

**PAPER-III**  
**ENVIRONMENTAL SCIENCES**

**Signature and Name of Invigilator**

1. (Signature) \_\_\_\_\_

(Name) \_\_\_\_\_

2. (Signature) \_\_\_\_\_

(Name) \_\_\_\_\_

**J 8913**

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 : 2 1/2 hours]

[Maximum Marks : 150

Number of Pages in this Booklet : 12

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 / polythene bag on the booklet. Do not accept a booklet without sticker-seal / without polythene bag 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 OMR Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.  
**Example :** (A) (B) (C) (D)  
where (C) 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 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, 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 duplicate copy of OMR Sheet on conclusion of examination.
10. Use only Blue/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. पहले 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 / पॉलिथीन बैग को फाड़ लें । खुली हुई या बिना स्टीकर-सील / बिना पॉलिथीन बैग 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 OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
4. प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (A), (B), (C) तथा (D) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है ।  
**उदाहरण :** (A) (B) (C) (D) जबकि (C) 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, 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 OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
10. केवल नीले/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 अंक काटे नहीं जाएँगे ।

**ENVIRONMENTAL SCIENCES**  
**PAPER – III**

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

1. Most of the day to day weather changes are associated with which scale in meteorology ?  
(A) Micro scale  
(B) Meso scale  
(C) Synoptic scale  
(D) Planetary scale
2. Match the List-I with List-II and choose the correct answer from the codes given below :
- | <b>List – I</b>              | <b>List – II</b>                      |
|------------------------------|---------------------------------------|
| <b>(Date)</b>                | <b>(Event)</b>                        |
| (a) 5 <sup>th</sup> June     | (i) National Pollution Prevention Day |
| (b) 2 <sup>nd</sup> December | (ii) World Environment Day            |
| (c) 22 <sup>nd</sup> May     | (iii) World Forest Day                |
| (d) 21 <sup>st</sup> March   | (iv) Bio-diversity Day                |
- Codes :**
- |     |       |       |       |       |
|-----|-------|-------|-------|-------|
| (a) | (b)   | (c)   | (d)   |       |
| (A) | (ii)  | (i)   | (iv)  | (iii) |
| (B) | (iii) | (ii)  | (iv)  | (i)   |
| (C) | (iv)  | (iii) | (ii)  | (i)   |
| (D) | (i)   | (iv)  | (iii) | (ii)  |
3. 'Fanning' smokestack plumes are observed when  
(A) there is an inversion above the ground surface.  
(B) there is unstable atmosphere.  
(C) there is neutrally stable atmosphere.  
(D) the stack height is below an inversion layer.
4. The cyclonic winds are generated by the approximate balance between  
(A) Pressure gradient force and coriolis force  
(B) Centrifugal force and coriolis force  
(C) Centrifugal force, coriolis force and frictional drag force.  
(D) Centrifugal force and pressure gradient force.
5. Mixing height is determined by  
(A) adiabatic lapse rate and environmental lapse rate.  
(B) vertical profile of wind speeds and adiabatic lapse rate.  
(C) vertical profiles of wind speeds and ambient temperature.  
(D) wind speeds and solar insolation.
6. United Nations has declared "UN Decade of Education for sustainable Development" and the decade identified for this education is  
(A) 2006 – 2015  
(B) 2005 – 2014  
(C) 2011 – 2020  
(D) 2012 – 2021
7. Halon – 1301 is a  
(A) Fire extinguisher  
(B) Solvent  
(C) Refrigerant  
(D) Aerosol propellant

