

PAPER-III
ENVIRONMENTAL SCIENCES

Signature and Name of Invigilator

1. (Signature) _____

(Name) _____

2. (Signature) _____

(Name) _____

J 8916

Time : 2 ½ hours]

[Maximum Marks : 150

Number of Pages in this Booklet : 16

Number of Questions in this Booklet : 75

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of seventy five 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.
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) (3) (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 and duplicate copy of OMR Sheet on conclusion of examination.
10. Use only **Black Ball point pen provided by C.B.S.E.**
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.

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(In figures as per admission card)

Roll No. _____
(In words)

परीक्षार्थियों के लिए निर्देश

1. इस पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
2. इस प्रश्न-पत्र में पचहत्तर 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 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 प्रश्न-पुस्तिका का नंबर OMR पत्रक पर अंकित करें और OMR पत्रक का नंबर इस प्रश्न-पुस्तिका पर अंकित कर दें ।
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) (3) (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 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 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 । हालांकि आप परीक्षा समाप्ति पर मूल प्रश्न-पुस्तिका तथा OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
10. केवल C.B.S.E. द्वारा प्रदान किये गये 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 – III

Note : This paper contains **seventy five (75)** objective type questions of **two (2)** marks each. **All** questions are compulsory.

1. In India audit on conservation and protection of tigers in all 28 Tiger reserves was conducted in
 - (1) 2001
 - (2) 2004
 - (3) 2006
 - (4) 2007

2. In the screening stage of EIA, the impact level of a development project is not discernible, then what step should be adopted ?
 - (1) Scoping stage ought to be initiated
 - (2) Detailed EIA study ought to be conducted
 - (3) A rapid EIA study ought to be conducted
 - (4) The project may not be given environmental clearance

3. Biodiversity hotspots are regions of high
 - (1) stationary population of common species
 - (2) richness of endemic species
 - (3) migratory population
 - (4) richness of dominant species

4. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : Ocean Thermal Energy Conversion (OTEC) plants have very low efficiencies.

Reason (R) : The temperature difference between warm surface water and cold deeper ocean water is not all that great.

Choose the correct answer :

 - (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
 - (2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
 - (3) (A) is true but (R) is false.
 - (4) (A) is false but (R) is true.

5. In respect of geothermal power production, identify the correct sequence of the countries :
 - (1) Iceland > Russia > Japan > USA
 - (2) Japan > Iceland > USA > Russia
 - (3) USA > Iceland > Japan > Russia
 - (4) USA > Japan > Iceland > Russia

6. Among the forest types of India, which category of forest covers maximum geographical area :
- (1) Tropical grassland (2) Mangrove forest
(3) Tropical deciduous forest (4) Temperate evergreen forest
7. The overall diversity of a landscape comprising several ecosystems is known as
- (1) Alpha diversity (2) Beta diversity
(3) Gamma diversity (4) Delta diversity
8. The ratio between the amount of radiation emitted by earth upto the wavelength at which maximum radiation is emitted and total amount of radiation emitted by earth is approximately
- (1) ~ 25% (2) ~ 50%
(3) ~ 40% (4) ~ 66%
9. Milankovitch cycles refer to
- (1) Shifts in the temperature of surface water in the middle latitudes of the Pacific Ocean.
(2) The timing of the northern lights in the thermosphere.
(3) The changes in the Earth's rotation and orbit around the sun that may trigger climate variation.
(4) Upwelling and down-welling in the ocean.
10. El Nino and La Nina phenomena
- (1) decrease water temperatures in the eastern Pacific Ocean
(2) increase water temperatures in the Gulf of Mexico
(3) occur in a definite pattern every ten years
(4) cause changes in global temperature and precipitation pattern
11. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :
- Assertion (A) :** At a constant temperature, the solubility of ammonia in water increases with decrease in pH.
- Reason (R) :** The solubility of all gases increase with decrease in pH.
- Choose the correct answer :
- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
(3) (A) is true but (R) is false.
(4) (A) is false but (R) is true.

12. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : Temperature of sea water generally decreases with increasing latitude.

