

Signature and Name of Invigilator

1. (Signature) _____

(Name) _____

2. (Signature) _____

(Name) _____

J-8905

PAPER – II

Time : 1¼ hours] ENVIRONMENTAL SCIENCE [Maximum Marks : 100

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 Serial No. of the booklet should be entered in the Answer-sheets and the Serial No. of Answer Sheet should be entered on this 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 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 marking.

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

Roll No.

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(In figures as per admission card)

Roll No. _____
(In words)

Test Booklet No.

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 उत्तर-पत्रक पर अंकित करें और उत्तर-पत्रक को 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 चिह्नित 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 उत्तर-पुस्तिका निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद 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 उत्तर के लिए अंक नहीं काटे जायेंगे।

ENVIRONMENTAL SCIENCE

PAPER – II

Note : This paper contains **fifty** (50) multiple-choice questions, each question carrying **two** (2) marks. Attempt **all** of them.

- For maximum biogas production following conditions are recommended :
(A) Strict anaerobic (B) Strict aerobic
(C) Only cellulose as a carbon source (D) Semi aerobic
- To establish wind mill for commercial production of electricity, the optimum range of wind speeds required is :
(A) 4 - 10 m/sec (B) 20 - 30 m/sec
(C) 35 - 45 m/sec (D) > 100 m/sec
- To initiate fission of ^{238}U , the kinetic energy required for neutron is :
(A) ~ 1.5 MeV (B) ~ 0.5 MeV (C) ~ .025 MeV (D) ~ 1 KeV
- The national ambient air quality standard for average annual concentration of NO_x in residential area is :
(A) 20 $\mu\text{g}/\text{m}^3$ (B) 60 $\mu\text{g}/\text{m}^3$ (C) 80 $\mu\text{g}/\text{m}^3$ (D) 100 $\mu\text{g}/\text{m}^3$
- Land sea and mountain valley breezes occur on which of the following horizontal space scales :
(A) Micro Scale (B) Meso scale
(C) Synoptic scale (D) > 40,000 km
- Carbon di-oxide absorbs radiation very strongly in which of the following wavelength ranges ?
(A) 12 - 18 μm (B) 4 - 11 μm (C) 0.7 - 3 μm (D) 0.8 - 1.1 μm
- About 97% of the atmospheric mass lies in the first
(A) 30 km above ground (B) 100 km above ground
(C) 300 km above ground (D) 10 km above ground
- Which is the correct chronological order (oldest to youngest) in which the following were formed :
(I) Atlantic Ocean (II) Indian Ocean
(III) Pacific Ocean (IV) Mediterranean sea
Select the correct answer using the code given below :
(A) III, I, IV, II (B) III, I, II, IV
(C) I, III, II, IV (D) I, III, IV, II

9. A seismogram records the following types of earthquake waves :
 (I) L Waves (II) P Waves (III) S Waves
 The correct chronological sequence of the arrival of these waves is :
 (A) II, III, I (B) II, I, III
 (C) III, II, I (D) III I II
10. In humid climate, the rate of weathering of the following types of rocks is such that :
 (A) Basalt > Dunite > Granite (B) Basalt > Granite > Dunite
 (C) Dunite > Granite > Basalt (D) Dunite > Basalt > Granite
11. Which one of the following proximate content of coal indicates the optimum by product availability during coal carbonisation :
 (A) Moisture (B) Volatile matter
 (C) Fixed Carbon (D) Ash
12. Match list I and II and select the correct answer choosing the codes given below the lists :
- | | |
|----------------------|------------------|
| List - I | List - II |
| (a) Chain silicates | (1) Quartz |
| (b) Tekto silicates | (2) Beryl |
| (c) Phyllo silicates | (3) Augite |
| (d) Cyclo silicates | (4) Muscovite |
- Codes :**
- | | | | | |
|-----|------------|------------|------------|------------|
| | (a) | (b) | (c) | (d) |
| (A) | 1 | 2 | 3 | 4 |
| (B) | 1 | 2 | 4 | 3 |
| (C) | 3 | 1 | 2 | 4 |
| (D) | 3 | 1 | 4 | 2 |
13. In a closed ecosystem, across its boundaries,
 (A) Energy can transfer but mass can not transfer
 (B) Mass can transfer but energy can not transfer
 (C) Both energy and mass can not transfer
 (D) Both energy and mass can transfer
14. Under z transformation $z = (x - \mu) / \sigma$, the normal distribution $f(x)$ with mean μ and standard deviation σ , has the standard deviation :
 (A) 0 (B) 1 (C) ∞ (D) $\sqrt{\pi}$
15. The geometric mean of the following numbers 2, 3, 2, 3, 2, 3, 2, 3 is :
 (A) $\sqrt{6}$ (B) 6 (C) 2.5 (D) 5.0
16. Which of the following gases has maximum global warming potential (GWP) :
 (A) SF_6 (B) CH_4 (C) CO_2 (D) CFC_5

