the steps involved in risk analysis.

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

- a) What are the guidelines for construction graphical presentation of information.
- b) Narrate the salient features of EIA notification of 2006.
- c) What are the advantages of public participation in EIA studies.

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

- a) Briefly explain the steps in prediction and assessment of air environment.
- b) Explain the generic topical outline for EIA report.
- c) Explain in brief the importance of national environment policy.

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- Q4)** Write short note on any two : [10]
- a) Identification of public role in EIA.
 - b) Environmental inventory.
 - c) Stepped Metrics analysis.

SECTION - II

- Q5)** Solve any two from the following : [10]
- a) Explain the onsite and offsite audit procedure.
 - b) Enlist and describe different tools for environmental management.
 - c) Explain the importance of EMS in pollution studies.

- Q6)** Attempt any two from the following : [10]
- a) Explain the methodology for solid waste generating in sugar industry.
 - b) What is the importance of inventory data in housing project.
 - c) Explain the relation between environmental budgeting and environmental impact.

- Q7)** Solve any two from the following : [10]
- a) What are the provisions for Environmental audit under Environmental protection act.
 - b) Explain the post audit activities in mining project.
 - c) Explain the importance of cost benefit analysis.

- Q8)** Write short note on any two : [10]
- a) Consumption audit.
 - b) Social-cultural environmental impact.
 - c) Participatory appraisal.



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[3728] - 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 :

- a) Explain the Electromagnetic Radiation in relation to Remote sensing.
- b) Explain the operating principle of multi spectral scanner.
- c) Explain in brief the various types of photo recognition elements.

Q2) Attempt any two from the following :

- a) Explain the term remote sensing and photogrammetry.
- b) Find out the relief displacement (d) needed to correct a radial plot, if scale is 1 : 20,000 'r' of an image is 100mm, height of an object is 1000ft and 'f' is given to be 6 inches.
- c) Write a note on early history of space Imaging.

Q3) Answer any two from the following :

- a) Write about application of remote sensing in land use/land cover mapping.
- b) Explain supervised classification of digital image processing.
- c) Write about IRS series.

P.T.O.

Q4) Write short notes on any two :

- a) Image Parallax.
- b) Data merging and GIS integration.
- c) Thermal imagery.

SECTION - II

Q5) Solve any two from the following :

- a) Explain the component of GIS.
- b) What are the techniques of digitization.
- c) What are the merits & demerits of raster data.

Q6) Answer any two from the following :

- a) Explain the process of DTM generation.
- b) Write a note on format conversion.
- c) Define GIS and how does it work?

Q7) Attempt any two from the following :

- a) Explain the various methods of analysis geographic data in GIS studies.
- b) Give a general view on application of GIS.
- c) What is GPS? Explain the working of GPS.

Q8) Write short notes on any two :

- a) Scales of measurements.
- b) GIS software scenario.
- c) Component of data quality.



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[3728] - 304

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 311 : Restoration Ecology

(Optional Paper) (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) Discuss the biotic and abiotic components considered in restoration of river.
- b) Write the criteria used in selection of plants in constructed wetlands.
- c) Mention the steps involved in restoration of coastal degraded areas.

Q2) Justify the following statements (Any Two) :

- a) Ecological restoration has greater chance of success.
- b) Understanding abiological interactions is must in restoration.
- c) Decontamination of soil is effective with microbial treatment.

Q3) Answer any two of the following :

- a) Explain the role of micro-organisms in restoration.
- b) Mention various approaches adopted for wasteland restoration.
- c) Discuss the physico-chemical characters of leachates.

Q4) Write notes on any two of the following :

- a) Bioscrubbers.
- b) Phytoremediation.
- c) Floral elements in Rhizosphere.

P.T.O.

SECTION - II

Q5) Attempt any two of the following :

- a) Explain the concept of watershed management.
- b) What are the physical characteristics of watershed.
- c) Discuss the need of land-use and land-cover classification in watershed management.

Q6) Solve any two of the following :

- a) What are the features of area treatment in water and soil conservation practices?
- b) Describe the importance of selection of plant species for plantation in ecology restoration.
- c) “Organic farming is an anthropogenic efforts of ecosystem restoration”. Explain.