8. Which of the following is a primary pollutant in atmospheric air ?  
 (A)  $Cl_2$   
 (B)  $SO_3$   
 (C) Nitrates  
 (D) Sulphates
9. Hardness is expressed on the Mohs scale, which ranges from  
 (A) 1 to 10  
 (B) 1 to 14  
 (C) -14 to 14  
 (D) 1 to 100
10. The halon H-1211 has the following chemical composition :  
 (A)  $CF_2 Cl Br$   
 (B)  $CCl_2 FBr$   
 (C)  $CCl_2 F_2$   
 (D)  $CBr_2 Cl F$
11. The most toxic among the chlorinated hydrocarbons is  
 (A) Aldrin  
 (B) DDT  
 (C) Endrin  
 (D) Heptachlor
12. Agent orange is a  
 (A) Weedicide  
 (B) Fungicide  
 (C) Nematicide  
 (D) Rodenticide
13. Major source of  $SO_2$  is  
 (A) Cement Industry  
 (B) Forest fires  
 (C) Thermal Power Stations  
 (D) Volcanic activity

14. Match each water contaminant in Column-I with its preferred method of removal in Column-II.

Column – I	Column – II
(a) $Mn^{2+}$	(i) Activated Carbon
(b) $Ca^{2+}$ and $HCO_3^-$	(ii) Raise pH by addition of $Na_2CO_3$
(c) Trihalomethane	(iii) Addition of lime
(d) $Mg^{2+}$	(iv) Oxidation

**Codes :**

(a)	(b)	(c)	(d)
(A) (iv)	(iii)	(i)	(ii)
(B) (iii)	(ii)	(iv)	(i)
(C) (ii)	(iv)	(iii)	(i)
(D) (i)	(ii)	(iv)	(iii)

15. Reverse Osmosis (RO) operated at 200–1200 psig removes particles ranging from  
 (A) 0.0001 to 0.001  $\mu m$   
 (B) 0.01 to 10  $\mu m$   
 (C) 0.1 to 1.0  $\mu m$   
 (D) 0.1 to 2.0  $\mu m$
16. Coagulation is a chemical process, in which charged particles or colloids undergo  
 (A) Stabilization  
 (B) Destabilization  
 (C) Attraction  
 (D) Precipitation

17. Water has the following chemical composition :

$$[\text{Ca}^{2+}] = 15 \text{ mg/L};$$

$$[\text{Mg}^{2+}] = 10 \text{ mg/L};$$

$$[\text{SO}_4^{2-}] = 30 \text{ mg/L};$$

The total hardness of water will be

- (A) 80 mg/L as  $\text{CaCO}_3$   
(B) 55 mg/L as  $\text{CaCO}_3$   
(C) 160 mg/L as  $\text{CaCO}_3$   
(D) 40 mg/L as  $\text{CaCO}_3$
18. Two water samples were collected.  
Sample # 1 : pH = 9, but no carbonate or other dissolved proton donors or acceptors.  
Sample # 2 : pH = 8.3, but it contains dissolved  $\text{NaHCO}_3$  at a concentration of 0.01/mg/l  
Which of the following is true based on the above observations.  
(A) Sample # 1 will have more alkalinity.  
(B) Sample # 2 will have more alkalinity.  
(C) Sample # 1 and sample # 2 will have exactly same alkalinity.  
(D) Alkalinity cannot be estimated.
19. Two soil samples, A and B, at different soil moisture levels are placed in contact with each other. Water will more likely move from soil A to soil B if their water potential, expressed in kPa, are :  
(A)  $A = -5; B = +5$   
(B)  $A = -5; B = -5$   
(C)  $A = -20; B = -10$   
(D)  $A = -30; B = -40$

20. Blue baby syndrome is caused by

- (A) Carbon monoxide  
(B) Nitrate  
(C) Fluoride  
(D) Mercury

21. **Assertion (A)** : For solar cell fabrication, those semi-conducting materials which have band-gap energies in the range 1-1.8 eV are most suitable.

**Reason (R)** : The maximum solar irradiance is around a wavelength corresponding to 1.5 eV.

Identify the correct Code :

- (A) Both (A) and (R) are correct and (R) is the correct explanation of (A).  
(B) Both (A) and (R) are correct 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.

22. **Assertion (A)** : State factors (external factors) control the overall structure of an ecosystem and the way things work within it.