17. In India, Air (Prevention and Control of Pollution) Act came into being in which year ?
 (A) 1974 (B) 1981 (C) 1978 (D) 1990
18. Kyoto Protocol envisages a reduction in CO₂ concentration, below 1990 levels, by :
 (A) 10.2% (B) 5.2 % (C) 15% (D) 25%
19. Anomalous expansion of water has helped amphibious biological systems to sustain themselves in polar regions such as :
 (A) Polar bear (B) Frog (C) Eskimo (D) Seal
20. When 100 ml of 0.1M sulphuric acid is used to neutralise 0.01N NaOH, how many milli-litres of NaOH will be required ?
 (A) 100 (B) 500 (C) 1000 (D) 2000
21. If 100% noise dose corresponds to equivalent sound pressure level $L_{eq} = 90$ dB for 8 hours, then 25% dose would correspond to :
 (A) 93 dB for 2 hours (B) 90 dB for 4 hours
 (C) 87 dB for 4 hours (D) 87 dB for 2 hours
22. ⁶⁰Co (Cobalt sixty) is used to treat cancer as it emits :
 (A) Strong gamma rays (B) β radiations
 (C) α radiations (D) X - rays
23. Molar concentration of pure water is :
 (A) 1M (B) 18 M (C) 55.5M (D) 100 M
24. The internal combustion engines using petrol are mainly responsible for the generation of :
 (A) Ozone (B) NO_x (C) SO_x (D) VOCs
25. Which nod gene product interacts with flavonoids to initiate the process of root hair deformation ?
 (A) Nod A (B) Nod B (C) Nod C (D) Nod D
26. Which of the materials is most preferred as a carrier for legume inoculation ?
 (A) Peat (B) Slag (C) Soil (D) Anthracite
27. **Assertion (A) :** The ozone layer absorbs UV radiations.
Reason (R) : Part of the UV flux is used up in the formation of ozone in stratosphere
 (A) Both (A) and (R) are true and (R) is the correct explanation of (A)
 (B) Both (A) and (R) are true and (R) is not the correct explanation of (A)
 (C) (A) is true but (R) is false
 (D) (A) is false but (R) is true

28. Match Lists I and II and select the correct answer using the codes given below the lists :

List - I

(Characteristics)

- (a) Point of initial movement during the earthquakes
- (b) Measurement of the magnitude of earthquake
- (c) Measurement of solar radiation incident on earth
- (d) Earthquakes generated water waves in coastal areas

List - II

(Terms/Names)

- I. Tsunami
- II. Insolation
- III. Richter scale
- IV. Focus

Codes :

- | | (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|-----|
| (A) | IV | III | II | I |
| (B) | III | IV | I | II |
| (C) | II | I | III | IV |
| (D) | I | II | IV | III |

29. Which is the most common gas released from the landfills :

- (A) Carbon monoxide
- (B) Methane
- (C) Hydrogen Sulphide
- (D) Carbon di oxide

30. Trickling filters are used for the treatment of :

- (A) Primary sewage
- (B) Secondary sewage
- (C) Tertiary sewage
- (D) Quaternary sewage

