PAPER-III
ENVIRONMENTAL SCIENCES

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 A 0 8 9 1 7

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.
   (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.**
13. In case of any discrepancy in the English and Hindi versions, English version will be taken as final.

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 अर्थात 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 चिह्नांकित 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 अपने साथ ले जा सकते हैं ।
10. **काले बाल प्वाईंट 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 ।**
13. यदि अंग्रेजी या हिंदी विवरण में कोई विसंगति हो, तो अंग्रेजी विवरण अंतिम माना जाएगा ।

ENVIRONMENTAL SCIENCES
PAPER – III

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

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

Assertion (A) : Vertical velocity often equals or exceeds horizontal velocity in mesoscale meteorological systems.

Reason (R) : Rising thermals are susceptible to undergo non-hydrostatic processes such as buoyant acceleration or acceleration through a narrow mountain pass.

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 and (R) is true.

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

Assertion (A) : Geostrophic wind velocity is independent of latitude.

Reason (R) : Geostrophic wind velocity is determined by pressure gradient force only.

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 and (R) is true.

3. Mixing height during night is typically in the range

(1) < few hundred metres (2) 1 km – 2 km

(3) 2 km – 3 km (4) 3 km – 4 km

4. At a given urban location, the temperature at an elevation of 25 m above ground is 15 °C. If the inversion conditions prevail and the environmental lapse rate is 1.25 °C per 100 m, the temperature at an elevation of 200 m will be

(1) 12.5 °C (2) 17.5 °C

(3) 12.75 °C (4) 17.25 °C

5. When the temperature of the atmosphere falls at a rate greater than the dry adiabatic lapse rate, the atmosphere is

(1) stable (2) highly stable

(3) unstable (4) conditionally unstable

6. Gross Primary Productivity (GPP) of an ecosystem is

(1) net rate of carbon gain by the plant after respiration losses.

(2) total energy used to convert the sugar during growth.

(3) photosynthetic fixation rate of atmospheric carbon dioxide.

(4) rate of release of oxygen through respiration of a plant.

7. The oxygen atom species, which reacts with water to form hydroxyl radical, is produced by the photodissociation of

(1) O_2 (2) O_3

(3) NO_2 (4) H_2O

8. Match the List – I and List – II given below :

List – I (Element)		**List – II (Classification)**
a. Sodium	i.	Chalcogen
b. Calcium	ii.	Alkali Metal
c. Chromium	iii.	Alkaline Earth Element
d. Sulfur	iv.	Transition Element

Choose the correct answer :

Codes :

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

9. Identify the incorrect statement about carbon isotopes :

(1) C-13 is less abundant in vegetation than in oceans.

(2) C-12 is most abundant in nature.

(3) C-14 is absent in fossil fuels.

(4) C-13 is used for carbon-dating.

10. Among the following insecticides, which one is relatively more soluble in water ?

(1) Aldicarb (2) Carbaryl

(3) Malathion (4) Aldrin

11. At 25 °C, hydrogen ion concentration in an environmental aqueous solution is found to be 5×10^{-4} mol L^{-1}. This implies that the concentration of hydroxyl ions is

(1) 2×10^{-3} mol L^{-1} (2) 1×10^{-7} mol L^{-1}

(3) 2×10^{-11} mol L^{-1} (4) 2×10^{-19} mol L^{-1}

12. Identify the incorrect statement about humus.

(1) Humus acts as a reservoir of nitrogen for plants.
(2) By decaying, humus supplies nitrogen to plants.
(3) Its rate of decay and rate of nitrogen release follow plant growth.
(4) Rate of nitrogen release to plants is slow during warm growing season and fast during winter months.