Reason (R) : Surface layers of sea water tend to contract and sink in cold waters.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

13. A normal sand dune is characterized by

- (1) Gentle windward and steeper leeward sides.
- (2) Both gentle sides.
- (3) Steeper windward and gentle leeward sides.
- (4) Both steeper sides.

14. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : The distribution of animals over the world is much more complex and irregular compared to plants.

Reason (R) : The animals are mobile and therefore capable of more rapid dispersal.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

15. Consider the following statements in case of Gaussian Plume Model.

- a. The wind speed is constant both in time and with elevation.
- b. The emission rate from the source is constant.
- c. The pollutant is conservative.

Choose the answer :

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

16. A stream flowing at $5.0 \text{ m}^3/\text{s}$ converges with another stream with the same flow rate. The concentration of the phosphate upstream to the junction is 10.0 mg/L and that in the other stream is 5.0 mg/L . The downstream concentration of phosphate is

- (1) 2.5 mg/L
- (2) 5.0 mg/L
- (3) 7.5 mg/L
- (4) 10 mg/L

17. Lotka-Volterra model for an ecosystem can be used to study
- oscillations in prey-predator population.
 - effect of predator on prey population.
 - effect of prey on predator population.
- Choose the correct answer :
- a and b only
 - b and c only
 - a and c only
 - a, b and c
18. In an ecosystem following logistic growth model initial population was 900 with growth rate constant of 0.1. If the carrying capacity of the ecosystem is 1000, what is the instantaneous rate of change of population ?
- 10
 - 25
 - 1.1
 - 9
19. Choose an appropriate hypothesis testing method for the condition where the variance is an unknown parameter of a population of independent observations :
- Z-test
 - χ^2 -test
 - t-test
 - F-test
20. For sampling error of 1.96σ ; where σ is the standard deviation, and at critical value of 1.96, the significance level is
- 5.0 %
 - 1.0 %
 - 2.7 %
 - 4.5 %
21. Qualitatively a sampling error in a survey based environmental experiment is the sum of
- Frame error + Response error + chance error
 - Frame error + non-sampling error
 - Chance error + Frame error + Systematic error
 - Non-sampling error + Chance error + Systematic error
22. Ecosensitive zones are declared by the Ministry of Environment, Forest and climate change, Govt. of India under the provisions of
- Forest Act, 1927
 - Forest (Conservation) Act, 1980
 - Environment (Protection) Act, 1986
 - Biological Diversity Act, 2002
23. Basel convention on trans-boundary movement of hazardous waste and disposal was adopted in the year
- 1969
 - 1979
 - 1999
 - 1989
24. Which method reduces the volume of waste but could release toxic air emissions into the atmosphere ?
- Biological treatment
 - Sanitary landfill
 - Incineration
 - Chemical treatment

25. As per CRZ (Coastal Regulation Zone) 2011 Notification, which of the following activities is permitted ?
- (1) Dumping of untreated sewage, effluents or solid waste.
 - (2) Traditional fishing and allied activities.
 - (3) Construction of Housing Complexes.
 - (4) Infrastructural projects.

26. Match the List – I and List – II. Identify the correct answer from the codes given below :

List – I	List – II
(Biomedical Waste)	(Treatment/Disposal)
a. Human tissues	i. Incineration
b. Scalpels	ii. Autoclaving
c. Solid plaster casts	iii. Microwave mutilation
d. Catheters	iv. Deep burial

Codes :

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

27. An organisation implementing an EMS under ISO 14001 should set environmental targets in order to achieve environmental objectives within a specified time-frame. The target should be

- (1) implemented on a trial basis
- (2) generic in nature
- (3) related to financial aspects
- (4) measurable and specific

28. ISO 14001 requires an organisation to

- (1) set improvement targets for every department.
- (2) define a quality policy within the defined scope of its EMS.
- (3) define the scope of its EMS.
- (4) define the scope of its audit.

29. Cost-benefit analysis is performed during

- | | |
|--------------------|-----------------------------|
| (1) Design phase | (2) Feasibility study phase |
| (3) Implementation | (4) Maintenance phase |

30. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : The ecosystem surrounding a river gets damaged due to the construction of a dam on it.