31. Continuous - flow air-agitated photobioreactors are used for the removal of which compound from water ?

- (A) Nitrite
- (B) Chloride
- (C) Cyanide
- (D) Nitrate

32. Sea water is :

- (A) acidic
- (B) alkaline
- (C) neutral
- (D) hypotonic

33. The tidal mouth of a river opening into the sea is termed as :

- (A) Estuary
- (B) Littoral zone
- (C) Hypolimnion
- (D) Abyssal zone

34. In an aquatic ecosystem, the depth to which light penetrates is called :

- (A) aphotic
- (B) photic
- (C) euphotic
- (D) nonphotoc

35. Which of the following is used for the large scale treatment of potable water ?

- (A) Chlorine
- (B) Potassium permagnate
- (C) Ozone
- (D) Potassium permagnate and UV radiation

36. High B.O.D values in a water sample reflects a :
- (A) High biodegradable organic content
 - (B) Low organic content
 - (C) High phosphorous content
 - (D) High nitrogen content
37. Biological rhythm in animals is regulated by one of the following :
- (A) Water
 - (B) Air
 - (C) Light
 - (D) Crowding
38. Pineal gland mediates the environmental information to animals through the day-night secretion of :
- (A) Gonadotropin
 - (B) Thyroxin
 - (C) Melanin
 - (D) Melatonin
39. Zeitgeber means :
- (A) Time giving
 - (B) Photoperiod information
 - (C) Temperature information
 - (D) Rainfall information
40. The ΔG_0 of ATP hydrolysis could not be measured directly because :
- (A) one cannot determine the K_{eq}
 - (B) ATPase concentration could not be measured
 - (C) One of the reactants could not be estimated
 - (D) The products could not be determined
41. The corals generally grow in nutrient poor clear sea water because :
- (A) Nutrients are provided through sewage
 - (B) Single cell algae present on the corals provide nutrients through photosynthesis
 - (C) They absorb nutrients from the sea water
 - (D) They get nutrition from the dead organisms.
42. Thermoclines of a lake mean :
- (A) The upper layer with well lit, well mixed and relatively having warm water
 - (B) The intermediate layer in which a rapid decline in temperature occurs with depth
 - (C) The deep layer which is generally cold and dark
 - (D) The bottom layer
43. A cell is filled up with 0.6M NaCl and presumed that the membrane is more permeable to water than NaCl. In this condition if the cell is placed in 0.2 M NaCl, the approach to equilibrium will be largely governed by :
- (A) Osmosis
 - (B) Diffusion
 - (C) Losing salt rapidly
 - (D) Losing salt and water equally

44. When a lowlander man is transferred to high altitudes, the oxygen consumption will :
 (A) not decrease
 (B) remain the same
 (C) reduce mitochondrial oxygen tension
 (D) Impair oxidative metabolism
45. **Assertion (A)** : Cost-Benefit Analysis is an important tool in Environmental Impact Assessment.
Reasons (R) : It evaluates the likely return on capital inputs in a project.
 (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
46. Environmental Impact Assessment (EIA) seeks to achieve goals pertaining to :
 (A) Sustainable Development (B) Prevention of pollution only
 (C) Conservation of resources only (D) Social Benefit
47. **Assertion (A)** : Environmental Audit is an important aspect of post-project analysis
Reasons (R) : It helps in assessment of compliance with environmental regulatory requirements.
 (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
48. For the detection of Polyaromatic hydrocarbons (PAH) which of the following instruments is used ?
 (A) Atomic Absorption Spectrophotometer
 (B) X-ray Diffractometer
 (C) Gas Chromatograph
 (D) Flame Photometer
49. **Assertion (A)** : Land use changes have implications for Climate.
Reasons (R) : The radiative fluxes get modified
 (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
50. Tissue protein can be estimated by :
 (A) Gravimetric method (B) Biurate method
 (C) Calorimeter (D) Manometer

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Space For Rough Work