**Reason (R)** : The state factors are not themselves influenced by the ecosystem.

Identify the correct code :

- (A) (A) is correct (R) is incorrect.  
(B) Both (A) and (R) are correct, but (R) is not correct explanation of (A).  
(C) Both (A) and (R) are correct and (R) is correct explanation of (A).  
(D) Both (A) and (R) are incorrect.

23. **Assertion (A)** : When energy is transferred between trophic levels, the successive level in the pathway have lesser available energy compared to the preceding level.

**Reason (R)** : Whenever energy is transformed, there is loss of energy through the release of heat.

- (A) Both (A) and (R) are true and (R) is the correct explanation.
- (B) Both (A) and (R) are true and (R) is not the correct explanation.
- (C) (A) is true and (R) is false.
- (D) (A) is false and (R) is true.

24. **Assertion (A)** : The ecosystem surrounding a river gets damaged due to construction of a dam.

**Reason (R)** : The area gets inundated with large volume of water.

Identify the correct answer :

- (A) Both (A) and (R) are true, with (R) being the correct explanation.
- (B) Both (A) and (R) are true, but (R) is not the correct explanation.
- (C) (A) is true, but (R) is wrong.
- (D) Both (A) and (R) are wrong.

25. **Assertion (A)** : Soils rich in clay minerals have high levels of organic matter.

**Reason (R)** : Clay soils tend to have low decomposition rates.

Identify the correct answer :

- (A) Both statements are correct and (R) is correct explanation of (A).
- (B) Both statements are correct, but (R) is not correct explanation of (A).
- (C) Statement (A) is correct, but (R) is incorrect.
- (D) Statement (A) is incorrect, but (R) is correct.

26. **Assertion (A)** : Nitrogen cycle is an endogenic biogeochemical cycle.

**Reason (R)** : Atmospheric  $N_2$  can be fixed by certain prokaryotes in the soil.

Choose correct answer :

- (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.

27. Match the following :

Column – I	Column – II
(a) Nekton	(i) Associated with surface film water
(b) Neuston	(ii) Found at the bottom of an aquatic ecosystem.
(c) Benthos	(iii) Active swimmer, against water current.
(d) Plankton	(iv) Incapable of independent movement.

Choose the correct answer from the Codes :

**Codes :**

- (a) (b) (c) (d)  
(A) (i) (iii) (iv) (ii)  
(B) (ii) (iv) (i) (iii)  
(C) (iii) (i) (ii) (iv)  
(D) (iv) (ii) (iii) (i)

28. Which of the following is not a major biome of India ?

- (A) Tropical rain forest biomes  
(B) Tropical deciduous forest biomes  
(C) Temperate needle leaf forest biomes  
(D) Mountains and glaciers

29. To survive and avoid competition for the same resources, a species usually occupies only part of its fundamental niche in a particular community or ecosystem. This is called

- (A) Geographic isolation  
(B) Mutualism  
(C) Realized Niche  
(D) Broad Niche

30. Which of the following is not a characteristic feature of community ?

- (A) Populations of different species occupying a particular place.  
(B) Complex interacting network of plants, animals and microbes.  
(C) Different species interacting with one another and with their environment of matter and energy.  
(D) Groups of interacting individuals of different species.

31. Which of the following food chain is correct ?

- (A) Krill → Adelie → Emperor  
Penguins Penguins  
→ Leopard Seal  
(B) Krill → Crabeater → Leopard Seal  
Seal Seal  
→ Killer Whale  
(C) Krill → Leopard → Emperor Seal Penguins  
Seal Penguins  
→ Killer Whale  
(D) Krill → Crabeater → Killer → Leopard Seal  
Seal Seal Whale

32. The observation that individuals of a population are uniformly distributed suggests that

- (A) Density of population is low.  
(B) Resources are distributed unevenly.  
(C) The members of the population are neither attracted to nor repelled by one another.  
(D) The members of the population are competing for access to a resource.