Reason (R) : The area in upper catchment of the river gets inundated.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

31. Match the List – I and List – II. Identify the correct answer from the codes given below :

List – I
(Auditing)

List – II
(Actions)

- | | |
|--------------------------------|--|
| a. Implementation audit | i. External review |
| b. Predictive techniques audit | ii. Initial activities |
| c. Performance audit | iii. Validation of impacts |
| d. Procedures audit | iv. Comprehensive operational activities |

Codes :

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

32. The interaction matrix developed by Leopold consists of how many parameters ?

- (1) 30
- (2) 60
- (3) 70
- (4) 90

33. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : The goal of the National Land Utilisation Policy is to achieve improvement of livelihood, food and water security under the umbrella of sustainable development in India.

Reason (R) : The National Land Utilisation Policy envisages a guiding framework for state specific needs, potentials, priorities and legal provisions.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

34. Which of the following is a major photochemical oxidant ?

- (1) PAN
- (2) Ozone
- (3) Aldehydes
- (4) Peroxybenzoyl nitrates (PBzN)

35. In terms of toxicity, identify the correct sequence :

- (1) Arsenic > Cadmium > Methylene chloride
- (2) Cadmium > Arsenic > Methylene chloride
- (3) Methylene chloride > Cadmium > Arsenic
- (4) Methylene chloride > Arsenic > Cadmium

36. Upwelling of oceanic waters is important for
- (1) enrichment of nutrients in pelagic waters.
 - (2) balancing water circulation pattern in oceans and seas.
 - (3) making the pelagic waters nutrient deficient.
 - (4) helping survival of benthic organisms.

37. Arrange the following in terms of increasing productivity :
- | | |
|-------------------|----------------|
| a. Antarctica sea | b. Arctic sea |
| c. Dead sea | d. Arabian sea |

Choose the correct answer :

- | | |
|---------------------|---------------------|
| (1) $c < a < d < b$ | (2) $c < a < b < d$ |
| (3) $d < b < c < a$ | (4) $a < c < d < b$ |

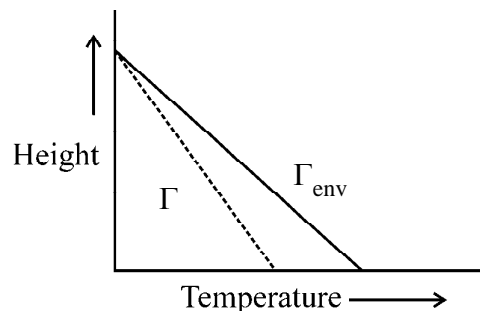
38. Match the List – I and List – II. Identify the correct answer from the codes given below :

List – I (Process/Event)	List – II (Consequences/Links)
a. Assimilative capacity	i. DO, BOD, Coliform
b. Critical water parameter	ii. Cadmium
c. Itai-Itai disease	iii. Blue baby syndrome
d. Excess nitrate in water	iv. Waste discharge

Codes :

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

39. Which type of plume behaviour one would expect from a tall stack located on a flat terrain if adiabatic lapse rate (Γ) and environmental lapse rate (Γ_{env}) are as shown in the diagram below :



- | | |
|-------------|--------------|
| (1) looping | (2) fanning |
| (3) coning | (4) trapping |

40. A road carrying heavy traffic has an average noise level of 90 dB when measured at a distance of 10 metres. What would be the noise level at 20 metres distance ?
- (1) 87 dB (2) 84 dB
(3) 60 dB (4) 45 dB
41. When biomass is converted to CO and H₂O, the energy made available is ~ 450 kJ per mol of carbon per unit of reduction level. What would be the heat of combustion per gram of methane ?
- (1) 28.125 kJ/g (2) 56.25 kJ/g
(3) 67.5 kJ/g (4) 135 kJ/g
42. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :
- Assertion (A)** : Hydrogen, as a fuel, when burned, does produce some amount of pollution.
- Reason (R)** : Heat produced during combustion of hydrogen chemically combines N₂ and O₂ in atmosphere to produce NO_x.
- Choose the correct answer :
- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
(3) (A) is true but (R) is false.
(4) (A) is false but (R) is true.
43. Given standard enthalpies for methane, carbon dioxide and water vapour as ~ 75 kJ/mol, 394 kJ/mol and 240 kJ/mol, respectively. What is the net heat of combustion of methane ?
- (1) - 799 kJ/mol (2) - 802 kJ/mol
(3) + 1598 kJ/mol (4) + 799 kJ/mol
44. In an ideal magnetohydrodynamic power plant, the speed of flow of the hot ionized gas is u m/s. The maximum power output from the plant varies as
- (1) $\propto u$ (2) $\propto u^{3/2}$
(3) $\propto u^2$ (4) $\propto u^3$
45. An ideal wind turbine located on a hill top produces electrical power. If wind speed changes by 5%, by what percentage the electrical power will change ?
- (1) 12.5 % (2) 25 %
(3) 30 % (4) 15 %
46. A person working in a nuclear reactor is exposed to a beam of thermal neutrons and receives a dose of 20 millirads per hour for an exposure of 12 minutes. What is the equivalent dose in millirems, the person is exposed to ?
- (1) 4 (2) 8
(3) 12 (4) 16

