

## PAPER-II ENVIRONMENTAL SCIENCE

### Signature and Name of Invigilator

1. (Signature) \_\_\_\_\_

(Name) \_\_\_\_\_

2. (Signature) \_\_\_\_\_

(Name) \_\_\_\_\_

**J 8 9 1 2**

Time : 1 ¼ hours]

[Maximum Marks : 100

Number of Pages in this Booklet : 8

Number of Questions in this Booklet : 50

#### Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of fifty multiple-choice type of questions.
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.**
  - (iii) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.  
**Example :** (A) (B) (C) (D)  
where (C) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Sheet given inside the Paper I Booklet only**. If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR 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.
9. You have to return the test question booklet and Original OMR Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry duplicate copy of OMR Sheet on conclusion of examination.
10. Use only Blue/Black Ball point pen.
11. Use of any calculator or log table etc., is prohibited.
12. There is no negative marks for incorrect answers.

OMR Sheet No. : .....  
(To be filled by the Candidate)

Roll No. 

--	--	--	--	--	--	--	--

  
(In figures as per admission card)

Roll No. \_\_\_\_\_  
(In words)

#### परीक्षार्थियों के लिए निर्देश

1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
2. इस प्रश्न-पत्र में पचास बहुविकल्पीय प्रश्न हैं ।
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 चेक 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 ।
  - (iii) इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
4. प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (A), (B), (C) तथा (D) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है ।  
**उदाहरण :** (A) (B) (C) (D)  
जबकि (C) सही उत्तर है ।
5. प्रश्नों के उत्तर केवल प्रश्न पत्र I के अन्दर दिये गये OMR पत्रक पर ही अंकित करने हैं । यदि आप OMR पत्रक पर दिये गये वृत्त के अलावा किसी अन्य स्थान पर उत्तर चिह्नांकित करते हैं, तो उसका मूल्यांकन नहीं होगा ।
6. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें ।
7. कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें ।
8. यदि आप OMR पत्रक 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 ।
9. आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें । हालांकि आप परीक्षा समाप्ति पर OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
10. केवल नीले/काले बाल प्वाइंट पेन का ही इस्तेमाल करें ।
11. किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है ।
12. गलत उत्तरों के लिए कोई अंक काटे नहीं जाएँगे ।

**ENVIRONMENTAL SCIENCE**  
**Paper – II**

**Note :** This paper contains **fifty (50)** objective type questions, each question carrying **two (2)** marks. Attempt **all** the questions.

1. If the standard deviation of a population is 20 and the standard error of mean is 4, then the sample size is  
(A) 25  
(B) 80  
(C) 5  
(D) 100
2. In a multiple regression model, the explained variance per d.f. is 50 and unexplained variance per d.f. is 10. The F-ratio is  
(A) 2.5  
(B) 5  
(C) 25  
(D) 0.2
3. Which one of the following is not a random sampling method ?  
(A) Stratified Sampling  
(B) Cluster Sampling  
(C) Systematic Sampling  
(D) Judgement Sampling
4. In the Gaussian Plume Model, the plume size is estimated considering buoyancy of exhaust gases, stack diameter, wind speed and stability of the atmosphere. The plume size  $\Delta h$  depends on inside radius of stack ( $r$ ) as  
(A)  $\Delta h \propto r$   
(B)  $\Delta h \propto r^{1/3}$   
(C)  $\Delta h \propto r^{2/3}$   
(D)  $\Delta h \propto r^2$
5. The acidity of normal rain water is due to  
(A)  $\text{CO}_2$   
(B)  $\text{Cl}_2$   
(C)  $\text{NO}_2$   
(D)  $\text{SO}_2$
6. Percent of water on the world's surface representing fresh water is  
(A) 97  
(B) 50  
(C) 10  
(D) 3
7. Concentration of  $\text{CO}_2$  in present day atmosphere is  
(A) ~ 220 ppm  
(B) ~ 280 ppm  
(C) ~ 360 ppm  
(D) ~ 390 ppm
8. Hardness of diamond is due to  
(A) Coordinate bonding  
(B) Covalent bonding  
(C) Electrovalent bonding  
(D) van der Waals forces

