

PAPER-II
ENVIRONMENTAL SCIENCES

Signature and Name of Invigilator

1. (Signature) _____
(Name) _____
2. (Signature) _____
(Name) _____

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

Roll No.

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(In figures as per admission card)

Roll No. _____
(In words)

D 8 9 1 0

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 oval as indicated below on the correct response against each item.
Example :

(A)	(B)	(C)	(D)
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where (C) is the correct response.
5. Your responses to the items are to be indicated in the **Answer Sheet given inside the Paper I Booklet only**. If you mark at any place other than in the ovals in the Answer 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 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.
9. You have to return the test question booklet and OMR Answer sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.
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.

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 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 ।
 - (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 दीर्घवृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है ।
उदाहरण :

(A)	(B)	(C)	(D)
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जबकि (C) सही उत्तर है ।
5. प्रश्नों के उत्तर केवल प्रश्न पत्र I के अन्दर दिये गये उत्तर-पत्रक पर ही अंकित करने हैं । यदि आप उत्तर पत्रक पर दिये गये दीर्घवृत्त के अलावा किसी अन्य स्थान पर उत्तर चिह्नानंकित 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 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 ।
9. आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं OMR उत्तर-पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें ।
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. Across the boundaries of a closed thermodynamical system
(A) matter flows but the energy doesn't.
(B) energy flows but the matter doesn't.
(C) both energy and matter flow.
(D) both energy and matter do not flow.
2. The largest soil group in India is of
(A) Red soil
(B) Black soil
(C) Sandy soil
(D) Mountain soil
3. Sustainable development is about
(A) Social justice and equity
(B) Avoiding depletion of non-renewable resources
(C) Environmental protection
(D) All of the above
4. The mixing height is maximum in the
(A) morning
(B) noon time
(C) evening
(D) mid-night
5. Synoptic scale in meteorology is of the order of
(A) 100 m
(B) 1 km
(C) 10 km
(D) 1000 km
6. Polychlorinated biphenyls (PCBs) are known to cause
(A) deformities in foetus
(B) nervous disorders
(C) liver and stomach cancer
(D) All of the above
7. Match the List – I and II and select the correct answer from the codes given below the lists :

List – I	List – II
(Analytical techniques)	(Measured items)
(a) XRF	1. Functional groups
(b) Nephelometry	2. Elements
(c) IR spectroscopy	3. Turbidity
(d) Gas chromatography	4. PAH

Codes :

	(a)	(b)	(c)	(d)
(A)	4	2	3	1
(B)	1	3	4	2
(C)	3	2	4	1
(D)	2	3	1	4
8. An antibacterial chemical present in wood smoke is
(A) Formaldehyde
(B) Cellulose
(C) Acetone
(D) Methane

9. Microfiltration generally employs
- thin polymer film with uniform pore size and a high pore density
 - thin microfilm with smaller pore size and low pore density
 - thin micro-bioplastic with regular pore size and a high pore density
 - thin membrane filter with uniform pore size and a high pore density
10. In natural waters with pH near 7.0, the redox potential lies between
- .81 Volt and 0.85 Volt
 - 0.41 Volt and 0.06 Volt
 - 0.41 Volt and 0.82 Volt
 - 0.06 Volt and 1.23 Volt
11. BIOCLAIM[®] – a metal biosorbent includes microorganisms, mainly bacteria of the genus
- Bacillus
 - Escherichia
 - Pseudomonas
 - Rhizobium
12. Saccharomyces cerevisiae is a
- Alga
 - Bacterium
 - Protozoan
 - Yeast
13. Method used to select growth of a specific type of bacteria in microbial ecology is
- FISH test
 - Enrichment culture
 - Biofilms
 - DNA sequencing
14. About half of earth's photosynthesis is carried out by
- Cyanobacteria
 - Rainforest flora
 - Protists
 - Marine phytoplankton
15. Ramsar Convention is associated with
- Forest conservation
 - Soil conservation
 - Wetland conservation
 - Wildlife conservation
16. In tropical cyclones, mean wind speeds are
- between 10 to 20 knots
 - between 20 to 40 knots
 - between 40 to 60 knots
 - greater than 63 knots
17. **Assertion (A)** : Processes involving living organisms are associated with sedimentation which is more closely linked with hydrosphere and the atmosphere.
- Reason (R)** : In the biosphere geochemical differentiation takes place through the metabolic action of organisms.
- Both (A) and (R) are correct and (R) is the correct explanation of (A).
 - Both (A) and (R) are correct and (R) is not the correct explanation of (A).
 - (A) is true, but (R) is false.
 - (A) is false, but (R) is true.