Q7) Answer any two of the following :

- a) What is the mechanism of Roof-top water Harvesting?
- b) Discuss the importance of cooperative lift irrigation.
- c) Classify agro-forestry system with perspective of restoration.

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

- a) Micro-watershed Management.
- b) Role & importance of self help group.
- c) Role of exotics.



P1180

[3728] - 305

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 312 : Biodiversity & Conservation

(2008 Pattern) (Sem. - III)

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) Define magnitude of biological diversity with examples.
- b) Discuss the problem associated with the introduced species.
- c) Explain the concept of drivers dynamics in biodiversity study.

Q2) Justify any two of the following :

- a) Inventory forms a basis for monitoring.
- b) Biodiversity offers direct and indirect services.
- c) Biodiversity is operated by the process of evolution.

Q3) Answer any two of the following :

- a) Explain different approaches to inventorying ecosystem.
- b) Discuss the need for assessment of biodiversity.
- c) Mention the significance of diversification of species in ecosystem.

Q4) Write notes on any two of the following :

- a) Beta diversity.
- b) Inbreeding depression.
- c) Agrobiodiversity.

P.T.O.

SECTION - II

Q5) Write any two of the following :

- a) What are the organizations in financing biodiversity management?
- b) Explain the trade related IPR.
- c) What are the National Legislation to protect important habitats and biodiversity elements? Describe any one.

Q6) Answer any two of the following :

- a) What are the sources, tools and techniques of collecting biodiversity information?
- b) Describe the role of biotechnology in assessing bioresources.
- c) Explain the indirect impacts of biotechnology on biodiversity.

Q7) Write any two of the following :

- a) Describe the current practices of biodiversity conservation.
- b) Explain the concept of sustainable development.
- c) What are protected areas? Explain their significance.

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

- a) Indigenous knowledge systems.
- b) Problems & prospects in participatory management of biodiversity.
- c) Aesthetic value of biodiversity.
- d) Legal aspects of biodiversity information management.



P1181

[3728] - 401

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 401 : Environmental Toxicology Health & Safety

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) Write any two of the following :

- a) Explain the interrelationship between health and environment.
- b) Describe how one can identify the potential safety measures in chemical industrial projects.
- c) What are safety standards for development projects?

Q2) Answer any two of the following :

- a) Describe the risk identification process.
- b) Explain the national policy for hazard preparedness plan.
- c) Explain mock-drill importance in awareness program for safety.

Q3) Justify any two of the following :

- a) EMS in safety and risk evaluation studies.
- b) The control measures and its importance in noise pollution.
- c) Community health program and its role in social environment.

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

- a) Industrial health safeguards.
- b) Risk Mitigation strategies.
- c) Noise abatement.

P.T.O.

SECTION - II

Q5) Attempt any two of the following :

- a) Explain the basic concept of toxicity.
- b) Describe toxicity assay methods.
- c) Comment on physiological disorders caused by copper on fauna.

Q6) Answer any two of the following :

- a) Explain the various programs of WHO in brief.
- b) What are the guidelines for public participation in polio eradication program?
- c) Describe the importance of ambient air quality in urban environment.

Q7) Justify any two of the following :

- a) Effects of metal dust on vegetation.
- b) Wide spread effects of airborne bacteria on human immune system.
- c) The importance of sanitation program in urban area.

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

- a) Toxicity of organic solvent.
- b) Preventive measures for biological warfare.
- c) Sanitation program in rural areas.



P1182

[3728] - 402

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 402 : Watershed Management

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 from the following :

- a) Explain the concept of Watershed Management.
- b) Write a note on deliniation of watershed.
- c) Elaborate on the format for resource appraisal.

Q2) Justify any two of the following :

- a) Resource mapping is significant tool for watershed planning.
- b) Environmental Impact Assessment is prerequisite for watershed management.
- c) Timely evaluation is necessary for successful watershed project.

Q3) Answer any two of the following :

- a) Discuss the role of watershed management in improving environmental quality.
- b) Give an account of peoples organisation in watershed development and management with suitable example.
- c) Explain various levels of planning in watershed planning.

P.T.O.

Q4) Write note on any two of the following :

- a) Linear aspect.
- b) Benefits of watershed management.
- c) Environmental regeneration.

