PAPER-II
ENVIRONMENTAL SCIENCE

Signature and Name of Invigilator

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

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Time : 1 ¹/₄ hours]

OMR Sheet No. : ....

(To be filled by the Candidate)

Roll No. | | | | | | | | |

(In figures as per admission card)

Roll No._____

(In words)

[Maximum Marks : **100**

Number of Pages in this Booklet : **8**

Number of Questions in this Booklet : **50**

Note : This paper contains **fifty (50)** objective type questions, each question carrying **two (2)** marks. Attempt **all** the questions.

1. If the standard deviation of a population is 20 and the standard error of mean is 4, then the sample size is
   (A) 25
   (B) 80
   (C) 5
   (D) 100

2. In a multiple regression model, the explained variance per d.f. is 50 and unexplained variance per d.f. is 10. The F-ratio is
   (A) 2.5
   (B) 5
   (C) 25
   (D) 0.2

3. Which one of the following is not a random sampling method ?
   (A) Stratified Sampling
   (B) Cluster Sampling
   (C) Systematic Sampling
   (D) Judgement Sampling

4. In the Gaussian Plume Model, the plume size is estimated considering buoyancy of exhaust gases, stack diameter, wind speed and stability of the atmosphere. The plume size Δh depends on inside radius of stack (r) as
   (A) $\Delta h \propto r$
   (B) $\Delta h \propto r^{1/3}$
   (C) $\Delta h \propto r^{2/3}$
   (D) $\Delta h \propto r^2$

5. The acidity of normal rain water is due to
   (A) CO_2
   (B) Cl_2
   (C) NO_2
   (D) SO_2

6. Percent of water on the world's surface representing fresh water is
   (A) 97
   (B) 50
   (C) 10
   (D) 3

7. Concentration of CO_2 in present day atmosphere is
   (A) ~ 220 ppm
   (B) ~ 280 ppm
   (C) ~ 360 ppm
   (D) ~ 390 ppm

8. Hardness of diamond is due to
   (A) Coordinate bonding
   (B) Covalent bonding
   (C) Electrovalent bonding
   (D) van der Waals forces

9. In biological systems sulphur is largely bound in

(A) Lipids

(B) Proteins

(C) Nucleic acids

(D) Proteins and nucleic acids

10. pH of 0.01 M HNO_3 is

(A) 0.1   (B) 1

(C) 2   (D) 10

11. Which is a correct food chain in the Antarctic ecosystem ?

(A) Phytoplankton – Krill – Carnivorous Plankton – Emperor Penguin

(B) Phytoplankton – Krill – Carnivorous Plankton – Squid – Elephant Seal – Leopard Seal

(C) Phytoplankton – Herbivorous Zoo Plankton – Carnivorous Plankton – Adelic Penguin – Emperor Penguin

(D) Herbivorous Zoo Plankton – Phytoplankton – Carnivorous Plankton – Elephant Seal – Leopard Seal

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

Assertion (A) : The phosphorous cycle in an ecosystem is a sedimentary cycle.

Reason (R) : Phosphorous does not occur naturally as gas.

(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.

13. Pyramid of trophic levels is always upright in case of

(A) Biomass

(B) Energy

(C) Number

(D) All of the above

14. Which of the following is a correct match ?

(A) Periyar – Kerala

(B) Ranthambore – M.P.

(C) Panna – U.P.

(D) Bandhvgarh – Bihar

15. Replacement of existing communities by any external condition is termed

(A) Primary succession

(B) Secondary succession

(C) Autogenic succession

(D) None of the above

16. The area where two major communities meet and blend together is termed as

(A) Ecotype

(B) Biotype

(C) Ecotone

(D) Meeting place

17. Indian wolf has become an important animal because

(A) It's name appears in Red Data Book.

(B) It is only an important member of food chain of almost all Indian forests.

(C) Wild dogs disappeared due to their presence.

(D) It has been chosen as a State animal.

18. Walkley and Black rapid titration method is used for the determination of

(A) Organic carbon content of soil

(B) Nitrate content of soil

(C) Phosphate content of soil

(D) Fluoride content of soil

19. Which one of the following is an endoenzyme in soil ?

(A) Cellulase

(B) Invertase

(C) Protease

(D) Dehydrogenase

20. Of the following humic groups which is not soluble in both acid and alkali ?

(A) Fulvic acid

(B) Humic acid

(C) Humin

(D) All of the above

21. The sources of thermal pollution are

(A) Power plants

(B) Cooling forests

(C) Industrial effluents

(D) All of the above

22. Which one of the following radionuclides has the longest half life ?

(A) C^{14}

(B) Sr^{90}

(C) I^{131}

(D) Cs^{137}

23. What is the importance of the 42nd Amendment to the Constitution brought in the year 1976 ?

(A) Insertion of Article 48-A

(B) Insertion of Article 51-A (g)

(C) Insertion of Article 48-A and 51-A (g)

(D) None of the above

24. Who issues the Ecomark notification ?

(A) Ministry of Environment and Forest, Govt. of India

(B) Ministry of Human Health and Family Welfare, Govt. of India

(C) Department of Science and Technology, Govt. of India

(D) Bureau of Indian Standards

25. Which one of the following is a waste recycling method of solid waste management ?

(A) Pelletisation

(B) Composting

(C) Incineration

(D) Sanitary Landfill

26. A hazardous waste is characterised by

(A) Ignitibility

(B) Reactivity

(C) Toxicity

(D) All of the above

27. How many hot spots have been identified in the world and Indian Subcontinent respectively ?

(A) 17, 2

(B) 12, 3

(C) 35, 2

(D) 17, 3

28. Which one of the following chemical species of mercury is highly toxic to living system ?

(A) Mercurous ion

(B) Mercuric ion

(C) Organo mercurials

(D) Atomic mercury

29. Natural gas is composed primarily of

(A) Methane

(B) n-butane

(C) n-octane

(D) A mixture of n-octane and n-butane

30. Which of the following is true regarding the Leopold interaction matrix used in Environmental Impact Assessment Process ?

