PAPER-III
ENVIRONMENTAL SCIENCE

Signature and Name of Invigilator

1. (Signature) ___________________________
(Name) _____________________________
2. (Signature) ___________________________
(Name) _____________________________

Roll No.
(In figures as per admission card)

Roll No.___________________________________
(In words)

J 8 9 1 1

Time : **$2\,^{1}/_{2}$** hours] [Maximum Marks : **200**

Number of Pages in this Booklet : **32** Number of Questions in this Booklet : **19**

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. Answer 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 Question 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, Roll Number, Phone Number 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, or use abusive language or employ any other unfair means, 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.**

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 हुए 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 कागज की 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 अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें । 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 नियत स्थान के अलावा अपना नाम, रोल नम्बर, फोन नम्बर या कोई भी ऐसा चिह्न जिससे आपकी पहचान हो सके, अंकित करते हैं अथवा अभद्र भाषा का प्रयोग करते हैं, या कोई अन्य अनुचित साधन का प्रयोग करते हैं, तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
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 पेन का ही इस्तेमाल करें ।**
9. **किसी भी प्रकार का संगणक (केलकुलेटर) या लॉग टेबल आदि का प्रयोग वर्जित है ।**

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 consists of **two** essay type questions of **twenty (20)** marks each, to be answered in about **five hundred (500)** words each. **(2 × 20 = 40 marks)**

1. Hazardous waste management.

OR

Problems and prospects of nuclear energy in India.

OR

Soil types in India

OR

Role of National Parks and Sanctuaries in conservation of biodiversity.

OR

Environmental Impact Assessment of open cast coal mining projects.

OR

Environmental dimensions of pesticides and biopesticides.

2. Marine pollution as an emerging problem in India.

OR

Seismic zonation and earthquake risks in India.

OR

Bioethanol production from plant biomass.

OR

Principle of Atomic Absorption Spectroscopy and its application in the study of Environmental samples.

OR

Wildlife Conservation and Management.

SECTION – II

Note : This section contains **three (3)** questions of **fifteen (15)** marks each to be answered in about **three hundred (300)** words. **(3 × 15 = 45 marks)**

3. The excessive application of nitrogen fertilizers contaminates the groundwater. Comment.

4. Describe various types of radioactive waste.

5. Discuss the role of ions and radicals in the atmospheric chemistry.

SECTION – III

Note : This section contains **nine (9)** questions of **ten (10)** marks, each to be answered in about **fifty (50)** words. **(9 × 10 = 90 marks)**

6. What is the significance of carbonate compensation depth and lysocline in marine environment ?

7. How do the benthic fauna contribute to the productivity of a water body ?

8. Write about the methods to test the microbial quality of drinking water.

9. Define aquifer and zone saturation in relation to ground water.

10. Enlist methods for control of NO_x pollution in environment.

11. Distinguish between actinomycetes from fungi.

12. Define day-night noise index L_{DN}, if day is of 15 hours (6 AM – 9 PM) and night is of 9 hours (9 PM – 6 AM).

13. What are the guidelines of environmental audit ?

14. Give in brief the theoretical framework of a multiple regression model.

SECTION – IV

Note : This section contains **five (5)** questions of **five (5)** marks each based on the following passage. Each question should be answered in about **thirty (30)** words.

(5 × 5 = 25 marks)

Since long it has been realised that the exploitation of fossil fuels, metals and other non – renewables cannot continue unchecked. Expression of worldwide concern about sustainable industrialisation and development led to the first UN Earth Summit in Rio de Janeiro in 1992. The Summit defined the objectives of the sustainable development which included avoiding depletion of non–renewable resources, protection of environment, social equity and justice.

The International Energy Agency in the year 2003 predicted that with increasing energy demand, the world's supply of crude oil will peak around 2014 and that coal will last until the year 2200. The decline in available coal and crude oil should cause their prices to go up which would limit their use. Moreover the use of fossil fuels has been identified as a major factor contributing to global warming. To address the problems due to global warming, the international community agreed to have Kyoto Protocol in 1997, which envisaged a reduction of CO_2 emissions by 5.2% below 1990 levels by 2012. The use of renewable energy was to be increased to 5% by 2003 and 10% by 2010.

The Governments in United Kingdom and India have also stressed the need to create a low carbon economy and to have a low carbon footprint for the individuals. In response, countries like India have started searching for alternative energy sources. In this quest for developing new sources of energy, Biotechnology can play a significant role by identifying biological agents, tools and techniques for producing biofuels. This would help in achieving the goal of energy security for the country to a great extent.

15. What are the main objectives of sustainable development ?

16. What is the major cause of global warming and how does it occur ?

17. What was the main resolution of Kyoto Protocol ?

18. What do you understand by low carbon economy and carbon foot print ?

19. How can biotechnology help in achieving energy security ?

Space For Rough Work

FOR OFFICE USE ONLY	
Marks Obtained	
Question Number	Marks Obtained
1	
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Total Marks Obtained (in words) ....

(in figures) ....

Signature & Name of the Coordinator ....

(Evaluation) Date ....