

PAPER-II
ENVIRONMENTAL SCIENCES

Signature and Name of Invigilator

1. (Signature) _____

(Name) _____

2. (Signature) _____

(Name) _____

J A 0 8 9 1 7

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)

Time : 1 ¼ hours]

[Maximum Marks : 100

Number of Pages in this Booklet : 12

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 Test Booklet Number should be entered on the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
 - (iv) The test booklet no. and OMR sheet no. should be same. In case of discrepancy in the number, the candidate should immediately report the matter to the invigilator for replacement of the Test Booklet / OMR Sheet.
4. Each item has four alternative responses marked (1), (2), (3) and (4). You have to darken the circle as indicated below on the correct response against each item.
Example : ① ② ● ④
where (3) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Sheet given inside the Booklet only**. If you mark your response 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, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. You have to return the 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 original question booklet on conclusion of examination.
10. Use only **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. इस 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 पुस्तिका 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 ओ 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 प्रश्न-पुस्तिका का नंबर OMR पत्रक पर अंकित करें और OMR पत्रक का नंबर इस प्रश्न-पुस्तिका पर अंकित कर दें ।
 - (iv) प्रश्न पुस्तिका नं. और OMR पत्रक नं. समान होने चाहिए । यदि नंबर भिन्न हों, तो परीक्षार्थी प्रश्न-पुस्तिका / OMR पत्रक बदलने के लिए निरीक्षक को तुरंत सूचित करें ।
4. प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (1), (2), (3) तथा (4) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है :
उदाहरण : ① ② ● ④
जबकि (3) सही उत्तर है ।
5. प्रश्नों के उत्तर केवल प्रश्न पुस्तिका 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 चिह्नित 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, जैसे कि अंकित किये गये उत्तर को मिटाना या सफेद स्याही से बदलना तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
9. आपको परीक्षा समाप्त होने पर मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें । हालाँकि आप परीक्षा समाप्ति पर मूल प्रश्न-पुस्तिका अपने साथ ले जा सकते हैं ।
10. 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 नकारात्मक अंक नहीं हैं ।



ENVIRONMENTAL SCIENCES

Paper – II

Note : This paper contains **fifty (50)** objective type questions of **two (2)** marks each. **All** questions are compulsory.

1. Which of the following methods is generally not adopted for the safe disposal of biomedical waste ?
 - (1) Incineration
 - (2) Hydroclaving
 - (3) Landfilling
 - (4) Shredding after disinfection

2. Which of the following prompted the Govt. of India to enact Environment (Protection) Act, 1986 ?
 - (1) River Ganga Water Pollution
 - (2) Endosulfan tragedy in Kerala
 - (3) London Smog
 - (4) Bhopal Gas Tragedy

3. Protection and improvement of environment and safeguarding of forest and wildlife is emphasized in constitution of India under the Article
 - (1) 48 A
 - (2) 21
 - (3) 47
 - (4) 46

4. Environmental Relief Fund was established under the provisions of
 - (1) The Environment (Protection) Act, 1986
 - (2) The Indian Wild Life (Protection) Act, 1972
 - (3) The Public Liability Insurance Act, 1991
 - (4) The Forest (Conservation) Act, 1980

5. A type of lake that forms in the depression of the earth's crust between two parallel faults is known as
- (1) Grade lake (2) Surface lake
(3) Graben lake (4) Glacial lake
6. In case of plumes from a tall stack located on flat terrain 'Lofting' type of plume behaviour is observed when in the atmosphere
- (1) inversion conditions prevail below the stack height.
(2) strong lapse rate conditions exist.
(3) inversion conditions exist above the stack height.
(4) weak lapse rate conditions exist.
7. Turbulent updrafts and downdrafts flows are an example of
- (1) Synoptic scale phenomena (2) Planetary scale phenomena
(3) Meso-scale phenomena (4) Micro-scale phenomena
8. A niche of the species where there is no competition from other species is called
- (1) hyper volume niche (2) habitat
(3) fundamental niche (4) realized niche
9. Dissipative process of energy during photosynthesis in a plant is
- (1) Decomposition (2) Senescence
(3) Respiration (4) Mineralization of humus
10. Which of the following substances is generally not considered toxic ?
- (1) Carbonic acid (2) Carbon monoxide
(3) Acetaldehyde (4) Benzene