(A) It can be expanded.

(B) It can be contracted.

(C) It can be contracted and expanded.

(D) It cannot be contracted and expanded.

31. Which of the following can be considered in Environmental Risk Assessment ?

(A) Exposure period

(B) Potency of a toxic material

(C) Quality of models

(D) All of the above

32. In India, Environmental Impact Assessment report of a proposed river valley project after environmental clearance is applicable for a maximal period of how many years ?

(A) 5

(B) 10

(C) 30

(D) 2

33. An earthquake is rated as 'major' if its magnitude in Richter Scale is in the range of

(A) 4.0 – 4.9

(B) 7.0 – 7.9

(C) 6.0 – 6.9

(D) 5.0 – 5.9

34. What is the proportion of the frequency of occurrence of La Nina compared to El Nino ?

(A) Half

(B) One-third

(C) Twice

(D) Two-third

35. An element in soil will be considered as a trace element if its concentration is

(A) 1 – 2 wt %

(B) < 0.1 wt %

(C) > 2 wt %

(D) < 1 wt %

36. Which of the following is correct about attribute data in Geographic Information System ?

(A) Attributes are pieces of data that are connected or related to the points, lines or polygons mapped in the GIS.

(B) Attribute data can be analysed to determine patterns of importance.

(C) Attribute data is entered directly into a database where it is associated with element data.

(D) All of the above

37. At Nadir, the LISS – IV camera in IRS-P6 has a spatial resolution of

(A) 5.8 m

(B) 5.9 m

(C) 5.7 m

(D) 5.6 m

38. Which one of the following can be estimated by Flame Photometer ?

(A) Sodium and Potassium

(B) Cadmium and Cobalt

(C) Chlorine and Bromine

(D) Mercury and Arsenic

39. The contribution of CO_2 towards global warming has been estimated to be about

(A) 57 – 60%

(B) 60 – 75%

(C) 80 – 85%

(D) 45 – 55%

40. The principal components of photochemical smog in urban areas are

(A) SO_2 and NO_2

(B) SPM and CO

(C) SPM and NO_2

(D) Hydrocarbons and Ozone

41. Match Lists – I and II and choose the correct answer from the codes given below :

List – I (Aerosol Constituents)	List – II (Sources)
(i) Si	1. Gases in the ambient atmosphere
(ii) V	2. Natural sources
(iii) Benzo(a)pyrene	3. Combustion of certain kinds of fuel oil
(iv) Sulfuric acid droplets	4. Incomplete combustion

Codes :

	(i)	(ii)	(iii)	(iv)
(A)	2	4	3	1
(B)	3	1	2	4
(C)	4	1	2	3
(D)	1	4	3	2

42. A river flowing at 20.0 m³/sec has a tributary feeding into it with a flow rate of 5.0 m³/sec. Upstream from the point of junction. The fluoride concentration is 5 mg/L in the river and 10 mg/L in the tributary. Assuming fluoride to be conservative substance and rapid mixing in the river, the downstream concentration in the river is

(A) 6 mg/L

(B) 8 mg/L

(C) 8.5 mg/L

(D) 7.5 mg/L

43. The power obtained from a horizontal wind turbine operating at maximum efficiency is proportional to its diameter (D) as

(A) D   (B) D^2

(C) $D^{3/2}$ (D) $\sqrt{D}$

44. Noise of 90 dB for 8 hours represents 100% dose. If the noise of 93 dB is for 1 hour duration, it represents a dose of

(A) 25%   (B) 50%

(C) 75%   (D) 100%

45. Scale lengths associated with mesoscale phenomenon in atmosphere are typically in the range

(A) 10 – 500 m

(B) 1 – 200 km

(C) 100 – 1000 km

(D) 1000 – 10,000 km

46. When an atmosphere has an isothermal profile, it is

(A) very stable

(B) slightly stable

(C) unstable

(D) very unstable (turbulent)

47. The wavelength range of UV-C radiation is

(A) 320 – 400 nm

(B) 280 – 320 nm

(C) 100 – 1500 nm

(D) 240 – 280 nm

48. Lightening in the atmosphere produces

(A) NO

(B) CO

(C) CO_2

(D) NH_3

49. The maximum tidal energy potential in India is

(A) in Gulf of Khambhat

(B) in Gangetic delta in Sundarbans

(C) along the coast of Odisha

(D) along the coast of Chennai

50. The maximum theoretical efficiency of a silicon solar cell can be

(A) 45%

(B) 30%

(C) 12%

(D) 50%

Space For Rough Work