

2013 September UGC NET Solved Question Paper in Environmental Sciences, Paper III

1. In which part of the atmosphere the momentum, heat flux and moisture content are conserved?

(A) Surface Boundary Layer

(B) Mesosphere

(C) Troposphere

(D) Stratosphere

Answer: (A)

2. The soil type which is good for agriculture is

(A) Podzols

(B) Latosols

(C) Serpent soil

(D) Solonchak

Answer: (B)

3. A local laboratory analyzed a water sample and determined that it contained a total solid (TS) content of 132 mg/L and a conductivity of 112 $\mu\text{S}/\text{cm}$. The total suspended solid (TSS) content (mg/L) of water will be

(A) ~ 57

(B) ~ 75

(C) ~ 32

(D) ~ 120

Answer: (A)

4. The settling of discrete, non-flocculating particle in a dilute suspension is known as

- (A) Class-I sedimentation
- (B) Class-II sedimentation
- (C) Class-III sedimentation
- (D) Compression

Answer: (A)

5. The theoretical oxygen demand for a solution containing 500 mg/L of phenol will be

- (A) 298 mg/L
- (B) 596 mg/L
- (C) 1191 mg/L
- (D) 2382 mg/L

Answer: (C)

6. The compound p-dichlorobenzene has been found to have $K_{OM} = 625$. For a soil containing 1.6% organic matter, the distribution coefficient (K_d) will be

- (A) 2
- (B) 5
- (C) 10
- (D) 20

Answer: (C)

7. Which one of the following is the single most important reactive intermediate species in atmospheric chemical processes?

- (A) OH^\cdot
- (B) $\text{O}_2^{\cdot-}$
- (C) ROO^\cdot

(D) OH^-

Answer: (A)

8. As per Indian Standards (BIS) for drinking water desirable limit for total hardness as CaCO_3 is

(A) 100 mg/l

(B) 200 mg/l

(C) 300 mg/l

(D) 400 mg/l

Answer: (C)

9. Flue gas laden with fine particles from a thermal power plant with a volume flow rate of $100 \text{ m}^3/\text{second}$ passes through an electrostatic precipitator (ESP) having 5000 m^2 of collector plate area. If the particle collection efficiency of the ESP is 98%, the drift velocity of the flue gas must be

(A) $\sim 0.052 \text{ m/s}$

(B) $\sim 0.078 \text{ m/s}$

(C) $\sim 0.15 \text{ m/s}$

(D) $\sim 1.5 \text{ m/s}$

Answer: (B)

10. Molar extinction coefficient of malondialdehyde is $0.155 \text{ mM}^{-1} \text{ Cm}^{-1}$. The concentration of malondialdehyde in a solution having an absorbance of 0.31 is

(A) 2 mM

(B) 0.31 mM

(C) 0.155 mM

(D) 1.55 mM

Answer: (A)

11. Removal of top fertile soil by water is called

- (A) Leaching
- (B) Siltation
- (C) Weathering of soil
- (D) Soil erosion

Answer: (D)

12. The rate of settling of air-borne particles in the atmosphere varies with their aerodynamic diameter (d) as__

- (A) $\propto d$
- (B) $\propto d^2$
- (C) $\propto d^3$
- (D) $\propto d^{1/2}$

Answer: (B)

13. The smokestack plumes exhibit 'coning' behaviour when

- (A) Stable atmospheric conditions exist
- (B) Atmosphere is unstable
- (C) The height of the stack is below the inversion layer
- (D) Inversion exists right from the ground surface above

Answer: (A)_

14. Among total dissolved matter in marine water, chlorine accounts for

- (A) 30%
- (B) 55%
- (C) 12%

(D) 6%

Answer: (B)

15. Photodissociation of NO_2 occurs in the presence of photons of wavelength,

(A) $< 0.39 \mu\text{m}$

(B) $0.5 - 0.6 \mu\text{m}$

(C) $0.6 - 0.65 \mu\text{m}$

(D) $0.65 - 0.7 \mu\text{m}$

Answer: (A)

16. Peroxyacetyl Nitrate (PAN) is formed by oxidation of

(i) Hydrocarbons

(ii) Isoprene

(iii) Terpene

(iv) Arsenic

Choose the correct answer from the codes:

