Signature and Name of Invigilator

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

Roll No. | | | | | | | | |

(In figures as per admission card)

Roll No. _____

(In words)

Test Booklet No.

J—8905

PAPER—III

Time : 2½ hours] **ENVIRONMENTAL SCIENCE** **[Maximum Marks : 200**

Number of Pages in this Booklet : **32** Number of Questions in this Booklet : **26**

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. Answers to short answer/essay type questions are to be given in the space provided below each question or after the questions in the Test Booklet itself.

   No Additional Sheets are to be used.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
   (i) To have access to the Test Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.
   (ii) **Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the question booklet will be replaced nor any extra time will be given.**
4. Read instructions given inside carefully.
5. One page is attached for Rough Work at the end of the booklet before the Evaluation Sheet.
6. If you write your name or put any mark on any part of the Test booklet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
7. You have to return the Test booklet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.
8. **Use only Blue/Black Ball point pen.**
9. **Use of any calculator or log table etc. is prohibited.**
10. **There is NO negative marking.**

परीक्षार्थियों के लिए निर्देश

1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
2. लघु प्रश्न तथा निबंध प्रकार के प्रश्नों के उत्तर, प्रत्येक प्रश्न के नीचे या प्रश्नों के बाद में दिये हुये रिक्त स्थान पर ही लिखिये।

   इसके लिए कोई अतिरिक्त कागज का उपयोग नहीं करना है।
3. परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी। पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे जिसकी जाँच आपको अवश्य करनी है :
   (i) प्रश्न-पुस्तिका खोलने के लिए उसके कवर पेज पर लगी सील को फाड़ लें। खुली हुई या बिना स्टीकर-सील की पुस्तिका स्वीकार न करें।
   (ii) **कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चैक कर लें कि ये पूरे हैं। दोषपूर्ण पुस्तिका जिनमें पृष्ठ / प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले ले। इसके लिए आपको पाँच मिनट दिये जायेंगे। उसके बाद न तो आपकी प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा।**
4. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें।
5. उत्तर-पुस्तिका के अन्त में कच्चा काम (Rough Work) करने के लिए मूल्यांकन शीट से पहले एक पृष्ठ दिया हुआ है।
6. यदि आप उत्तर-पुस्तिका पर अपना नाम या ऐसा कोई भी निशान जिससे आपकी पहचान हो सके, किसी भी भाग पर दर्शाते या अंकित करते हैं तो परीक्षा के लिये अयोग्य घोषित कर दिये जायेंगे।
7. आपको परीक्षा समाप्त होने पर उत्तर-पुस्तिका निरीक्षक महोदय को लौटाना आवश्यक है और इसे परीक्षा समाप्ति के बाद अपने साथ परीक्षा भवन से बाहर न लेकर जायें।
8. **केवल नीले / काले बाल प्वाईंट पैन का ही इस्तेमाल करें।**
9. **किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।**
10. **गलत उत्तर के लिए अंक नहीं काटे जायेंगे।**

ENVIRONMENTAL SCIENCE

PAPER – III

NOTE: **This paper is of two hundred (200) marks containing four (4) sections. Candidates are required to attempt the questions contained in these sections according to the detailed instructions given therein.**

SECTION - I

This section contains five (5) questions based on the following paragraph. Each question should be answered in about thirty (30) words and each carries five (5) marks. **(5x5=25)**

Read the passage below, and answer the questions that follow based on your understanding of the passage

The study of organism/s with respect to its or their environment is termed ecology. Any portion of earth in which life exists is called as the biosphere, which consists of biotic and abiotic components. The organisms living together in a specific environment form an ecosystem. They depend on each other and on the abiotic environment in which they live. They affect each others' existance in production of both benevolent and antagonistic meterials for other's organisms. The biota depletes the biosphere of some materials and in its excreta and debris it adds other material.

These tightly meshed interactions define the ecosystem. In an ecosystem biota is controlled by its climate and chemical composition, conversely, the biological activity governs the chemical status of ecosystem. An ecosystem contains a series of populations of organisms living together in a tenuous state of harmony. A population denotes a group of organisms belonging to one species. A number of different populations living together is known as community within population, communities change with time and are controlled both by the dynamic nature of the abiotic and biotic components of the ecosystem, known as succession. When the population reaches equilibrium and the communities stop changing the system has reached a climax.