33. Which of the following biomes is correctly paired with the description of its climate ?
- (A) Tropical – nearly constant forests day length and temperature  
 (B) Tundra – long summers, mild winters  
 (C) Savanna – cool temperature year-round, uniform precipitation during the year  
 (D) Temperate – relatively short grass-lands growing season, mild winters.
34. Cellulose and hemicellulose are not resistant to decay but are broken down more slowly. They are considered
- (A) Labile  
 (B) Moderately labile  
 (C) Recalcitrant  
 (D) Nonlabile
35. The parasitic gall formation is related to
- (A) Host-specific antibodies  
 (B) Parasite specific cysts  
 (C) Parasite specific enzymes  
 (D) Host specific hormones
36. What is the estimate of volume of water yield for saturated pond aquifer of 1 metre width and 2 metre depth and length of 4 metre. Consider the porosity of sand to be 35% and specific yield to be 25% ?
- (A)  $2.8 \text{ m}^3$   
 (B)  $28 \text{ m}^3$   
 (C)  $0.28 \text{ m}^3$   
 (D)  $280 \text{ m}^3$
37. Arrange the following climate proxies in ascending order of time scales :
- (i) Lithological records  
 (ii) Pollens  
 (iii) Tree rings  
 (iv) Historical records
- (A) (iv), (iii), (i), (ii)  
 (B) (iv), (iii), (ii), (i)  
 (C) (iv), (ii), (i), (iii)  
 (D) (iv), (i), (iii), (ii)
38. Acid drainage is more in mining of
- (A) Granite  
 (B) Bauxite  
 (C) Lime stone  
 (D) Base metal sulphide
39. Geothermal gradient in Earth is
- (A) Uniform throughout.  
 (B) Higher in continental lithosphere.  
 (C) Higher in subduction zones.  
 (D) Lower at mid oceanic ridges.
40. Coal mining areas are affected by
- (i) Land subsidence  
 (ii) Fire hazard  
 (iii) Radioactive waste  
 (iv) Air pollution
- (A) (i) and (ii)  
 (B) (i), (ii) and (iii)  
 (C) (i), (ii) and (iv)  
 (D) (i), (ii), (iii) and (iv)
41. Radioactive elements are concentrated in
- (A) Earth's core  
 (B) Earth's mantle  
 (C) Mid-Oceanic ridges  
 (D) Earth's crust

42. What led to maximum number of fatalities during Indonesian 2004 Earthquake ?  
 (A) Death on account of openings on surface  
 (B) Fires generated due to earthquake  
 (C) Epidemic diseases  
 (D) Tsunami
43. Maximum carbon in the world is found in  
 (A) Oceans  
 (B) Coal mines  
 (C) Antarctica  
 (D) Forests
44. The highest seismic domain in India is  
 (A) The Himalayas  
 (B) The Western ghats  
 (C) The Indogangetic plains  
 (D) The Dharwar craton
45. Earth's core is mainly composed of  
 (A) Iron  
 (B) Nitrogen  
 (C) Carbon  
 (D) Magnesium
46. Gasification is  
 (A) the high temperature (~ 750 – 850 °C) conversion of solid, carbonaceous fuel into flammable gas mixtures.  
 (B) the high temperature (~ 750 – 850 °C) conversion of solid, carbonaceous fuel into liquid.  
 (C) the low temperature (~ 250 – 350 °C) conversion of solid, carbonaceous fuel into flammable gas mixture.  
 (D) the low temperature (~ 250 – 350 °C) conversion of solid, carbonaceous fuel into liquid.
47. In case of magneto hydrodynamic power generation, for maximum power output, the efficiency is  
 (A) 0.25 (B) 0.5  
 (C) 0.75 (D) 0.4
48. Which combination of radiative fluxes plays the all important role in climate change ?  
 (A) Visible and infrared  
 (B) Visible and UV  
 (C) Visible, UV and infrared  
 (D) UV, microwaves and infrared
49. The climate sensitivity parameter is defined as the rate of change of  
 (A) surface temperature with albedo of earth  
 (B) surface temperature with CO<sub>2</sub> concentration in atmosphere  
 (C) precipitation with earth's temperature  
 (D) surface temperature with radiative forcing.
50. Which of the following fuels has highest carbon intensity ?  
 (A) Natural gas  
 (B) Oil  
 (C) Bituminous coal  
 (D) Biomass
51. Solid waste treatment by pyrolysis involves  
 (A) Autoclaving  
 (B) Heating in presence of air  
 (C) Heating in presence of acetic acid  
 (D) Heating in absence of air
52. In which year Wildlife Protection Act was enacted ?  
 (A) 1962 (B) 1972  
 (C) 1982 (D) 1992