11. Percentage of tropospheric ozone in relation to total atmospheric ozone is about
- (1) 90% (2) 10%
(3) 50% (4) 80%
12. Among the following, which one is the most hazardous chemical in the atmosphere ?
- (1) Dioxin (2) Carbon monoxide
(3) Halons (4) CFCs
13. The technique, which is fastest for measuring organic carbon is,
- (1) COD (2) BOD₅
(3) BOD₇ (4) TOC
14. With increase in temperature, the specific conductivity of water
- (1) remains unchanged (2) increases
(3) decreases (4) makes the water turbid
15. According to ZSI (GOI), which one of the following birds declined by 99% ?
- (1) Sparrow (2) Pink-headed Duck
(3) Pond heron (4) White backed Vulture
16. According to Convention on International Trade in Endangered species (CITES) COP 17, which one of the following is transferred from CITES Appendix II to Appendix I by January 2017.
- (1) Gorilla (2) Pangolin
(3) Tapir (4) Mongoose

17. Taxonomic diversity of a region with several ecosystems is :
- (1) Alpha diversity (2) Beta diversity
(3) Gamma diversity (4) Sigma diversity
18. Soil water available to roots is
- (1) Surface water (2) Hygroscopic water
(3) Gravitational water (4) Capillary water
19. C_4 plants are commonly found in
- (1) Arid and hot environment
(2) Humid and low temperature environment
(3) Temperature environment
(4) Semi-humid and rainy environment
20. The point at which the light intensity is just enough to produce energy by photosynthesis which equal to the energy used in respiration is called
- (1) Equal point (2) Regulatory point
(3) Compensation point (4) Complementary point
21. The global pattern of prevailing winds drives the cell – like circulation pattern of ocean currents called
- (1) Trade winds (2) Gyres
(3) Jet Streams (4) Shallow drifts
22. As the number of species in a food web increases
- (1) Food chain length tends to increase.
(2) System tends to be unstable.
(3) Energy flow decreases.
(4) System tends to collapse completely.

23. Each degree of latitude on the earth's surface represents approximately
- (1) 91 km (2) 101 km
(3) 111 km (4) 121 km
24. Remote sensing satellites for earth observation are normally located in
- (1) Elliptical orbit (2) Sun-synchronous orbit
(3) Geo-synchronous orbit (4) Equatorial orbit
25. Asian Ministerial Conference on Disaster Risk Reduction – 2016 (AMCDRR – 2016) was held in
- (1) Bangkok (2) Beijing
(3) New Delhi (4) Colombo
26. Groundwater movement depends on the following characteristics of rock materials.
- (a) Porosity
(b) Permeability
(c) specific yield
(d) specific retention capacity
- Choose the correct code :
- (1) (a) only (2) (a) and (b) only
(3) (a), (b) and (c) only (4) (a), (b), (c) and (d)
27. Magma starts to crystallise when it loses heat during its upward rise to shallower level from a deep source. Which among the following is Bowen's Reaction Series ?
- (1) Pyroxene, Hornblende, Olivine, Mica, Quartz
(2) Olivine, Pyroxene, Hornblende, Mica, Quartz
(3) Hornblende, Olivine, Mica, Pyroxene, Quartz
(4) Olivine, Pyroxene, Hornblende, Mica, Quartz

28. A 2000 MW dam has maximum head of 200 m. What is the rate of falling water on the turbines ? (Neglect losses)
- (1) $\sim 102.00 \text{ m}^3/\text{s}$ (2) $\sim 1560.24 \text{ m}^3/\text{s}$
(3) $\sim 1020.41 \text{ m}^3/\text{s}$ (4) $\sim 800.00 \text{ m}^3/\text{s}$
29. A hydro power plant has a reservoir storage capacity of $2 \times 10^3 \text{ m}^3$ and its maximum head is 500 m. What is its potential energy ?
- (1) $\sim 10 \text{ PJ}$ (2) $\sim 18.6 \text{ PJ}$
(3) $\sim 27.5 \text{ PJ}$ (4) $\sim 49 \text{ PJ}$
30. The maximum efficiency of hydrogen fuel cell is
- (1) 0.96 (2) 0.92
(3) 0.83 (4) 0.72
31. In a biogas digester having biomass and animal wastes as feed, for optimum methane production, the value of pH should be such that initially
- (1) pH is in the range 6.6 to 7 (2) $\text{pH} < 6.2$
(3) pH is in the range 7 to 7.2 (4) pH is in the range 7.6 to 8
32. Which of the following statements is true in relation to solar flat plate collectors ? Glazing (glass or plastic) above the absorber plate ?
- (1) Reduces convection losses
(2) Reduces conduction losses
(3) Reduces conduction and radiation losses
(4) Enhances the absorption of solar radiation onto the absorber plate.