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

List – I (Terms)		**List – II (Chromatographic action)**
a. Effluent	i.	The eluted solute
b. Eluate	ii.	The mobile phase
c. Eluent	iii.	The solute-mobile phase mixture which exits the column
d. Eluite	iv.	The stream flowing out of the column

Codes :

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

14. A textile industry effluent containing 1×10^{-6} mol L^{-1} of an organic dye has 0.6 absorbance in a cell of 1.0 cm path length. The molar extinction coefficient of the dye is

(1) 6×10^{4} L mol^{-1} cm^{-1} (2) 6×10^{-7} L mol^{-1} cm^{-1}
(3) 1.66×10^{-5} L mol^{-1} cm^{-1} (4) 6.0×10^{6} L mol^{-1} cm^{-1}

15. Characteristics of successful invasive plant species are :

a. Rapid growth and early flowering.
b. High phenotypic plasticity
c. Production of large number of seeds

Choose the correct answer :

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

16. Drugs that prevent the formation of bacterial cell wall are

(1) Quinolones (2) Beta-lactams
(3) Tetracyclines (4) Aminoglycocides

17. As a result of El Nino, it has been observed that phytoplankton productivity increases in Eastern Indian Ocean around Indonesia and Gulf of Mexico. This increase is probably due to

(a) Increased rainfall
(b) More nutrient inflow
(c) Turbulence in surface waters

Codes :

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

18. Vermi composting process depends on

(a) Quality of organic resources

(b) Types of earthworms

(c) Moisture content of the organic wastes

Choose the correct answer :

(1) (a) only (2) (a) and (b) only

(3) (b) and (c) only (4) (a), (b) and (c)

19. Photosynthesis in plants is associated with

(a) decrease in entropy

(b) increase in entropy

(c) increase in Gibbs free energy

Choose the correct answer :

(1) (a) only (2) (b) only

(3) (b) and (c) only (4) (a), (b) and (c)

20. The predominant bioparticulate allergens in the air are

(1) Insect debris and house dust mites

(2) Pollen grains and fungal spores

(3) Animal dander and house dust

(4) Wool particles and cockroach calyx

21. The enhancement of the fitness of a recipient individual by acts that reduce the evolutionary fitness of the donor individual is

(1) Amensalism (2) Altruism

(3) Commonsalism (4) Parasitism

22. The greater proportion of the edges in a national park indicates a

(a) less functional habitat

(b) highly functional habitat

(c) degraded habitat

Choose the correct answer :

(1) (a) only (2) (a) and (c) only

(3) (b) and (c) only (4) (a), (b) and (c)

23. The change in species composition that is imposed by factors external to the biotic community is known as

(1) Autogenic succession (2) Allogenic succession

(3) Xerarch (4) Hydrarch

24. Which ecosystem type produces maximum litter mass ?

(1) Tropical rain forest (2) Tropical seasonal forest

(3) Temperate deciduous forest (4) Boreal forest

25. Cyclomorphism is a phenomenon observed in certain planktonic crustaceans and is generally attributed as a response to

(a) changes in environmental variables of water.

(b) ensure adaptive significance.

(c) growth, reproduction and sudden genetic change

Codes :

(1) (a) and (c) only (2) (b) and (c) only

(3) (a) and (b) only (4) (a), (b) and (c)

26. Microbes in the environment are likely to be

I. living in biofilms on surfaces.

II. non-culturable

III. living solitary and planktonic lines

Choose the correct code :

(1) I only (2) II and III only

(3) I and III only (4) I and II only

27. Which magma type contains the greatest amount of silica ?

(1) Basaltic (2) Andesitic

(3) Rhyolitic (4) Peridotic

28. Match the List – I and List – II and choose the correct answer from the codes given below :

List – I (Stratigraphic Unit)		**List – II (Deposits)**
a.	Bailadila Group	i. Mn
b.	Nallamalai Group	ii. Phosphorite
c.	Udaipur Group	iii. Banded Iron Formation
d.	Sansar Group	iv. Pb-Zn

Codes :

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

29. Which group of following factors determine the discharge of a stream ?

(1) Width, length and depth (2) Width, length and velocity

(3) Width, depth and velocity (4) Length, depth and run-off

30. Which among the following zones has the highest erosion rate in the journey of a river ?

(1) Head water (2) Potamon

(3) Mouth (4) Sediment transforming zone

31. In the decreasing order of hardness on Moh's scale, choose the correct sequence from the following :

(1) Quartz, Feldspar, Calcite, Talc (2) Feldspar, Calcite, Talc, Quartz

(3) Talc, Quartz, Feldspar, Calcite (4) Quartz, Calcite, Feldspar, Talc

32. Wind transport of materials entails the following processes :

I. Saltation II. Reptation

III. Suspension IV. Creep

Choose the correct answer :

(1) I, II, III, IV (2) II, III and IV only

(3) III and IV only (4) I and II only

33. According to Darcy's law for ground water movement, velocity is proportional to

(1) Hydraulic gradient. (2) Square of hydraulic gradient.