SECTION - II

Q5) Attempt any two from the following :

- a) Mention various methods of strip cropping. Add a note on its significance.
- b) State the role of contour and graded burds in conservation of cultivable land.
- c) Explain the process of surface water runoff important in watershed planning.

Q6) Justify the statement (any two) :

- a) Watershed management is a participatory process.
- b) Hydrological processes influence watershed management.
- c) Improved agriculture practices strengthen the watershed management.

Q7) Answer any two from the following :

- a) Mention the role of indicators as monitoring tool in watershed management.
- b) What is dry land farming? State the need and procedures of dry land farming.
- c) Discuss the significance of conservation approach in watershed management.

Q8) Write notes on any two :

- a) Agro forestry.
- b) Self Help Group.
- c) Traditional water Harvesting methods.



P1183

[3728] - 403

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 411 : Forestry and Habitat Management

(New 2008)

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.*

SECTION - I

Q1) Attempt any two of the following :

- a) Define the term forestry. Discuss the scope of forestry.
- b) Mention the biotic and abiotic components of forestry.
- c) Explain the special silvicultural practices adopted in cold deserts.

Q2) Justify any two of the following statement :

- a) Forest is a functional ecosystem.
- b) Human development activities influence forest resource.
- c) Economic evaluation of tress is an important activity in the forestry.

Q3) Answer any two of the following :

- a) Differentiate between traditional and advanced methods of silviculture.
- b) Elaborate on the impact of human population growth on forestry.
- c) Discuss the ecological factors associated with silviculture.

Q4) Write notes on any two of the following :

- a) Agroforestry.
- b) Cultural traditions.
- c) Abiotic stresses on the forest resources.

P.T.O.

SECTION - II

Q5) Attempt any two of the following :

- a) Define stand structure and mention the significance of forest management.
- b) Explain the utility of modeling technique in forest management.
- c) How socio-economic analysis of forest productivity is carried out?

Q6) Justify any two of the following statement :

- a) Annual increment calculation is significant in forest management.
- b) Women play crucial role in forest management.
- c) Forest policies should be stringent for better management.

Q7) Answer any two of the following :

- a) Elaborate on the use of remote sensing and GIS in habitat management.
- b) Discuss the objectives of forest inventory.
- c) Mention the direct forest services.

Q8) Write notes on any two of the following:

- a) Forest mensuration.
- b) Shifting cultivation.
- c) Timber and non timber produce.



P1184

[3728] - 404

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 412 : Environmental Management

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) What is planning? Give its important in development projects.
- b) What is natural resources? How they are helpful for any development.
- c) “Social willingness play important role in development”. Justify the statement.

Q2) Attempt any two of the following :

- a) “Population explosion is obstacle in Development”. Justify the statement.
- b) Write important concept and parameter of planning in brief.
- c) What is regional planning? Write in brief parameters in regional planning.

Q3) Answer any two of the following :

- a) “Environmental planning play important role in development”. Justify the statement.
- b) Write in brief parameters required for rural planning.
- c) “Social willingness play important role in planning” comment on the statement.

Q4) Write notes on any two of the following :

- a) Urban Planning.
- b) Exploritation of natural resources.
- c) Problems associated with planning.

P.T.O.

SECTION - II

Q5) Attempt any two of the following :

- a) “Environment and development are two side of same coin” : Justify the statement.
- b) “Central pollution play important role in protection of environment”. Comment the statement.
- c) What is solid waste? How you can for its disposal?

Q6) Solve any two of the following :

- a) “EIA is essential tool of planning for development”. Comment the statement.
- b) “Biomedical waste doesn’t require planning for its disposal”. Justify the statement.
- c) Write an essay on importance of planning in any development.

Q7) Answer any two of the following :

- a) What is development? Write in brief environmental parameter considered for development.
- b) What is national policy? How policy helps for development.
- c) “Pollution controls boards play important role in protection of environment in India”. Comment on the statement.

Q8) Write notes on any two of the following:

- a) Exploitation and safeguard of environment.
- b) Public Participation.
- c) Important of law in protection of environment.



P1185

[3728] - 405

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 413 : Environmental Management Systems

(Theory & Job Licensing)

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) What is Environmental management? What are the different goals of Environmental management?
- b) Write a note on the background and development of ISO 14000 standards.
- c) What is sustainable development and how does environmental management help in achieving sustainable development?

