

# ENVIRONMENTAL SCIENCE (82)

*Candidates offering Environmental Applications (Group III) are not eligible to offer Environmental Science (Group II).*

## CLASS X

*There will be **one** paper of **two hours** duration carrying 80 marks and Internal Assessment of 20 marks.*

*The paper will have **two** Sections:*

***Section A (Compulsory)** will contain short answer questions covering the entire syllabus.*

***Section B** will contain **six** questions. Candidates will be required to answer any **four** questions from this section.*

### 1. Controlling Air Pollution

- (a) From Domestic Combustion.

*Reducing pollution from domestic cooking; clean cooking - kerosene as a desirable cooking fuel in rural areas.*

- (b) From Industries.

*Measures for controlling industrial air pollution - technological measures (energy efficient devices and clean technologies) zoning strategy; penalties and subsidies.*

*Case Study: the Taj Trapezium*

- (c) From Vehicles.

*Vehicle emission control - modify engine design (catalytic converters, four stroke engines), clean fuels, public transport options, traffic management, economic policy measures.*

### 2. Addressing Population

- (a) The link between growing population and environmental degradation.

*UN's population projections for 2050, the climate link, the choice of alternative futures. Growing population in the developing countries and rising consumption in the developed countries.*

- (b) Strategies for controlling growth of population.

*Strategies to include family planning and birth control, health care, education, economic development; women-centered human development.*

### 3. Managing the Urban environment

- (a) Urbanization - a challenge to the future.

*Sustainable cities: the need of the hour.*

- (b) Planning environmental improvement.

*Efficient land use, planning energy, shelter and transport; water supply management, wastewater and sanitary waste management, construction activities.*

- (c) Rural development to counter migration.

*Self-explanatory.*

- (d) Development of secondary cities to counter migration.

*Self-explanatory.*

- (e) Community participation.

*Community participation in keeping surroundings clean.*

### 4. Managing Soil and Land

- (a) Conserving soil

*Soil erosion - causes; Erosion control techniques - terracing, contour ploughing, dry farming, tree planting, bunds, gullies, wind-breaks, use of organic fertilizers.*

*Soil conservation techniques - land-use management, vegetative and mechanical practices, conserving soil and water together; appropriate cropping systems – cropping patterns (strip cropping and crop rotation), tree crops, and foliage crops.*

- (b) Integrated rural development.

*Objectives, self-help schemes like social and community forestry.*

- (c) Role of women and community in conservation

*Self-explanatory.*

- (d) Combating deforestation.

*Reforestation, energy plantations, forest harvesting of non-timber forest products, exploring alternative sources of livelihood, change in consumption patterns.*

- (e) Alternatives to timber.

*Recycling of timber and paper.*

## 5. Food

- (a) Sustainable agriculture.

*Integrated pest management – understanding the term, aims, advantages, disadvantages.*

*Genetically modified organisms, application in plants and animals and environmental risks.*

*New crop strains – high yielding varieties and their viability, hybrid varieties.*

*Mixed cropping – advantages and disadvantages; regenerative farming techniques - intercropping, crop rotation, agroforestry, social forestry, polyvarietal cultivation and polyculture.*

*Conservation tillage farming - meaning of conservation tillage, advantages and disadvantages.*

*Trickle drip irrigation – need for a trickle drip irrigation system; operation of a drip irrigation system; advantages and disadvantages.*

*New organic fertilizers – integrated nutrient supply programme, organic fertilizers - bulky organic manures, green manures, bio-fertilizers, and sewage sludge.*

*Gene banks – what are gene banks; objectives of maintaining gene banks.*

- (b) Problem of global food security, food aid.

*Global food imbalance, distributional inequality; role of food aid in achieving global food security.*

## 6. Biodiversity

- (a) Biodiversity at risk due to human actions.

*Reasons for loss of biodiversity (Habitat-loss destruction, wildlife trade, overexploitation of resources, pollution, pesticides, global climate change and domestication); Man - the super consumer: impact of his actions on the earth's resources; reasons for concern: economic, ecological and aesthetic.*

- (b) Conserving our genetic resource: in-situ and ex-situ; harvesting wildlife.

*In-situ - wildlife sanctuaries, national parks and biosphere reserves.*

*Ex-situ – zoological parks, botanical gardens, gene banks in agricultural research centers and forestry institutions*

*Harvesting wildlife to meet commercial needs.*

- (c) Conservation strategies at national and international levels.

*Wildlife (Protection) Act 1972, Project Tiger 1973, IUCN, the Ramsar Convention on Wetlands, 1971, CITES, The Convention on Biological Diversity.*

*Definition of hot spots of biodiversity.*

*Extinct, endangered, endemic, rare, vulnerable, pandemic.*

## 7. Energy

- (a) Nuclear energy.

*Nuclear fission, safety concerns (the Chernobyl disaster); nuclear fusion.*

- (b) A sustainable energy future.