47. What is the approximate increase in radiative forcing if the CO₂ concentration increases from 400 ppm to 800 ppm ?

- (1) ~ 4.37 W/m² (2) ~ 3.81 W/m²
(3) ~ 2.72 W/m² (4) ~ 1.62 W/m²

48. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : Large parts of India have already become water stressed.

Reason (R) : Climate change may be the main reason.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
(3) (A) is true but (R) is false.
(4) (A) is false but (R) is true.

49. Ecosystem degradation refers to

- a. loss or decrease in biodiversity.
b. modification in structure of abiotic components.
c. impairment of ecosystem processes such as nutrient cycling.

Choose the correct answer :

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

50. In addition to their role in ozone depletion, CFCs play a role in global warming by

- (1) reducing the albedo of the earth's surface
(2) absorbing solar radiation
(3) blocking UV-B radiation on earth
(4) absorbing terrestrial radiation

51. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : As per equilibrium theory of island biogeography, distance of the islands from the mainland determines the dispersal rate of new species.

Reason (R) : Size of an island is important in determining number of species.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
(3) (A) is true but (R) is false.
(4) (A) is false but (R) is true.

52. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : All cloud processes have implications for climate change.

Reason (R) : Clouds strongly affect the flux of both shortwave and infra-red light through atmosphere.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

53. Using remote sensing for height measurement of trees, which microwave band is most suitable ?

- (1) X
- (2) C
- (3) S
- (4) L

54. For public use, Survey of India publishes topographical maps on 1 : 50, 000 scale. These maps use

- (1) UTM projection and WGS 84 datum
- (2) Polyconic projection and WGS84 datum
- (3) UTM projection and Modified Mount Everest datum
- (4) Polyconic projection and Modified Mount Everest datum

55. Sub-geostrophic winds in the earth-atmospheric system are caused by the balance involving

- (1) pressure gradient force, Coriolis force and frictional force
- (2) pressure gradient force and Coriolis force
- (3) pressure gradient force and frictional force
- (4) Coriolis force and frictional force

56. Which one of the following is not a set of polymorphous minerals ?

- (1) Calcite, aragonite, vaterite
- (2) Quartz, coesite, tridymite
- (3) Graphite, anthracite, diamond
- (4) Kyanite, alusite and sillimanite

57. Match the List – I and List – II. Identify the correct answer from the codes given below :

- | List – I
(Geological events) | List – II
(Processes) |
|---|--|
| a. Exfoliation dome | i. Landform change |
| b. Rift valleys | ii. Ultisols |
| c. Palaeomagnetism | iii. Mechanical weathering |
| d. Pedogenesis | iv. Seafloor spreading |

Codes :

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

58. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : Soil development begins with physical, chemical and biological weathering of rocks.

