

Signature and Name of Invigilator

1. (Signature) _____

(Name) _____

2. (Signature) _____

(Name) _____

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

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

(In figures as per admission card)

Roll No. _____

(In words)

J 8 9 1 0

Time : 1 ¼ hours]

PAPER-II

[Maximum Marks : 100

ENVIRONMENTAL SCIENCES**Test Booklet No.**

Number of Pages in this Booklet : 8

Number of Questions in this Booklet : 50

Instructions for the Candidates

- Write your roll number in the space provided on the top of this page.
- This paper consists of fifty multiple-choice type of questions.
- 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 :
 - 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.
 - 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.**
 - After this verification is over, the Test Booklet Number should be entered in the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
- 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
---	---	---	---

where (C) is the correct response.
- 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.
- Read instructions given inside carefully.
- Rough Work is to be done in the end of this booklet.
- 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.
- 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.
- Use only **Blue/Black Ball point pen**.
- Use of any calculator or log table etc., is prohibited.
- There is no negative marks for incorrect answers.

परीक्षार्थियों के लिए निर्देश

- पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
- इस प्रश्न-पत्र में पचास बहुविकल्पीय प्रश्न हैं ।
- 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 :
 - 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 ।
 - 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 ।**
 - इस जाँच के बाद प्रश्न-पुस्तिका की क्रम संख्या OMR पत्रक पर अंकित करें और OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
- 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
---	---	---	---

जबकि (C) सही उत्तर है ।
- 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 ।
- अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें ।
- कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें ।
- 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 ।
- 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 ।
- केवल नीले/काले बाल प्वाइंट पेन का ही इस्तेमाल करें ।**
- किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है ।**
- 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. PIXEL is used in evaluation of satellite imageries. It refers to
 - (A) Photo ionic radiation
 - (B) Photo induced x-rays emitted light
 - (C) Printed in x-radiation region
 - (D) An image of 100 km ×100 km region
2. Geostationary satellites orbit above the earth at about
 - (A) 10 km above the earth
 - (B) 500 km above the earth
 - (C) 1500 km above the earth
 - (D) 5 km above the earth
3. Environmental assessment of a developmental projects follow the following sequence to achieve sustainable development.
 - (A) EA → EMP → EIA
 - (B) EIA → EA → EMP
 - (C) EMP → EA → EIA
 - (D) EIA → EMP → EA
4. Dolomite is
 - (A) an isomorphous substitution between CaCO_3 & MgCO_3
 - (B) a fixed composition of $\text{Ca}_{0.52}\text{Mg}_{0.48}\text{CO}_3$
 - (C) a polygraph of limestone
 - (D) an isomorph of calcite
5. In order of increasing cation exchange capacity
 - (A) Illite > Kaolinite > Sericite > Gibbsite
 - (B) Kaolinite > Gibbsite > Sericite > Illite
 - (C) Kaolinite > Illite > Montmorillonite
 - (D) Montmorillonite > Kaolinite > Illite
6. In order of increasing energy content
 - (A) Lignite, Peat, Anthracite, Bituminous coal
 - (B) Peat, Lignite, Anthracite, Bituminous coal
 - (C) Anthracite, Lignite, Bituminous coal, Peat
 - (D) Bituminous coal, Anthracite, Lignite, Peat
7. Agenda 21 is blue-print for environment & development. Agenda 21 was an outcome of the meeting at
 - (A) Rio de Janeiro
 - (B) Stockholm
 - (C) Vienna
 - (D) Washington

8. BOD of the effluents discharged on land for irrigation should not exceed
 (A) 30 mg/l (B) 100 mg/l
 (C) 300 mg/l (D) 60 mg/l
9. Atmospheric radioactive window permits thermal radiation of which wavelength to leave the earth ?
 (A) 4.3 to 9.3 μm
 (B) 9.5 to 10.6 μm
 (C) 7 to 12 μm
 (D) 7.3 to 10.3 μm
10. Three constituents that contribute towards stratospheric ozone depletion
 (A) CFC-11, CFC-12, N_2O
 (B) CFC-11, CFC-16, NO_2
 (C) CFC-11, CFC-12, O_2
 (D) CFC-11, CFC-13, H_2
11. In an ecological succession there is a progressive change in biological community over time & space
 (A) Old species are replaced by new one.
 (B) Old species evolved into new species.
 (C) New species moves in displacing previous one.
 (D) Each stage there is a modification in the environment to adopt new species.
12. In nitrogen cycle elemental nitrogen returned to the atmosphere by the following process.
 (A) Nitrogen fixing bacteria.
 (B) Nitrogen fixation by blue-green algae.
 (C) Nitrification process.
 (D) Denitrification process.
13. Fe & Mg silicates form ideal solid solution in
 (A) Pyroxene (B) Feldspar
 (C) Olivine (D) Mica
14. One of the following represent pyroclases :
 (A) $\text{NaAl}_2\text{Si}_2\text{O}_6$
 (B) $\text{KA/Si}_3\text{O}_8$
 (C) $\text{Mg}_2\text{Al}_2\text{Si}_2\text{O}_6$
 (D) $\text{Na}_x\text{K}_{1-x}\text{Al}_2\text{Si}_2\text{O}_6$
15. Government of India has enacted various Acts for protection & conservation of environment. However, more inclusive Act is
 (A) Water (Prevention & Control of Pollution) Act
 (B) Air (Prevention & Control of Pollution) Act
 (C) Forest Act
 (D) Environment (Protection) Act