9. In biological systems sulphur is largely bound in
- Lipids
  - Proteins
  - Nucleic acids
  - Proteins and nucleic acids
10. pH of 0.01 M HNO<sub>3</sub> is
- 0.1
  - 1
  - 2
  - 10
11. Which is a correct food chain in the Antarctic ecosystem ?
- Phytoplankton – Krill – Carnivorous Plankton – Emperor Penguin
  - Phytoplankton – Krill – Carnivorous Plankton – Squid – Elephant Seal – Leopard Seal
  - Phytoplankton – Herbivorous Zoo Plankton – Carnivorous Plankton – Adelic Penguin – Emperor Penguin
  - Herbivorous Zoo Plankton – Phytoplankton – Carnivorous Plankton – Elephant Seal – Leopard Seal
12. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R) :
- Assertion (A) :** The phosphorous cycle in an ecosystem is a sedimentary cycle.
- Reason (R) :** Phosphorous does not occur naturally as gas.
- Both (A) and (R) are true and (R) is the correct explanation of (A).
  - Both (A) and (R) are true, but (R) is not the correct explanation of (A).
  - (A) is true, but (R) is false.
  - (A) is false, but (R) is true.
13. Pyramid of trophic levels is always upright in case of
- Biomass
  - Energy
  - Number
  - All of the above
14. Which of the following is a correct match ?
- Periyar – Kerala
  - Ranthambore – M.P.
  - Panna – U.P.
  - Bandhvgarh – Bihar
15. Replacement of existing communities by any external condition is termed
- Primary succession
  - Secondary succession
  - Autogenic succession
  - None of the above
16. The area where two major communities meet and blend together is termed as
- Ecotype
  - Biotype
  - Ecotone
  - Meeting place

17. Indian wolf has become an important animal because
- (A) It's name appears in Red Data Book.
  - (B) It is only an important member of food chain of almost all Indian forests.
  - (C) Wild dogs disappeared due to their presence.
  - (D) It has been chosen as a State animal.
18. Walkley and Black rapid titration method is used for the determination of
- (A) Organic carbon content of soil
  - (B) Nitrate content of soil
  - (C) Phosphate content of soil
  - (D) Fluoride content of soil
19. Which one of the following is an endoenzyme in soil ?
- (A) Cellulase
  - (B) Invertase
  - (C) Protease
  - (D) Dehydrogenase
20. Of the following humic groups which is not soluble in both acid and alkali ?
- (A) Fulvic acid
  - (B) Humic acid
  - (C) Humin
  - (D) All of the above
21. The sources of thermal pollution are
- (A) Power plants
  - (B) Cooling forests
  - (C) Industrial effluents
  - (D) All of the above
22. Which one of the following radionuclides has the longest half life ?
- (A)  $C^{14}$
  - (B)  $Sr^{90}$
  - (C)  $I^{131}$
  - (D)  $Cs^{137}$
23. What is the importance of the 42<sup>nd</sup> Amendment to the Constitution brought in the year 1976 ?
- (A) Insertion of Article 48-A
  - (B) Insertion of Article 51-A (g)
  - (C) Insertion of Article 48-A and 51-A (g)
  - (D) None of the above
24. Who issues the Ecomark notification ?
- (A) Ministry of Environment and Forest, Govt. of India
  - (B) Ministry of Human Health and Family Welfare, Govt. of India
  - (C) Department of Science and Technology, Govt. of India
  - (D) Bureau of Indian Standards

25. Which one of the following is a waste recycling method of solid waste management ?
- (A) Pelletisation  
(B) Composting  
(C) Incineration  
(D) Sanitary Landfill
26. A hazardous waste is characterised by
- (A) Ignitibility  
(B) Reactivity  
(C) Toxicity  
(D) All of the above
27. How many hot spots have been identified in the world and Indian Subcontinent respectively ?
- (A) 17, 2  
(B) 12, 3  
(C) 35, 2  
(D) 17, 3
28. Which one of the following chemical species of mercury is highly toxic to living system ?
- (A) Mercurous ion  
(B) Mercuric ion  
(C) Organo mercurials  
(D) Atomic mercury
29. Natural gas is composed primarily of
- (A) Methane  
(B) n-butane  
(C) n-octane  
(D) A mixture of n-octane and n-butane
30. Which of the following is true regarding the Leopold interaction matrix used in Environmental Impact Assessment Process ?
- (A) It can be expanded.  
(B) It can be contracted.  
(C) It can be contracted and expanded.  
(D) It cannot be contracted and expanded.
31. Which of the following can be considered in Environmental Risk Assessment ?
- (A) Exposure period  
(B) Potency of a toxic material  
(C) Quality of models  
(D) All of the above
32. In India, Environmental Impact Assessment report of a proposed river valley project after environmental clearance is applicable for a maximal period of how many years ?
- (A) 5  
(B) 10  
(C) 30  
(D) 2
33. An earthquake is rated as 'major' if its magnitude in Richter Scale is in the range of
- (A) 4.0 – 4.9  
(B) 7.0 – 7.9  
(C) 6.0 – 6.9  
(D) 5.0 – 5.9
34. What is the proportion of the frequency of occurrence of La Nina compared to El Nino ?
- (A) Half  
(B) One-third  
(C) Twice  
(D) Two-third