18. A mountain slope of slope angle 45° corresponds to which of the following in percent slope notation ?
 (A) 10 %
 (B) 50 %
 (C) 45 %
 (D) 100 %
19. Elastic-Rebound Theory suggests that an earthquake results due to change in the state of rock from
 (A) Elastic to brittle
 (B) Elastic to plastic
 (C) Plastic to elastic
 (D) Elastic to undeformed
20. How many Universal Transverse Mercator (UTM) zones are there on earth ?
 (A) 45
 (B) 50
 (C) 60
 (D) 90
21. Match list – I and II. Identify the correct answers using the codes given below the lists :
- | List – I | List – II |
|--------------------|----------------|
| (a) Noamundi Mines | 1. Gold ore |
| (b) Khetri Mines | 2. Pb – Zn ore |
| (c) Zawar Mines | 3. Iron ore |
| (d) Kolar Mines | 4. Copper ore |
- Codes :**
- | | (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|-----|
| (A) | 2 | 4 | 1 | 3 |
| (B) | 1 | 3 | 2 | 4 |
| (C) | 3 | 4 | 2 | 1 |
| (D) | 4 | 3 | 1 | 2 |
22. The second generation resource for biofuel production.
 (A) Coal
 (B) Petrol
 (C) Corn and molasses
 (D) Crop residues
23. The maximum temperature that can be obtained in a flat plate box type solar collector is between
 (A) $50^\circ\text{C} - 90^\circ\text{C}$
 (B) $100^\circ\text{C} - 150^\circ\text{C}$
 (C) $200^\circ\text{C} - 250^\circ\text{C}$
 (D) $45^\circ\text{C} - 50^\circ\text{C}$
24. At present, the total installed capacity of power generation from all sources in India is between
 (A) 60 GW to 90 GW
 (B) 30 GW to 60 GW
 (C) 100 GW to 200 GW
 (D) 200 GW to 250 GW
25. Which of the following materials is not used as moderator to slow down the fast neutrons produced in a nuclear reactor ?
 (A) Water
 (B) Heavy water
 (C) Graphite
 (D) Lead
26. If equivalent sound pressure level of 90 dB(A) for 8 hours represents 100% dose of noise, noise dose of 25% implies
 (A) 87 dB(A) for 4 hours
 (B) 84 dB(A) for 4 hours
 (C) 22.5 dB(A) for 8 hours
 (D) 84 dB(A) for 2 hours

27. Maximum photodissociation of NO_2 molecules in atmosphere occurs due to solar radiations in the wavelength range
- 300 nm – 400 nm
 - 400 nm – 500 nm
 - 500 nm – 550 nm
 - 550 nm – 600 nm
28. The time scale for vertical transport of pollutants in the troposphere is typically
- minutes
 - minutes to hours
 - days to weeks
 - years
29. For domestic drinking water supply the total dissolved solids should not exceed
- 250 ppm
 - 500 ppm
 - 600 ppm
 - 100 ppm
30. Which of the following sewage treatment relies on removing the suspended solids from water ?
- Primary treatment
 - Secondary treatment
 - Tertiary treatment
 - Breaking down of organic matter
31. The concept of Environmental Impact Assessment originated from
- Findings of a Royal Commission investigating the 'Weald Iron Mills and Furnaces' in Southern England in 1548.
 - Report of the 'Volta Preparatory Commission' (HMSO, 1956).
 - Discretionary guidelines of the National Environmental Policy Act in 1971.
 - Report of copper mining in Puerto Rico commissioned in February 1967.
32. **Assertion (A) :** Impact Assessment enables the planners and decision makers to think carefully about the project proposals.
- Reason (R) :** Impact Assessment can help in ensuring that planners and decision makers are more accountable for their actions.
- 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.
33. Eco-auditing focuses on
- Assessment of actual effects of existing activities
 - Assessment of project decisions
 - Policy assessment
 - Post project assessment

