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—8907

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 Answer Sheet, 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

Note : 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 marks)

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

Water pollution refers to any change in natural waters that may impair further use of water, caused by the introduction of organic or inorganic substances or by a change in the temperature of water. Waste water emanate from the following sources : Municipal waste water, Industrial waste water, Agricultural runoff, Storm water and Urban run off.

During recent years such chemical pollution of water bodies has increased many fold and people, who are responsible for human health have become increasingly concerned about water pollution. Eutrophication is the enrichment of water by nutrients from natural or man-made sources. Of all the nutrients, nitrogen and phosphorus are most often considered as key nutrients responsible for promotion of growth of algae and other plants resulting in anoxic condition.

Pesticides used in agriculture reach natural or man-made water bodies and cause disruption to one or more physiological functions of aquatic organisms by interfering with the production of necessary biochemicals e.g, D.D.T. which consists of aromatic ring, mimic the effects of estrogen in aquatic animals such as fish, where the reproduction is disturbed. As such non biodegradable pesticides accumulate in the body of aquatic organisms through the process of biomagnification. Along with agricultural runoff many toxic chemicals reach water bodies through industrial effluents.

The structure of a molecule is the key to its biodegradability. In general polymers with mixed backbone linkage (carbon-oxygen or carbon-nitrogen) show greater susceptibility to hydrolysis, than carbon-carbon backbone polymers. Polymers with aromatic components or branched region tend to be more resistant to attack by microorganisms than straight chain aliphatic compounds.

Most common system practised for control of water pollution is the use of waste water treatment plants, based on the physical, chemical and biological treatment steps generally known as preliminary, primary, secondary and tertiary treatments. It must be remembered that the steps of treatment and type of treatment will depend upon the constituents and their concentrations in the effluent and final usage of water.

1. Explain how is the quality of water deteriorated due to human activities.

2. Why the protection of human health has become a problem ?

3. Justify the statement "Pesticides are useful and at the same time harmful to the ecosystem".

4. What determines biodegradability of a chemical ?

5. How polluted water is treated for safe disposal ?

SECTION - II

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

(5x15=75 marks)

Write short notes on :

6. Principle of HPLC.

7. Carbon monoxide.

8. Phytoplankton.

9. Ecological succession.

10. Student's 't' test.

11. Ecological Pyramids.

12. Food web

13. Fluorosis.

14. Application of GIS in Environmental Management.

15. Principle of coagulation.

16. Environmental Audit.

17. Scale of Meteorology.

18. Ecomark

19. Biofertilizers.

20. Laws of thermodynamics.

SECTION - III

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

(12x5=60 marks)

21. Write an account on radiation hazards and its impact on human health.

22. Describe 'hotspots' of biodiversity in India.

23. Examine the Arsenic problem in Bengal basin area. What are the possible remedial measures ?

24. Explain different components of soil and discuss the role of N, P and K in soil fertility.

25. Discuss harnessing potential of solar energy in India. Explain the principles used for heating and lighting.

SECTION - IV

Note : This section consists of one essay type question of forty (40) marks to be answered in about one thousand (1000) words on any of the following topics.

(40x1=40 marks)

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

(a) What are the endangered and threatened species ? Explain various methods of protecting them.

OR

(b) Define air quality index. Discuss various factors that affect urban air quality and measures of pollution control.

OR

(c) Discuss various methods of disposal and recycling of municipal and biomedical solid waste.

OR

(d) What is toxicity ? List out ten (10) important toxic substances present in the environment. Describe various methods of toxicity testing for pesticides.

OR

(e) Discuss hydrological cycle. Explain the concept of reservoirs, residence time and fluxes. Comment also on possible impact of climate change on water cycle.

OR

(f) What are the sources of marine pollution ? Discuss the 'impact of pollitants on marine ecosystem.' Describe control measures for marine pollution.

OR

(g) Explain the need for E.I.A. Discuss various methods of environmental impact assessment and their relative merits and demerits.

OR

(h) "Ecological modelling can forecast the population growth and interactions in an ecosystm". Justify with the help of suitable models.

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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 .....