Q2) Answer any two of the following :

- a) Write about the Plan-Do-Check-Act model of EMS? What are the benefits of EMS?
- b) Give the classification of ISO 14000 standards and list them accordingly.
- c) What are the goals and purposes of EMS?

Q3) Answer any two of the following :

- a) What are the different stages in product LCA?
- b) What are the ED strategies for building construction?
- c) Describe the environmental impacts to be considered in LCA.

Q4) Write short notes on any two :

- a) Ecolabelling.
- b) Carrying capacity of ecosystem.
- c) Well to wheel concept in LCA.

P.T.O.

SECTION - II

Q5) Answer any two of the following :

- a) What are the different properties of solid waste?
- b) Write a note on the transportation of solid waste in India.
- c) Give the source based classification of solid waste.

Q6) Attempt any two of the following :

- a) What is the importance of recycling in solid waste management? Which materials can be recycled.
- b) What is the composition of MSW?
- c) Explain with diagram the design of sanitary landfill.

Q7) Answer any two of the following :

- a) Compare the use of pyrolysis and incineration in solid waste management.
- b) What are the characteristics of hazardous waste.
- c) What is biomedical waste? What are the impacts of improper treatment of biomedical waste.

Q8) Write short notes on any two :

- a) Refuse derived fuel.
- b) Collection of solid waste.
- c) Advantages of composting.



P1186**[3728] - 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)** Compute quartiles and standard deviation for following data.

Percentage of Farmers having Horticulture practices	0 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 80	81 to 90
Number of villages	1	8	9	11	13	17	22	27	29

- Q2)** a) What is meant by regression? Discuss the application of regression analysis in environmental studies.
- b) Calculate the standard deviation and coefficient of variation for the following data.

Class interval	1 - 10	11 - 20	21 - 30	31 - 40	41 - 50
Frequency	5	6	11	13	14

- Q3)** What is meant by frequency distribution? Explain the method of classification of data by taking any 40 observation values.

Q4) Write notes on any two of the following:

- a) Binominal distribution.
- b) Rank order correlation.
- c) Histogram.

P.T.O.

SECTION - II

- Q5)** Explain with suitable examples the process of computer based modelling for population and population studies.
- Q6)** Define forecasting. Discuss the significance of forecasting in the computer based air pollution modelling. Add a note on statistical inputs for pollution modelling.
- Q7)** a) Explain the procedure of testing Independence of two attributes.
b) Explain in brief principle of replication.
- Q8)** Write notes on any four of the following:
- a) Features of MS EXCEL.
 - b) Properties of poisson distribution.
 - c) Correlation coefficient.
 - d) Two way ANOVA.
 - e) Environmental modelling.



P1187

[3728] - 22

M.Sc.

ENVIRONMENTAL SCIENCE

**ENV - 202 : Water & Waste Water 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)** a) State the types of water demand. Explain one in detail.
b) Explain incremental increase method with an example of any city to determine water required at the end of year 2031.
- Q2)** Discuss the term hardness in detail. Elaborate any one method of water softening.
- Q3)** a) Draw a neatly labelled diagram of various components of sand filter. Add a note on backwashing of filter.
b) Describe in detail the process of aeration. Discuss the various methods of deration.
- Q4)** Write short notes on any four :
- a) Chlorination (Break point).
 - b) Ultrafiltration.
 - c) Electrodialysis.
 - d) Population forecasting.
 - e) Intake well.

P.T.O.

SECTION - II

- Q5)** a) Differentiate between suspended and attached growth processes with examples.
- b) Draw a diagram for a conventional sewage treatment plant showing different units. Explain the function of different units.
- Q6)** a) Explain the significance of DO, BOD & COD in wastewater treatment. Write a note on treatability index.
- b) Draw the flowsheet for a dairy ETP.
- Q7)** a) What are the different models for anaerobic digestion. Explain one.
- b) Write a note on the impact of future growth and development and change in quality of life on sewage quality and quantity.
- Q8)** Write notes on any two :
- a) Trickling filter.
- b) Role of microorganisms in effluent treatment.
- c) Standards for disposal of wastewater.