(3) Square root of hydraulic gradient, (4) Reciprocal of hydraulic gradient.

34. Which of the following types of coal has maximum ash content (%) ?

(1) Anthracite (2) Sub-Bituminous

(3) Lignite (4) High volatile Bituminous

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

Assertion (A) : The amount of energy available in a single fusion event is small compared to a fission event.

Reason (R) : Isotopes of hydrogen are much lighter than uranium.

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 and (R) is true.

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

Assertion (A) : The thermal efficiency of nuclear reactors is lower than that of fossil fuelled steam plants.

Reason (R) : Temperature of water generating stream in a nuclear reactor has relatively lower values compared to fossil fuelled steam plants.

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 and (R) is true.

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

Assertion (A) : Natural gas contributes less to smog formation than gasoline.

Reason (R) : Unburnt CH_4 molecules are considerably less reactive with respect to the free radical chemistry for smog than the hydrocarbon molecules with more than one C atom.

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 and (R) is true.

38. Consider ocean waves of amplitude 2.0 m and wavelength 200 m. Assuming the gravity to be the only active force, the power available per metre perpendicular to the propagation of the wave is

(1) 86.24 kW m^{-1} (2) 172.48 kW m^{-1}

(3) 344.90 kW m^{-1} (4) 800.00 kW m^{-1}

39. A wind mill has cross-sectional area 25.0 m^2. The wind speed is 6.0 m/s. What will be the power generated by the wind mill in the Betz limit ?

(1) ~ 2.064 kW (2) ~ 3.483 kW

(3) ~ 11.162 kW (4) ~ 18.321 kW

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

Assertion (A) : The power output from an OTEC system installed at a tropical site is steady.

Reason (R) : At tropical sites, the temperatures of warm surface water and cold water in the depth of ocean hardly vary from season to season.

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 and (R) is true.

41. An electric power plant based on solar energy uses collectors with concentrators which can achieve temperature of about 700 °C to operate a heat engine to generate electricity. If the solar insolation is 1 kW/m^2, how much total collector area will be required to supply on average 10 MW of electricity ? (Take ambient air temperature to be 25 °C)

(1) 5.15×10^3 m^2 (2) 1.44×10^3 m^2

(3) 3.18×10^3 m^2 (4) 10.61×10^3 m^2

42. The potency factor of $CHCl_3$ is 6.1×10^{-3} kg-day/mg. The concentration in drinking water that would result in 2×10^{-6} risk for a 70-kg man, who drinks 2L/day throughout of his life, is

(1) 11.4 μg/L (2) 20.6 μg/L
(3) 6 μg/L (4) 25 μg/L

43. Which of the following compounds used for disinfection of water is not stable but is prepared *in situ* ?

(1) Cl_2 (2) $Ca(OCl)_2$
(3) NaOC*l* (4) HOC*l*

44. Identify the incorrect statement from the following regarding soil pollution by heavy metals :

(1) Soils act as a sink for heavy metals.
(2) Humic materials have great affinity for heavy metal cations.
(3) Humic materials extract heavy metals from soil water by forming complexes.
(4) Complexes formed by humic acids are normally water soluble.

45. A point source of noise produces a sound of 60 dB at a distance of 10 m from it. If the sound is measured at a distance of 40 m, what will be its value ?

(1) 48 dB (2) 54 dB
(3) 57 dB (4) 44 dB

46. Identify the incorrect statement with regard to water purification by coagulation.

(1) Particles suspended in water are in colloidal form.
(2) Suspended particles carry a positive charge.
(3) Suspended particles due to similar charge repel each other.
(4) When alum is added it works as a coagulant.