33. Marine pollution is caused by

- a. Sewage
- b. Land runoff
- c. Oil spills
- d. Ocean mining

Choose the correct code :

- (1) a, c, and d only
- (2) c and d only
- (3) a, b, c and d
- (4) d, c, b only

34. Which of the following wave properties is not taken advantage of in controlling noise ?

- (1) Absorption
- (2) Damping
- (3) Interference
- (4) Diffraction

35. The reaction $O_2 \rightarrow 2O$, which occurs in the stratosphere, does not occur in the troposphere to produce ozone due to

- (1) lower tropospheric temperature
- (2) absence of $\lambda < 242$ nm radiation
- (3) high air pressure
- (4) high gas molecule concentrations

36. The most important global sink process for aerosols is

- (1) Interception
- (2) Sedimentation
- (3) Impaction
- (4) Wet deposition

37. Identify the correct sequence with reference to environmental clearance process for new projects :

- (1) Appraisal \rightarrow Screening \rightarrow Scoping \rightarrow Public Consultation
- (2) Screening \rightarrow Scoping \rightarrow Public Consultation \rightarrow Appraisal
- (3) Scoping \rightarrow Public Consultation \rightarrow Appraisal \rightarrow Screening
- (4) Public Consultation \rightarrow Appraisal \rightarrow Screening \rightarrow Scoping

38. Which of the following elements has the longest oceanic residence time ?

- (1) Iron (2) Lead
(3) Calcium (4) Sodium

39. The purpose of offshore islands is focussed for site or landscape restoration to

- (1) provide linkage between movement and genetic interchange of species.
(2) foster populations of endangered species without native or introduced predators.
(3) increase the availability of habitats.
(4) increase the stabilization of surface cover and protect the animal corridor on land.

40. Match the List-I and List-II. Identify the correct answer from the codes given below :

List – I

List – II

(Series)

(Life Cycle Analysis)

- (a) ISO 14040 (i) Interpretation
(b) ISO 14041 (ii) Impact assessment
(c) ISO 14042 (iii) Principles and framework
(d) ISO 14043 (iv) Inventory Analysis

Codes :

- (a) (b) (c) (d)
(1) (i) (ii) (iii) (iv)
(2) (iv) (iii) (ii) (i)
(3) (i) (iv) (ii) (iii)
(4) (iv) (i) (iii) (ii)

41. Which of the following can be used for valuing environmental amenities ?

- a. Hedonic pricing
- b. Travel cost
- c. Contingent valuation

Choose the correct code :

- (1) a only
- (2) b only
- (3) a, b and c
- (4) b and c only

42. A graphical representation where frequencies are plotted against class intervals is called

- (1) stem and leaf plot
- (2) Pie chart
- (3) Histogram
- (4) Box plot

43. Which one of the following is a density – independent factor that limits the size of the natural population ?

- (1) Predation
- (2) Territoriality
- (3) Severe drought
- (4) Sex ratio

44. In a multiple regression analysis, if the variance of the observed variable Y is 1.57 and variance of the residue is 0.52, then R-square value is

- (1) 0.85
- (2) 0.67
- (3) 0.72
- (4) 0.52

45. The median value of the following data :

1, 2, 3, 5, 8 and 100 ; is

- (1) 3
- (2) 5
- (3) 4
- (4) 20

46. Exchangeable sodium percentage (ESP) > 40, and pH > 9.8 are characteristic of
- (1) Acidic soil (2) Weak saline soil
(3) Strongly saline soil (4) Eroded soil
47. The climate meet COP-22 was held in which country ?
- (1) Morocco (2) South Africa
(3) Malaysia (4) Indonesia
48. In an aquatic system, the presence of noxious gases such as H₂S and CH₄ is associated with
- (1) abundant algal growth (2) oxygen depletion
(3) absence of macrophytic vegetation (4) excess of dissolved oxygen
49. Severe drought is declared if
- (1) Deficit of rainfall is more than 50 percent of the normal.
(2) Deficit of rainfall varies between 25-45 percent of the normal.
(3) Rainfall deficit exceeds 25 percent of the normal.
(4) Rainfall deficit is between 15-25 percent of the normal.
50. The Global Warming Potential (GWP) of a substance depends on
- a. the spectral band of its absorbing wavelengths.
b. its residence time in atmosphere.
c. its number of carbon molecules.
d. concentration of the substance.
- Choose the correct answer :
- (1) a, b and c only (2) b, c and d only
(3) a, c and d only (4) b, d and a only

Space For Rough Work