P1188

[3728] - 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)** Describe the sampling methods for radioactive pollution. Explain the working and principle of G.M. Counter.
- Q2)** What are the units for measurement of radiation energy? Explain it in details and add a note on gray rontgen.
- Q3)** Explain the biological effects of ionizing radiations. Add a note on maximum permissible dose.
- Q4)** Write notes on any two of the following:
- a) Noise pollution-sources and consequences.
 - b) Parameters affecting the radiation monitoring.
 - c) Solid waste disposal methods.

P.T.O.

SECTION - II

- Q5)** What are the emissions from gasoline and diesel powered vehicles? Describe the effects of these emissions on flora and fauna.
- Q6)** Describe the air pollution indices. Add a note on rules and regulations for air pollution emissions and control.
- Q7)** Explain the sources of air pollutants. Enumerate the historical perspective of atmospheric pollutants before the industrial revolution.
- Q8)** Write notes on any two of the following:
- a) Water pollution-sources & consequences.
 - b) Effects of air pollutants on human health.
 - c) Analysis of water pollutants.



P1189

[3728] - 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) Define sustainable development. Correlate the concept of watershed development with sustainable development.

Q2) Discuss the consideration of hydrological characters in watershed development programme.

Q3) What is organic farming? Discuss the processes and advantages of organic farming.

Q4) Write notes on any four :

- a) Role of NGO's in watershed.
- b) PRA.
- c) Area treatment.
- d) Organic fertilizers.
- e) Watershed committee.

P.T.O.

SECTION - II

- Q5)** 'Participation is the key to the success of watershed development' Justify the statement with examples.
- Q6)** What is water harvesting? Explain various types with details of roof water harvesting.
- Q7)** Discuss the significance of post project management of watershed for sustainable ecological and economic benefits.
- Q8)** Write notes on any four of the following:
- a) Scalling up of watershed.
 - b) Entry point activity.
 - c) Silvipastural system.
 - d) Watershed plus activities.
 - e) Selection criteria for the trees.



P1190

[3728] - 31

M.Sc.

ENVIRONMENTAL SCIENCE

**ENP - 301 : Environmental Planning : Rural & Urban
(Old Course)**

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 importance of base line data status of demographic aspect in environmental planning.
- Q2)* How the industrial growth pattern will decide the trends in urban planning.
- Q3)* What is the importance of pre and post audit activities in development project.
- Q4)* Write short notes on any two :
- a) Environmental protection act 1986.
 - b) Solid waste audit.
 - c) EIA Notification.

SECTION - II

- Q5)* What are the rules and regulation of Air act 1981.
- Q6)* What are the merits and demerits of public participation in development project.

P.T.O.

Q7) What is risk. Explain briefly the methods of risk analysis.

Q8) Write short notes on any two :

- a) Hazardous waste management act 1999.
- b) Network methodology.
- c) Cost benefit analysis.



P1191

[3728] - 32

M.Sc.

ENVIRONMENTAL SCIENCE

**ENV - 302 : Environmental Management Legislation & Policy
(Old Course)**

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) Why ISO series are important for developing nation?

Q2) How international laws and regulations works for protection of environment.

Q3) Enlist the global environmental issue and add a note on global warming.

Q4) Write notes on any two of the following:

- a) Stockholm conference.
- b) Duties of Panchayat Raj System.
- c) RIO conference.

SECTION - II

Q5) Discuss, how Water Act 1974 helps to protect water pollution?

Q6) “The role of court is very important in protection of Environment”. Justify the statement.

P.T.O.

Q7) How statutory protection of human environment is achieved in India?

Q8) Write notes on any two of the following:

- a) Role of MPCB in control of pollution.
- b) Motor Vehical Act.
- c) Antipollution Act.



P1192

[3728] - 33

M.Sc.

ENVIRONMENTAL SCIENCE

ENP - 303 : Effect of Pollutants on Biota

(Old Course)

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) Define water pollution. Explain in detail the consequences of groundwater pollution.

Q2) What are the types and sources of water pollution? Describe various pollutants responsible for water pollution.

Q3) Explain the purpose of water sampling. Add a note on different types of samples and collection methods with various instruments.

