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.

D-8909

Time : **2 1/2** hours] [Maximum Marks : **200**

PAPER-III
ENVIRONMENTAL SCIENCE

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. 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 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.**

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 अर्थात 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 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 ।**

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. **(5 × 5 = 25 marks)**

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

Biomes are defined as plants, which are evolved in response to climatic conditions and animals adapted to plants as per source food and shelter. This means types of plants and animals communities present in a defined climatic conditions are different from other climatic zones. There are basically three broad climatic conditions influencing biotic communities (temperature, sunshine and precipitation). In addition, local edaphic factors play important role in variation of biological communities with same climatic conditions.

Biome classification is based on average rainfall, potential evapo-transpiration and mean annual temperatures. These factors may also vary depending on longitude, latitude and altitude. Whittakar also proposed biome classification based on gradient analysis. There are extreme climatic conditions in certain types of biomes while other have uniform climatic throughout the years. These biomes also differ in species diversity, stratification and canopy cover. Biomes occurring on both sides of equator are known to be rich in biodiversity, evergreen and stratified, while polar and hot desert biomes are very characteristic due to limitation in various climatic factors. Within tropical bromes, there are a number of different units which are known as desert, moist deciduous, deciduous, thorny and grasslands, each having set of climatic ranges and biotic communities.

These naturally occurring biological communities are under threat due to various developmental activities, trade, rapid utilization for health, food and economical purposes etc.

As these biomes play an important role in regulating various ecological functions, their protection and conservation have been undertaken under various initiatives, rules and regulations and legislation.

1. Explain basis of biome classification with example.

2. Describe the role of altitudinal changes in biotic communities.

3. Explain characteristics of desert biome.

4. Is CITES relevant in protection and conservation of biomes ?

5. Mention types of protected areas in India. Explain their significance.

SECTION – II

Note : This section contains **fifteen (15)** questions, each to be answered in about **thirty (30)** words. Each question carries **five (5)** marks. **(5 × 15 = 75 marks)**

6. Discuss the importance of sensitivity and detection limit in analytical method.

7. Heavy metals (As, Cd, Hg, Pb etc.) are known to be toxic for human beings and animals. Suggest remedial measures for any one of the above mentioned metal.

8. Different models have been suggested to describe energy flow in an ecosystem. What do the two arms of a Y-shaped energy flow model represent ?

9. What is cryo-preservation ? Is this technique useful in germ plasm conservation through somatic embryogenesis ?

10. Comment on the energy content of different types of coal.

11. Discuss the water quality index.

12. Explain health hazards associated with fly ash.

13. What are the criteria used in identification of 'Hot Spots' ?

14. Explain the principles and working of aerobic pond used in sewage treatment.

15. Describe the process involved in formation of secondary air pollutants.

16. How important is environmental audit as a part of EIA ?

17. Enlist various processes involved in environmental planning.

18. Explain the principles of coastal regulation zones.

19. Define Skewness, Kurtosis and Median.

20. Explain methanogenesis in biogas production.

SECTION – III

This section contains **five (5)** questions. Each question carries **twelve (12)** marks and is to be answered in about **two hundred (200)** words. **(5 × 12 = 60 marks)**

21. Discuss an appropriate chromatographic method for separation of organic pollutants in water on the basis of their relative size.

22. How do the moist tropical deciduous forest differ from dry tropical deciduous forest ? Explain with example.

23. Discuss green energy options.

24. Explain the principles and working of an aerobic pond used in sewage treatment.

25. Describe in brief methods used in reclamation of wastelands.

SECTION – IV

This section consists of one essay type question of **forty (40)** marks to be answered in about **one thousand (1000)** words on any **one** of the following topics. **(40 × 1 = 40 marks)**

26. Discuss the linkages between El Nino, La Nino, thermahyaline balance and the global climate change.

OR

Integrate EIA, EMP & Environmental Audit as requirement of life cycle-use coal based thermal power plant for elaborating your answer.

OR

What is bio-remediation ? Is bioremediation eco-friendly method in restoration of soil quality ? Justify your answer.

OR

Discuss various guidelines and notification required in developing new township with reference to environmental issues. Add a note on methods used to make eco-friendly township.

OR

What are wetlands ? Discuss the role of wetlands in ecosystem. Explain criteria used in identification of ecologically important wetlands under Ramsar convention.

OR

Explain method for removal of interference caused by the emission intensities in the measurement of absorption intensities using atomic absorption spectrometer (AAS).

OR

Describe the various methods of energy production from ocean ? Add a note on the feasibility of power production through ocean thermal energy conversion.

OR

What is ecological succession ? How many types of ecological successions are there ? Discuss in detail the structural and functional changes taking place from a baren to climax stage in a water habitat giving suitable examples.

FOR OFFICE USE ONLY	
Marks Obtained	
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(in figures) .....

Signature & Name of the Coordinator .....

(Evaluation) Date .....