Reason (R) : Anthropogenic factors play a major role in soil formation.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

59. The most common ferromagnesian rock forming minerals are as follows :

- (1) Amphibole and Biotite Mica
- (2) Muscovite mica and Quartz
- (3) Galena and Pyrite
- (4) Calcite and Dolomite

60. Underground coal mine fires can best be monitored by remote sensing technique in the spectral region

- | | |
|-------------------------|---------------------------|
| (1) 3 – 5 μm | (2) 10 – 12 μm |
| (3) 1 – 3 μm | (4) 1 mm – 10 mm |

61. Our inability to address the conflict between short term individual well-being and long term societal welfare is responsible for the

- | | |
|--------------------------------|------------------------------|
| (1) Tragedy of the population | (2) Tragedy of the community |
| (3) Tragedy of the environment | (4) Tragedy of the commons |

62. Proportion of representation of each species allows ecologists to compare different communities through graphical representation. Such a graph is called
- (1) Rank abundance curve
 - (2) Species accumulation curve
 - (3) Survivorship curve
 - (4) Sigmoid curve
63. Lincoln index is a mark-recapture method used in animals to estimate the
- (1) total population density
 - (2) total number
 - (3) total frequency
 - (4) total dominance
64. K-selected population during ecological succession tends to dominate in
- (1) mature stages
 - (2) early stages
 - (3) pioneer stages
 - (4) seral stages
65. Evolution can be viewed as
- a. genetic change over time
 - b. a process of descent with modification
 - c. a sudden change in organism
 - d. a man-made change in organism
- Choose the correct code :
- (1) a and b only
 - (2) b and c only
 - (3) c and d only
 - (4) a and d only
66. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :
- Assertion (A) :** C_4 photosynthesis lowers photorespiratory energy loss.
- Reason (R) :** The greater supply of CO_2 lowers the rate of O_2 uptake by rubisco substantially reducing photorespiration.
- Choose the correct answer :
- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
 - (2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
 - (3) (A) is true but (R) is false.
 - (4) (A) is false but (R) is true.
67. Symbiotic blue-green algal biofertilizer is obtained from
- (1) *Nostoc* species
 - (2) *Rhizobium* species
 - (3) *Azolla* mass culture
 - (4) *Azospirillum* mass culture

68. With reference to smog consider the following statements :

- a. Los Angeles smog is oxidizing.
- b. London smog is reducing.

Choose the correct answer :

- (1) Both a and b are false.
- (2) Both a and b are true.
- (3) a is false but b is true.
- (4) a is true but b is false.

69. Match the List – I and List – II. Identify the correct answer from the codes given below :

List – I	List – II
(Chemical Species)	(Measurement Techniques)
a. DO	i. West-Gaeke Method
b. SO ₂	ii. Non-dispersive infrared analyser
c. CO	iii. Chemiluminescence
d. NO	iv. Winkler's Method

Codes :

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

70. Disintegration of ${}_{88}^{226}\text{Ra}$ yields ${}_{86}^{222}\text{Rn}$ owing to the emission of

- (1) two β -particles
- (2) one α -particle
- (3) γ -radiation
- (4) one β -particle followed by an α -particle

71. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :

Assertion (A) : Temperature in stratosphere increases with increase in altitude.

Reason (R) : Photodissociation of O₂ in stratosphere makes the lapse rate positive.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

72. At 15 °C, a manufacturer dissolves CO₂ at 2.4 atm in water in a bottle. If Henry's law constant of CO₂ in water be 0.045 mol L⁻¹ atm⁻¹ at 15 °C, calculate the concentration of CO₂ dissolved in water.

- (1) 5.6 mol L⁻¹ (2) 0.019 mol L⁻¹
(3) 0.098 mol L⁻¹ (4) 0.108 mol L⁻¹

73. Match the List – I and List – II. Identify the correct answer from the codes given below :

List – I
(Pesticides)

- a. Malathion
b. Metaldehyde
c. Diethyl Tolumide (DEET)
d. Chloroneb

List – II
(Purpose)

- i. Molluscicide
ii. Fungicide
iii. Insecticide
iv. Insect repellent

Codes :

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

74. Which of the following is not an Advanced Oxidation Process for the treatment of waste water ?

- (1) PhotoFenton Process
(2) Photocatalytic TiO₂ Process
(3) UV/H₂O₂ Process
(4) Acidified Potassium Dichromate Oxidation Process

75. If a material containing humic substances is extracted with a strong base, and the resulting solution is acidified, products are

- a. humin
b. humic acid
c. fulvic acid

Choose the correct answer :

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

Space For Rough Work