34. Match the list – I and II. Select the correct answer using the codes given below the lists :

List – I	List – II
(a) Ad-hoc Method	(i) Gives some measurements and describes the impacts
(b) Checklist Method	(ii) Limited value for scoping
(c) Overlay Method	(iii) Used for screening and for impact assessment, especially for impact identification
(d) Matrix Method	(iv) Acts as an aid in screening sites or routes for impacts

Codes :

	(a)	(b)	(c)	(d)
(A)	(i)	(ii)	(iii)	(iv)
(B)	(ii)	(iii)	(i)	(iv)
(C)	(iii)	(iv)	(ii)	(i)
(D)	(ii)	(i)	(iv)	(iii)

35. Eco-labelling is governed by

- (A) ISO 14001
- (B) ISO 14020
- (C) ISO 14010
- (D) ISO 14040

36. The predominant gas emitted during the early life of a MSW landfill is

- (A) CO
- (B) CO₂
- (C) CH₄
- (D) VOCs

37. Black foot disease is caused by

- (A) excess of fluoride in water
- (B) deficiency of iodine in water
- (C) excess of arsenic in water
- (D) excess of iodine in water

38. The Water Cess Act 1977 was amended in the year

- (A) 1991
- (B) 1978
- (C) 1988
- (D) 1987

39. Public Liability Insurance Act was enacted in which year ?

- (A) 1991
- (B) 1986
- (C) 1990
- (D) 1984

40. In a multiple regression model $Y_i = \alpha + \beta_{1i}X_i + \beta_{2i}X_{2i} + \beta_{3i}X_3 + \epsilon_i$, if $i = N$, the number of degrees of freedom required for determining the t-value at 5% level of significance

- (A) $N - 3$
- (B) $N - 2$
- (C) $N - 4$
- (D) $N - 1$

41. For large population sizes, the t-distribution approaches

- (A) Normal distribution
- (B) Poisson distribution
- (C) Binomial distribution
- (D) Chi-square distribution

42. Lotka-Volterra Model deals with
- (A) Prey-Predator interactions
 - (B) Predicting CO₂ concentrations
 - (C) Study of pollutant concentration in river streams
 - (D) Study of pollutant concentration in atmospheric environment

43. Eigen values of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

are

- (A) 0, 0, 1
 - (B) 0, 1, 1
 - (C) 0, 2, 1
 - (D) 0, 0, 3
44. The second moment of the data set 2, 3, 7, 8, 10 is
- (A) 6
 - (B) 378
 - (C) 45.2
 - (D) 22.51
45. In Gaussian dispersion model, the effective stack height is taken as sum of physical stack height and the plume rise ΔH . The plume rise varies with stack velocity V_S in the following manner :
- (A) $\Delta H \propto V_S$
 - (B) $\Delta H \propto V_S^2$
 - (C) $\Delta H \propto V_S^{-1}$
 - (D) $\Delta H \propto V_S^{3/2}$

46. **Assertion (A) :** A large number of districts in States of India have become water stressed.

Reason (R) : The population in India has increased appreciably since independence.

Codes :

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
 - (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
 - (C) (A) is true, but (R) is false.
 - (D) (A) is false, but (R) is true.
47. Copenhagen Conference on climate change was held as a sequel to
- (A) Montreal Protocol
 - (B) Ramsar Convention
 - (C) Basel Convention
 - (D) Kyoto Protocol
48. Under the Climate Change Action Plan of Government of India which of the renewable source of energy has been identified as a priority for exploitation ?
- (A) Solar energy
 - (B) Wind energy
 - (C) Tidal energy
 - (D) Geothermal energy
49. International Ozone Day is celebrated on
- (A) 21st April
 - (B) 5th June
 - (C) 22nd April
 - (D) 16th September
50. Sardar Sarovar Dam is built on
- (A) Sabarmati river
 - (B) Narmada river
 - (C) Tapti river
 - (D) Chambal river

Space For Rough Work