47. In relation to drinking water source without conventional treatment but after disinfection, water parameters and their permissible values are given in the lists given below :

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

List – I (Water parameters)	**List – II (Permissible values)**
a. Total coliform organism MPN per 100 ml	i. 6.5 – 8.5
b. pH	ii. < 50 per 100 mL
c. DO	iii. 2 mg/L or less
d. BOD (5 days, 20 °C)	iv. 6 mg/L or more

Codes :

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

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

Assertion (A) : Ozone depletion is much less over arctic stratosphere than over Antarctic stratosphere.

Reason (R) : Antarctic atmosphere is on an average about 10 °C cooler than the arctic stratosphere.

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 and (R) is true.

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

List – I (Water type)	**List – II (Conductivity ($\mu S\ cm^{-1}$))**
a. Fresh water	i. > 500
b. Clean tap water	ii. < 300
c. Clean upland river	iii. 60 – 100
d. Organically enriched river	iv. 2 – 4

Codes :

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

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

List – I (Auditing types)	**List – II (Set of terms)**
a. Implementation audit	i. External review of the procedures used
b. Performance audit	ii. Compare actual with predicted impacts
c. Project impact audit	iii. To cover full operation
d. Procedures audit	iv. To cover a start-up

Codes :

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

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

Assertion (A) : The ecological restoration is a difficult proposition both in principle and in practice.

Reason (R) : Identity and population sizes of plants and animals once present at a particular site are largely unknown.

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 and (R) is true.

52. During the EIA process under the EIA notification of September 14, 2006, no public hearing is required for

(a) all A' category projects
(b) all 'B_1' category projects
(c) all 'B_2' category projects

Choose the correct code :

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

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

Assertion (A) : Evaporation of surface water is reduced due to black carbon in atmosphere.

Reason (R) : Presence of aerosols having black carbon is responsible for dimming effect.

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 and (R) is true.

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

List – I (Methods)		**List – II (Description)**
a. Network Method	i.	Possible impacts by composite environmental parameters.
b. Overlays Method	ii.	Structured approaches by involving scaling-weighing techniques.
c. Checklists Method	iii.	Environmental systems as a complex web of relationships.
d. Adhoc Method	iv.	Spatial distribution of environmental impacts using GIS.

Codes :

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

55. In environmental Impact Assessment, the baseline studies describe the

(1) socio-economic mapping of the area.

(2) consequences of the development activity.

(3) assessment of the risk involved during project implementation.

(4) environmental setting existing in the project area.

56. An ecosystem restoration project should have the outcomes which are

I. Specific II. Measurable

III. General IV. Realistic

V. Time bound

Choose the correct code :

(1) I, II, III, V (2) I, II, IV, V

(3) II, III, IV, V (4) I, II, III, IV

57. When applied to field populations, Lotka-Volterra equations suffer from the following :

I. Competition coefficients are assumed to be constant.

II. Carrying capacity is assumed to be constant.

III. There are no time lags.

IV. Maximal rate of increase is assumed to be constant.

Choose the correct answer :

(1) I and II only

(2) II and III only

(3) II, III and IV only

(4) I, II, III and IV

58. In a city, the daily per capita inhalation (m^3) values of contaminated air over a period of 5 days are 6.3, 6.3, 6.2, 6.4 and 5.8, respectively. The sample mean with standard deviation of the data is

(1) 6.2 ± 0.02 (2) 6.2 ± 0.23

(3) 6.0 ± 0.15 (4) 6.2 ± 0.18

59. The population (N) of fish in a pond follows the logistic equation

$\frac{dN}{dt} = 0.1\ N - 0.001\ N^2$.

What is the maximum sustainable yield ?

(1) 100 (2) 50

(3) 25 (4) 200

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

Assertion (A) : For power stations and polluting industries, tall stacks are installed.

Reason (R) : The maximum ground level concentration of a pollutant released from a stack is inversely proportion to the height of the stack.

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 and (R) is true.