16. CRZ notification of Government of India specify the stretches of sea, bays, estuaries etc. as coastal areas requires protection from developmental activities.
- (A) upto 500 metre from High Tide Level
 (B) upto 150 metre from High Tide Level
 (C) upto 500 metre from Low Tide Level
 (D) upto 100 metre from Low Tide Level
17. An objective of environmental audit is
- (A) Raw-material & Waste minimization.
 (B) Energy conservation & monitoring.
 (C) To improve technical competency.
 (D) All of the above.
18. Biome is a natural community of
- (A) Plants in a geographical area.
 (B) Animals in a geographical area.
 (C) Plants and animals in a geographical area.
 (D) Plants in Arctic region.
19. Who proposed that succession is not orderly and directional but is heterogenous ?
- (A) Clements (B) Egler
 (C) Tansley (D) Reiter
20. In an ecosystem a food chain is represented as :
 Dead organic matter → Earthworm → Sparrow → Falcon.
 This is a type of
- (A) Predator food chain
 (B) Grazing food chain
 (C) Detritus food chain
 (D) Auxiliary food chain
21. The rate of biogenetic nutrients between the abiotic and biotic components of an ecosystem is often referred to as
- (A) Turn over rate
 (B) Production rate
 (C) Standing state
 (D) Cycling rate
22. Which of the following pair is not correctly matched regarding National Parks and their locations ?
- (A) Nilgiri → Tamil Nadu
 (B) Sunderbans → West Bengal
 (C) Nanda Devi → Uttar Pradesh
 (D) Kanha → Rajasthan
23. Ecotone is
- (A) ecosystem
 (B) a zone of an ecosystem
 (C) an ecological study
 (D) a zone between two ecosystem

24. When solid becomes liquid at its melting point, the entropy
- increases
 - decreases
 - zero
 - remains unaltered
25. The CNS poisoning by methyl mercury is known as
- Methamoglobinemia
 - Minamata disease
 - Anemic disease
 - All of the above
26. Topographic factors affect indirectly one of the following :
- Edaphic factors
 - Biotic factors
 - Climatic factors
 - All of the above
27. Atmosphere contains various layers each having characteristic composition. The correct sequence starting from earth surface is
- Stratosphere → Ionosphere → Toposphere.
 - Toposphere → Ionosphere → Stratosphere.
 - Ionosphere → Stratosphere → Toposphere.
 - Toposphere → Stratosphere → Ionosphere.
28. One of the following in biogeochemical cycle has not involved biological fixation :
- Oxygen
 - Carbon
 - Nitrogen
 - Phosphorus
29. One of the following 'P' values indicates significance of the test :
- $P > 0.05$
 - $P < 0.05$
 - $P = 0.05$
 - All of the above
30. The calorific value of natural gas varies from
- 12,000 – 14,000 kCal/m³
 - 13,000 – 18,000 kCal/m³
 - 16,000 – 18,000 kCal/m³
 - 10,000 – 11,000 kCal/m³
31. Biogas is composed of
- Ethane, CO₂, H₂ & N₂
 - Methane, CO₂, H₂ & N₂
 - Methane, CO₂ & N₂
 - Ethane, Methane & CO₂
32. Which of the following is the concentration of CO₂ in the atmosphere (water vapour free) ?
- 0.32 %
 - 0.032 %
 - 0.38 %
 - 0.038 %
33. Methanization is carried out by the process of
- Incineration
 - Alcoholic fermentation
 - Thermo-chemical transformation
 - Anaerobic fermentation