53. According to National Ambient Air Quality Standards, the annual average concentration of Sulphur dioxide in residential areas in India is  
 (A)  $20 \mu\text{g}/\text{m}^3$  (B)  $40 \mu\text{g}/\text{m}^3$   
 (C)  $60 \mu\text{g}/\text{m}^3$  (D)  $80 \mu\text{g}/\text{m}^3$
54. Which of the following statements is correct in the context of Environmental Impact Assessment ?  
 (A) The process considers broad range of potential alternatives.  
 (B) It provides early warning of cumulative effects.  
 (C) Focusses on sustainability agenda.  
 (D) Focusses on standard agenda.
55. Match the List-I with List-II and choose the correct answer from the codes given below :

List – I (Components)	List – II (Dimensions)
(a) Equitable utilization of natural resources	(i) Social dimensions
(b) Benefit to disadvantaged group	(ii) Economic dimensions
(c) Creation of additional value	(iii) Environmental dimensions
(d) Elimination of toxic substances	(iv) Political dimensions

**Codes :**

- |           |      |       |       |
|-----------|------|-------|-------|
| (a)       | (b)  | (c)   | (d)   |
| (A) (iv)  | (i)  | (ii)  | (iii) |
| (B) (iv)  | (i)  | (iii) | (ii)  |
| (C) (iii) | (ii) | (i)   | (iv)  |
| (D) (ii)  | (iv) | (i)   | (iii) |

56. Among the following, which one does not belong to EIA process ?  
 (A) Establishment of base line environmental condition.  
 (B) Identification, Prediction and assessment of impact.  
 (C) Suggesting the mitigation measures.  
 (D) Developing EMS auditing procedures.
57. According to Gaussian Plume Model, the ground level concentration (C) of a pollutant varies with effective height (H) as ( $\sigma$  is the vertical dispersion coefficient) :  
 (A)  $C \propto \frac{1}{H}$   
 (B)  $C \propto e^{-\frac{H^2}{\sigma^2}}$   
 (C)  $C \propto e^{-\frac{H}{\sigma}}$   
 (D)  $C \propto H^{-2}$
58. In a multiple regression analysis, an examination of variances revealed that explained sum of squares per degree of freedom and residual sum of squares per degree of freedom were 250 and 100, respectively. What is the F-ratio ?  
 (A) 6.25  
 (B) 5.25  
 (C) 0.4  
 (D) 2.5

59. A source of air pollution is emitting a pollutant at the rate  $S$ (mg/hours) inside a room of volume  $V$ ( $m^3$ ). The air of the room is being changed  $n$  times per hour. If  $k$  is pollutant decay rate constant, the concentration  $C(t)$  of the pollutant at any given instant of time under well mixed conditions is given by

- (A)  $C(t) = \left(\frac{S}{nV}\right) (1 - e^{-nt})$   
 (B)  $C(t) = \left(\frac{S/V}{n+k}\right) (1 - e^{-nt})$   
 (C)  $C(t) = (S/nV) (n+k)$   
 (D)  $C(t) = \left(\frac{nV}{S}\right) (1 - e^{-nk})$