Organism living in the biosphere utilize solar radiations and a pool of chemicals in the earth's mantle as their prime sources of energy. This energy is transferred from one organism to another, to maintain the complex network of life on the planet. The energy is transferred through the biosphere in food chains or food webs. The initial fixation of solar energy into biological material is carried out by the primary producer. At each tropic level maximum position of the energy is lost on heat. The energy budget is further complicated by microbial degradation. All tropic levels are subjected to biodegradation. In a natural or undisturbed ecosystem almost all nutrients are recycled, however, to renew producer as well as consumer populations.

An important attribute of food chains is their ability to concentrate non-metabolizable toxic materials, called as biomagnification. The ecological damage of biomagnification is amplified by the concentration of toxic material in the specific organs and tissues.

In the modern world the urbanization and industrialization has disturbed the quality and quantity of biological population of ecosystem(s). The increase in solid and liquid waste from household and industries have lead the environmental pollution. For example as a result of oil spill, the flora and fauna of waterbody and that of soil is seriously depressed and get deteriorated. Addition of industrial effluents rich in nitrates and phosphates in water bodies cause eutrophication and in turn promotes development of algal blooms.

In order to control the environmental pollution, it is necessary to protect the environment by managing the disposal of the waste by changing the mind set and adopting zero pollution policy.

Answer the following questions :

1. Enumerate different components of the ecosystem.

2. How do the algal blooms develop ?

3. How does the energy flow in the ecosystem ?

4. Which aspects of environmental problems are emphasized in the paragraph ?

5. What is the implication of food chain for the transport of pollutants in the ecosystem ?

SECTION - II

This section contains fifteen (15) questions each to be answered in about thirty (30) words. Each question carries five (5) marks.

Define the following : **(5x15=75)**

6. Acid rain

7. Aquifer

8. Carbonate Compensation depth (CCD)

9. Life Cycle Analysis (LCA)

10. Biosorption

11. Polymorphism

12. Sustainable Yield

13. Food chain

14. Mixing height

15. Lapse rate

16. UV-B radiation

17. Dobson unit

18. Aerodynamic diameter

19. Toxins

20. F - statistic

SECTION - III

This section contains five (5) questions. Each question carries twelve (12) marks and is to be answered in about 200 words.

(12x5=60)

21. Give an account of aeolian deposits.

22. Using thermodynamic considerations, derive the expression for adiabatic lapse rate for dry atmosphere.

23. Discuss the effects of heavy metals on living organisms in aquatic environment.

24. Discuss the process of bioremediation of soil contaminated with oil spills.

25. Comment on the wind energy potential in India. Obtain an expression for power generated from a simple windmill.

SECTION - IV

This section consists of one essay type question to be answered in about one thousand (1000) words on any of the following topics. This question carries 40 marks. **(40x1=40)**

26. Write an essay on **any one** of the following :

(a) Merits and Demerits of mega dams in India.

OR

(b) Application of remote sensing and GIS in environmental management.

OR

(c) Marine Pollution as an emerging problem in India.

OR

(d) Biofertilizers and their application.

OR

(e) List modern analytical techniques used in environmental science. Describe any one technique.

OR

(f) Biofuels - the energy source of the future.

OR

(g) Modelling approaches to study ecosystems.

OR

(h) Role of education and media in creating environmental awareness in society.

FOR OFFICE USE ONLY							
Marks Obtained							
Question Number	Marks Obtained	Question Number	Marks Obtained	Question Number	Marks Obtained	Question Number	Marks Obtained
1		26		51		76	
2		27		52		77	
3		28		53		78	
4		29		54		79	
5		30		55		80	
6		31		56		81	
7		32		57		82	
8		33		58		83	
9		34		59		84	
10		35		60		85	
11		36		61		86	
12		37		62		87	
13		38		63		88	
14		39		64		89	
15		40		65		90	
16		41		66		91	
17		42		67		92	
18		43		68		93	
19		44		69		94	
20		45		70		95	
21		46		71		96	
22		47		72		97	
23		48		73		98	
24		49		74		99	
25		50		75		100	

Total Marks Obtained (in words) .....

(in figures) .....

Signature & Name of the Coordinator .....

(Evaluation) Date .....