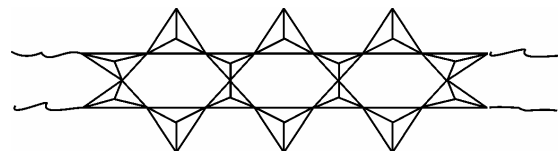
34. Diesel oil is a fraction obtained between
 (A) 40-120 °C (B) 180-250 °C
 (C) 250-320 °C (D) 280-360 °C
35. In a trickling filter biological method of domestic waste treatment a layer of biological community growing on the substrate is
 (A) Algal film
 (B) Bacterial layer
 (C) Protozon community
 (D) Zoogloea film
36. Primary clarifier basically designed to remove which of the following from waste water ?
 (A) Particulate matter
 (B) Heavy materials & large size materials
 (C) Particulate matter & oily substances
 (D) Dissolved substances
37. Solubility of NaCl in water is 10^{-1} m/l. The concentration of Na⁺ in water will be
 (A) $\left[\frac{10^{-1}}{2}\right]$ m/l (B) $\left[\frac{10^1}{2}\right]$ m/l
 (C) 10^{-1} m/l (D) $\left[\sqrt{10^{-1}}\right]$ m/l
38. In a river with symmetric channel
 (A) Maximum velocity is at the bottom
 (B) Minimum velocity is at the surface
 (C) Maximum velocity is at the borders
 (D) Maximum velocity is at 0.7 of the depth
39. Reciprocal of arithmetic mean of the reciprocal of individual observation refers to
 (A) weighted mean
 (B) geometric mean
 (C) median mean
 (D) harmonic mean
40. If the size of the sample is very small, then suitable sampling method for better result is obtained by
 (A) Random sampling
 (B) Stratified sampling
 (C) Census sampling
 (D) Purposive sampling
41. In an unbalanced or skewed distribution, which measures of central tendency is least biased ?
 (A) Mean (B) Median
 (C) Mode (D) Range
42. Proposed fuel for controlled nuclear fusion is lithium deuteride, LiD. Which of the following reactions would possibly contribute to energy production ?
 I. ${}^6_3\text{Li} + {}^1_0\text{h} \rightarrow {}^4_2\text{He} + {}^3_1\text{H}$
 II. ${}^6_3\text{Li} + {}^2_1\text{H} \rightarrow 2{}^4_2\text{He}$
 III. $2{}^2_1\text{H} + {}^3_2\text{He} + {}^1_0\text{h}$
 (A) All of them (B) I
 (C) III (D) I and II

43. What is the free energy, ΔG , when 1.0 mole of water is converted, at 100 °C and 1.0 atm, to steam at 100 °C and 1.0 atm in a reversible manner ?

$$[\Delta H_{\text{vap}}(\text{H}_2\text{O}) = 9.7 \text{ kcal mol}^{-1}]$$

- (A) 9700 Cal (B) 970 Cal
(C) -970 Cal (D) 0.0 Cal
44. Silver oxalate $\text{Ag}_2(\text{C}_2\text{O}_4)$ is dissolved in pure water. The concentration of Ag^+ in the saturated solution is 2.2×10^{-4} mole liter. What is the K_{sp} value of $\text{Ag}_2(\text{C}_2\text{O}_4)$?
- (A) 5.3×10^{-12} (B) 5.0×10^{-8}
(C) 2.2×10^{-4} (D) 11×10^{-12}
45. The bond distance in A-B is 0.917 Å and the de pole moment is 1.91 D. The partial character of the bond is
- (A) 43 % (B) 50 %
(C) 45 % (D) 38.5 %
46. One of the chief ores of uranium ($Z = 92$) is pitch blende (U_3O_8). When pitch blende is treated with nitric acid, uranyl nitrate $[\text{UO}_2(\text{NO}_3)_2]$ is formed. What is the change in the oxidation number of uranium when this conversion takes place ?
- (A) +6 (B) no change
(C) +2/3 (D) +2

47. The silicate ion in chrysotile consists of double strands of $\text{Si}_2\text{O}_7^{-4}$ tetrahedra as shown below :



What is the general composition of the silicate ion in chrysotile ?

- (A) $(\text{Si}_2\text{O}_7)_n$ (B) $\text{Si}_2\text{O}_7^{-6}$
(C) $(\text{Si}_4\text{O}_{11})_n^{-6n}$ (D) $(\text{SiO}_3)_n^{-2n}$
48. One of the following categories of CRZ, there is no developmental activities are allowed :
- (A) CRZ-II (B) CRZ-I
(C) CRZ-III (D) CRZ-IV
49. Rapid EIA is called
- (A) a study of three months
(B) a study of four months
(C) a study of six months
(D) a study of one year
50. Development of 'Green Belts' around industries are
- (A) to control ground leachates
(B) to mitigate the gaseous pollutant
(C) to increase bioaesthetic
(D) all of the above

Space For Rough Work