35. An element in soil will be considered as a trace element if its concentration is

- (A) 1 – 2 wt %
- (B) < 0.1 wt %
- (C) > 2 wt %
- (D) < 1 wt %

36. Which of the following is correct about attribute data in Geographic Information System ?

- (A) Attributes are pieces of data that are connected or related to the points, lines or polygons mapped in the GIS.
- (B) Attribute data can be analysed to determine patterns of importance.
- (C) Attribute data is entered directly into a database where it is associated with element data.
- (D) All of the above

37. At Nadir, the LISS – IV camera in IRS-P6 has a spatial resolution of

- (A) 5.8 m
- (B) 5.9 m
- (C) 5.7 m
- (D) 5.6 m

38. Which one of the following can be estimated by Flame Photometer ?

- (A) Sodium and Potassium
- (B) Cadmium and Cobalt
- (C) Chlorine and Bromine
- (D) Mercury and Arsenic

39. The contribution of CO<sub>2</sub> towards global warming has been estimated to be about

- (A) 57 – 60%
- (B) 60 – 75%
- (C) 80 – 85%
- (D) 45 – 55%

40. The principal components of photochemical smog in urban areas are

- (A) SO<sub>2</sub> and NO<sub>2</sub>
- (B) SPM and CO
- (C) SPM and NO<sub>2</sub>
- (D) Hydrocarbons and Ozone

41. Match Lists – I and II and choose the correct answer from the codes given below :

**List – I**

**(Aerosol Constituents)**

(i) Si

(ii) V

(iii) Benzo(a)pyrene

(iv) Sulfuric acid droplets

**List – II**

**(Sources)**

1. Gases in the ambient atmosphere

2. Natural sources

3. Combustion of certain kinds of fuel oil

4. Incomplete combustion

**Codes :**

- |     | (i) | (ii) | (iii) | (iv) |
|-----|-----|------|-------|------|
| (A) | 2   | 4    | 3     | 1    |
| (B) | 3   | 1    | 2     | 4    |
| (C) | 4   | 1    | 2     | 3    |
| (D) | 1   | 4    | 3     | 2    |

42. A river flowing at  $20.0 \text{ m}^3/\text{sec}$  has a tributary feeding into it with a flow rate of  $5.0 \text{ m}^3/\text{sec}$ . Upstream from the point of junction. The fluoride concentration is  $5 \text{ mg/L}$  in the river and  $10 \text{ mg/L}$  in the tributary. Assuming fluoride to be conservative substance and rapid mixing in the river, the downstream concentration in the river is
- (A)  $6 \text{ mg/L}$   
 (B)  $8 \text{ mg/L}$   
 (C)  $8.5 \text{ mg/L}$   
 (D)  $7.5 \text{ mg/L}$
43. The power obtained from a horizontal wind turbine operating at maximum efficiency is proportional to its diameter (D) as
- (A) D                      (B)  $D^2$   
 (C)  $D^{3/2}$                 (D)  $\sqrt{D}$
44. Noise of  $90 \text{ dB}$  for 8 hours represents  $100\%$  dose. If the noise of  $93 \text{ dB}$  is for 1 hour duration, it represents a dose of
- (A)  $25\%$                 (B)  $50\%$   
 (C)  $75\%$                 (D)  $100\%$
45. Scale lengths associated with mesoscale phenomenon in atmosphere are typically in the range
- (A)  $10 - 500 \text{ m}$   
 (B)  $1 - 200 \text{ km}$   
 (C)  $100 - 1000 \text{ km}$   
 (D)  $1000 - 10,000 \text{ km}$
46. When an atmosphere has an isothermal profile, it is
- (A) very stable  
 (B) slightly stable  
 (C) unstable  
 (D) very unstable (turbulent)
47. The wavelength range of UV-C radiation is
- (A)  $320 - 400 \text{ nm}$   
 (B)  $280 - 320 \text{ nm}$   
 (C)  $100 - 1500 \text{ nm}$   
 (D)  $240 - 280 \text{ nm}$
48. Lightening in the atmosphere produces
- (A) NO  
 (B) CO  
 (C)  $\text{CO}_2$   
 (D)  $\text{NH}_3$
49. The maximum tidal energy potential in India is
- (A) in Gulf of Khambhat  
 (B) in Gangetic delta in Sundarbans  
 (C) along the coast of Odisha  
 (D) along the coast of Chennai
50. The maximum theoretical efficiency of a silicon solar cell can be
- (A)  $45\%$   
 (B)  $30\%$   
 (C)  $12\%$   
 (D)  $50\%$

**Space For Rough Work**