Q4) Write notes on any two of the following:

- a) Biological pollutants.
- b) Specification for disposal of sewage and effluents on land for irrigation.
- c) Characteristics of agricultural waste.

P.T.O.

SECTION - II

- Q5)** What is open cost coal mining? Explain how it effects the soil quality with suitable example.
- Q6)** What is marine water pollution? Describe the types sources and consequences of marine water pollution.
- Q7)** Describe the impacts of biodegradable organic matter, toxic chemicals and solid dumps on marine life.
- Q8)** Write notes on any two of the following:
- a) Effects of copper mining on biota.
 - b) Impact and control of oil spillages from tankers.
 - c) Role of mangroves in marine ecosystem.



P1193

[3728] - 41

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)** Discuss how green processes could act as effective alternative route for manufacturing industrial products.
- Q2)** Explain the methodology for treat-ability studies of wastewater to get desired wastewater quality.
- Q3)** Draw a schematic flow diagram of an Effluent Treatment Plant (ETP). Add a note no significance of BOD and COD tests in industrial wastewater treatment.
- Q4)** Write notes on any three of the following:
- a) Sludge drying beds.
 - b) Electrical conductivity and Total Dissolved Solids.
 - c) Characteristics of dairy industry wastewater.
 - d) Anaerobic biological treatment.

P.T.O.

SECTION - II

- Q5)** Explain the various physical, chemical and biological methods used for the removal of heavy metals from industrial effluents.
- Q6)** Differentiate between incineration, gasification and pyrolysis with respect to
a) Requirement of air b) Type of reactions c) Chemical reactions involved and d) End products.
- Q7)** Describe the use of wastewaters for irrigation purpose in context to
a) Irrigation water quality and b) Soil and crop selection.
- Q8)** Write notes on any two of the following:
- a) Hazardous waste disposal methods.
 - b) Sludge thickening.
 - c) Utilization of fly ash.
 - d) Distillery waste management.



P1194

[3728] - 42

M.Sc.

ENVIRONMENTAL SCIENCE

ENV - 402 : Environmental Health and 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)** Discuss the interrelationship between health, environment and safety. Support your answer with suitable examples.
- Q2)** What is risk assessment? Explain the process of risk identification, allocation and mitigation strategy with examples.
- Q3)** Discuss the significance of BS 18000 series with respect to health and safety measures.
- Q4)** Write short notes on any four of the following:
- a) Local health policies.
 - b) Public awareness about safety.
 - c) Industrial health hazards.
 - d) Role of safety offices.
 - e) Safety standards.

P.T.O.

SECTION - II

- Q5)** Explain physiological and chemical disorder causing by mercury in animals.
- Q6)** Which are the safeguarding techniques for protecting ambient air and water qualities.
- Q7)** Explain various awareness programmes of state government for health and sanitation.
- Q8)** Write short notes on any two of the following :
- a) EI - nino effect.
 - b) Carcinogenic compounds.
 - c) Bio transformation of toxicant.



P1195

[3728] - 43

M.Sc.

ENVIRONMENTAL SCIENCE

**ENV - 403 : Information Technology & Bioinformatic for
Environmental Science (Old Course)**

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)** Define atmospheric windows. Explain the advantages and limitations of atmospheric windows in Remote sensing.
- Q2)** What is Remote sensing? Discuss the utilization of satellite data in understanding temporal and spatial changes in vegetation, earth and water features.
- Q3)** What is image interpretation? Discuss the processes advantages and limitations of visual and digital data analysis.
- Q4)** Write notes on any four of the following:
- a) Effects of relief displacement.
 - b) LANDSAT Satellite series.
 - c) Image overlap.
 - d) Application of Remote sensing in marine environment.
 - e) Pushbroom scanning.
 - f) Application of GIS in urban planning.

P.T.O.

SECTION - II

- Q5)** Explain the networking systems. What are different types of network topologies.
- Q6)** What is bioinformatics? Explain the tools used in bioinformatics with a note on its scope and applications.
- Q7)** Discuss the components expected in designing the website of your department for making it more informative and interactive.
- Q8)** Write notes on any four of the following:
- a) Significance of photographs in visit report.
 - b) Search engines.
 - c) Standard softwares used in environmental science.
 - d) Importance of bibliography.
 - e) Objectives of review writing.