*Energy conservation; alternative energy sources - solar energy, wind energy, hydroelectricity, geothermal energy, biomass, liquid fuels from biomass- methanol, ethanol, gasohol, CNG, hydrogen.*

## 8. Waste

- (a) Solid waste: the throwaway society.

*Solid waste, biodegradable and non-biodegradable materials; where does the trash go - landfills and incinerators.*

- (b) Solid waste: options for the future.

*Producing less waste - segregation, reusing, recycling, reducing (3Rs) composting, vermiculture, biotechnology; finding alternatives to materials we use.*

## 9. Environment and Development

Role of multinational corporations (MNCs).

*Definition of MNCs, their contribution to development and debatable contribution to environment; case study - Bhopal gas tragedy; measures to regulate activities of MNCs in developing countries.*

## 10. Towards a Sustainable Future

- (a) International cooperation.

*The Montreal Protocol; the Global Environmental Facility (GEF) support; the Earth Summit, UN's International Conference on Population and Development (Cairo); the Kyoto Treaty.*

- (b) Sustainable development

*The concept of sustainable development, sustainable development and developed countries; sustainable development and developing countries.*

- (c) Technology that sustains.

*Satellite imagery as a means of monitoring the global environment: satellite remote sensing, advantages in collecting environmental data, applying data in areas of environmental damage as deforestation, desertification, land degradation, wastelands, mining, ozone layer depletion and predicting droughts and floods.*

*The concept of alternate technology, adopting alternate technology to create self-sustaining societies in the developed and developing world.*

## INTERNAL ASSESSMENT

A minimum of three assignments as prescribed by the teacher, need to be completed.

### Suggested Assignments

1. Make a field study of the effect of human interaction on the natural environment and write a project report (1500 words) on the likely impact of the interaction on the global environment.
2. Prepare an original study/essay (2000 words) on an area of the prescribed curriculum that is indicative of his/her appreciation/concern for environmental issues and make a functional model to support the above.

## EVALUATION

The assignments/project work are to be evaluated by the subject teacher and by an External Examiner. (The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the section/class**. For example, a teacher of Environmental Science of Class XI may be deputed to be an External Examiner for Class X, Environmental Science projects.)

The Internal Examiner and the External Examiner will assess the assignments independently.

### Award of Marks (20 Marks)

|                                     |          |
|-------------------------------------|----------|
| Subject Teacher (Internal Examiner) | 10 marks |
| External Examiner                   | 10 marks |

The total marks obtained out of 20 are to be sent to the Council by the Head of the school.

The Head of the school will be responsible for the online entry of marks on the Council's CAREERS portal by the due date.

**INTERNAL ASSESSMENT IN ENVIRONMENTAL SCIENCE - GUIDELINES FOR MARKING WITH GRADES**

| <b>Criteria</b> | <b>Preparation</b>  | <b>Investigation/<br/>Gathering Data</b>   | <b>Analysis/Inference</b>   | <b>Solutions<br/>Alternatives/<br/>Innovations</b>    | <b>Presentation</b>  | <b>Marks</b> |
|-----------------|---|--|---|---|--|--------------|
| Grade I         | Follows instructions with understanding, modifies if needed. Background information correct. Level of awareness high. | Is able to ask right questions. Knows whom to ask, when and how. Can deal with more than one variable. | Analyses systematically. Can see sequences or correlation. Can segregate fact from opinion. | Innovative ideas presented. Alternatives suggested.   | Accurate. Feasible, neat, well labelled diagrams. Index and references given.  | 4 marks      |
| Grade II        | Follows instructions step-by-step. Awareness is good. Background information correct.                                 | Is able to ask questions and identify whom to ask when and how. Can handle two variables only.         | Makes observations correctly. Analysis fair.  | Alternatives presented. Innovative but not practical. | Accurate. Neat, well labelled diagrams, index and references given.            | 3 marks      |
| Grade III       | Follows simple instructions only. Awareness basic. Background information sketchy.                                    | Needs help with the investigations. Has suggestions but cannot decide.                                 | Observation - help needed. Needs guidance to see correlations or sequence.                  | Obvious solutions presented. Not innovative.          | A bit disorganised, but neat and accurate. Either index or references missing. | 2 marks      |
| Grade IV        | Follows some instructions but confused. Has to be made aware. Background information incorrect in places.             | Needs to be told what questions to be asked, whom to ask or where to gather the data from.             | Detailed instructions required to draw inferences. Charts have to be made.                  | Thinks of solutions under guidance.                   | Poorly organised. Some things missing. Index and references missing.           | 1 mark       |
| Grade V         | Confused about instructions. Has to be made aware. Needs help with background information.                            | Gets stuck at every step. Questionnaire has to be formulated.  | Even with help, analysis is not clear. Takes teacher's word for it.                         | Solutions not forthcoming.                            | Overall impression very poor. Not very accurate.                               | 0 mark       |