61. Consider a box model for an airshed over a city and assume that the initial concentration of a pollutant is zero and that the air entering the box is clean. If the length of the box is 10 km and the wind speed along the length of the box is 5 m/s, what is the time taken for the pollutant concentration to reach ~ 95% of its final value ?

(1) 1 h 40 minutes (2) 1 h 7 minutes

(3) 33 minutes 20 seconds (4) 2 h 13 minutes 20 seconds

62. For a sample size n = 16, the mean ($\bar{X}$) value and standard deviation (S) are found to be 5.667 and 0.934, respectively. If the population mean is $\mu = 5.2$, then t – statistic is

(1) 0.5 (2) 0.47

(3) 1.76 (4) 2.0

63. Which of the following are sources of the greenhouse gas methane (CH_4) ?

(a) Coal mining areas (b) Ruminants

(c) Wetlands (d) Low land paddy

Choose the correct answer :

(1) (a), (b) and (c) only (2) (b) and (c) only

(3) (b), (c) and (d) only (4) (a), (b), (c) and (d)

64. Which of the following convention/protocols/treaties is legally binding on the signatory countries ?

(1) Basel Convention (2) Montreal Protocol

(3) Kyoto Protocol (4) Paris Agreement

65. For untreated municipal wastewater, BOD/COD ratio is in the range

(1) 1.3 – 3 (2) 0.3 – 0.8

(3) 3.0 – 6.5 (4) > 10

66. Organic wetland soils have

I. High porosity
II. Low density
III. High Ion exchange capacity
IV. Low nutrient availability

Choose the right answer :

(1) I, II, III, IV
(2) II, III, IV only
(3) III, IV only
(4) I, II only

67. Consider following statements about the ozone hole ?

I. Ozone formation and destruction keeps on happening.
II. Ozone destruction rate is higher than its formation rate.
III. Ozone destruction rate is equal to its formation rate.

Choose the correct answer :

(1) I only
(2) I and II only
(3) I and III only
(4) III only

68. Consider following statements about an estuary :

I. Estuary is the ecotonal region between fresh water and oceanic water.
II. This area is highly productive.
III. This area is highly unproductive.

Choose the correct answer :

(1) I only
(2) I and II only
(3) III only
(4) I and III only

69. The ionic species, O^+, O_2^+ and N_2^+ are found generally in

(1) Troposphere
(2) Stratosphere
(3) Mesosphere
(4) Heterosphere

70. As part of recently signed international agreement on phasing out synthetic hydrofluorocarbons (HFCs), India will start phasing them out from the year

(1) 2019
(2) 2024
(3) 2028
(4) 2032

71. In the tropospheric ozone formation reaction sequence, which of the following chemical species does not act as a catalyst ?

(1) OH
(2) HO_2
(3) NO_2
(4) O_2

72. Which of the following are useful indicators of pollution potential of organic effluents ?

(a) Total Organic Carbon (TOC)

(b) Biological Oxygen Demand (BOD)

(c) Turbidity

(d) Conductivity

Choose the correct code :

(1) (a) and (b) only (2) (a) and (c) only

(3) (b) and (d) only (4) (a), (b), (c) and (d)

73. Which of the following power plants releases radioactive materials as well as hazardous metals such as lead and arsenic under normal operating conditions ?

(1) Nuclear power plant (2) Solar power installations

(3) Hydro power (4) Coal based thermal power plants

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

List – I (Convention)	**List – II (Purpose)**
a. Paris Convention 1992	i. Transboundary Movement of Waste
b. Vienna Convention 1985	ii. Protection of Marine Environment
c. Bamako Convention 1998	iii. Protection of ozone layer
d. Basel convention 1992	iv. Ban on import of hazardous waste to Africa

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

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

List – I (Colour Codes)	**List – II (Hospital Wastes)**
a. Yellow Bags	i. Infected metal sharps
b. Red Bags	ii. Outdated Medicine bottles
c. Blue Bags	iii. Used Catheters
d. Black Carboy	iv. Infectious waste placenta

Codes :

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

Space For Rough Work