60. Which one of the following is not an eigen value of the matrix ?

$$\begin{bmatrix} -1 & 2 & 2 \\ 2 & 2 & 2 \\ -3 & -6 & -6 \end{bmatrix}$$

- (A) 0  
 (B) -2  
 (C) -3  
 (D) 3
61. A sample of 17 measurements of the diameter of a spherical particle gave a mean = 5  $\mu\text{m}$  and a standard deviation = 0.5  $\mu\text{m}$ . Assuming  $t$ -statistic for 16 degrees of freedom  $t_{0.05} \approx 2$ , the 95% confidence limits of actual diameter are
- (A) 4.75 and 5.25  $\mu\text{m}$ .  
 (B) 4.00 and 6.00  $\mu\text{m}$ .  
 (C) 4.9 and 5.1  $\mu\text{m}$ .  
 (D) 4.5 and 5.5  $\mu\text{m}$ .

62. "Hot spots" are areas,  
 (i) extremely rich in species  
 (ii) with high endemism  
 (iii) extremely scarce in species  
 (iv) under constant threat

Choose the correct answer from the codes :

**Codes :**

- (A) (i) and (ii)  
 (B) (ii) and (iii)  
 (C) (ii), (iii) and (iv)  
 (D) (i), (ii) and (iv)
63. A paddy field is an example of  
 (A) Fresh water ecosystem  
 (B) Terrestrial ecosystem  
 (C) Auto ecosystem  
 (D) Engineered ecosystem
64. Which pyramid cannot be inverted in a stable ecosystem ?  
 (A) Pyramid of energy  
 (B) Pyramid of biomass  
 (C) Pyramid of number  
 (D) Pyramid of dry weight
65. Which one of the following environmental factors is responsible for cyclomorphism in animals ?  
 (A) Moisture  
 (B) Temperature  
 (C) Photoperiod  
 (D) Wind
66.  $\text{Sr}^{90}$  can enter and accumulate in the body through  
 (A) Drinking water  
 (B) Inhaling contaminated air  
 (C) Food chain  
 (D) Skin

67. Which one of the following is a neurotoxic ?
- (A) Organophosphate  
(B) Nitric oxide  
(C) 2, 4-D  
(D) Cuprous oxide
68. If 0.05 M proline-ninhydine complex has an absorbance of 0.15 at 520 nm in a 1 cm curvette, its molar extinction coefficient will be
- (A)  $50 \text{ m M}^{-1} \text{ cm}^{-1}$   
(B)  $0.1 \text{ M}^{-1} \text{ cm}^{-1}$   
(C)  $1 \text{ M}^{-1} \text{ cm}^{-1}$   
(D)  $3 \text{ M}^{-1} \text{ cm}^{-1}$
69. Which bacterium found in soil is anaerobic ?
- (A) Clostridium Sp  
(B) Azatobacter Sp  
(C) Bacillus Sp  
(D) Thiobacillus Sp
70. Particles of sizes  $< 1 \mu\text{m}$  are most efficiently removed by
- (A) Cyclones  
(B) Scrubbers  
(C) Bag filter  
(D) Electrostatic Precipitator
71. The attenuation of sound by reactive type silencers is based on
- (A) absorption of sound waves  
(B) scattering of sound waves  
(C) impedance discontinuity  
(D) interference of sound waves
72. "Farmer's lung" is a classic example for
- (A) Psittacosis  
(B) Extrinsic allergic alveolitis  
(C) Legionnaire's disease  
(D) Aspergillosis
73. The lichen and moss stages occur in
- (A) Lithosere  
(B) Psamosere  
(C) Hydrosere  
(D) Hydrarch
74. The mean of a data following Poisson distribution is 4. The second moment of the distribution is :
- (A) 4  
(B) 2  
(C) 1  
(D) 0
75. Which of the following rivers has maximum melt water component in its discharge ?
- (A) Indus  
(B) Ganges  
(C) Brahmaputra  
(D) Narmada

**Space For Rough Work**