Codes:

(A) (i) and (iv)

(B) (ii) and (iv)

(C) (iii) and (iv)

(D) (i), (ii) and (iii)

Answer: (D)

17. The evolution of genetic resistance to antibiotics among disease-carrying bacteria is an example of

(A) Directional natural selection

- (B) Stabilizing natural selection
- (C) Diversifying natural selection
- (D) Convergent natural selection

Answer: (A)

18. Pulmonary oedema is caused by

- (A) Carbon monoxide
- (B) Sulphur dioxide
- (C) Nitrous oxide
- (D) Methane

Answer: (C)

19. What is the half-life of ^{131}I ?

- (A) 60 days
- (B) 8 days
- (C) 12 years
- (D) 30 days

Answer: (B)

20. Which one of the following makes blood toxic, after combining with haemoglobin?

- (A) CO_2
- (B) CO
- (C) SO_2
- (D) CH_4

Answer: (B)

21. Respiratory electron transport chain can be inhibited by

- (A) ADP
- (B) Phosphate
- (C) H_2S
- (D) CO_2

Answer: (C)

22. Assertion (A): Oil slick in the ocean causes mass scale death of fish.

Reason (R): The gills of fish get clogged.

Point out the correct one of the following:

- (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.

Answer: (A)

23. Chaparral, Maquis, Encinuous, Melleseab are important areas of

- (A) Tropical evergreen woodland
- (B) Temperate evergreen woodland
- (C) Tropical deciduous woodland
- (D) Temperate deciduous woodland

Answer: (A)

24. The Keystone predator species maintain diversity in a community by

- (A) Preying on community's dominant species

- (B) Allowing immigration of other predators
- (C) Competitively excluding other predators
- (D) Coevolving with their prey

Answer: (A)

25. Which of the following is not an external factor controlling an ecosystem?

- (A) Climate
- (B) Topography
- (C) Parent material forming soil
- (D) Microbes

Answer: (D)

26. Which of the following food chain is correct?

- (A) Phytoplankton → Zooplankton → Turtle → Crabs
- (B) Phytoplankton → Zooplankton → Crab → Turtle
- (C) Turtle → Crab → Zooplankton → Phytoplankton
- (D) Zooplankton → Turtle → Crab → Phytoplankton

Answer: (B)

27. Which of the following is not categorized as an internal factor of an ecosystem?

- (A) Decomposition
- (B) Succession
- (C) Root competition
- (D) Bedrock

Answer: (D)

28. Two species cannot remain in same place according to

- (A) Allen's law
- (B) Gause hypothesis
- (C) Doll's rule
- (D) Weismann's theory

Answer: (B)

29. Identify the correct pair:

- (A) Ecotope – Transition between two ecosystems.
- (B) Edaphic – Saline soil
- (C) Heliophytes – Photophilic plants
- (D) Ecotone – Particular type of soil

Answer: (A)

30. Based on the number arrange the following group of endemic vertebrate species of India in descending order:

- (i) Mammals
- (ii) Birds
- (iii) Reptiles
- (iv) Amphibians

Choose the correct answer from the following:

- (A) Amphibians, Reptiles, Birds and Mammals.
- (B) Reptiles, Amphibians, Birds and Mammals.
- (C) Mammals, Birds, Amphibians and Reptiles.
- (D) Birds, Mammals, Reptiles and Amphibians

Answer: (B)

31. Freshwater ecosystems are nutritionally limited by

- (A) Phosphorous and Iron
- (B) Phosphorous and Carbon
- (C) Iron and Nitrogen
- (D) Nitrogen and Calcium

Answer: (A)

32. 'Threshold of Security' refers to the population level at which

- (A) Parasites damage the host body but do not cause immediate mortality.
- (B) Predators no longer find it profitable to hunt for the prey species.
- (C) Functional response of the predator is very high.
- (D) The balance between parasite and host is disturbed as the host produces antibodies.

Answer: (B)

33. "Bermuda grass allergy" is a type of

- (A) Airborne allergy
- (B) Contact allergy
- (C) Hydroborne allergy
- (D) Soilborne allergy

Answer: (A)

34. Parasites which initiate production of antibodies within hosts are termed as

- (A) Endoparasites
- (B) Pathogenic parasites

- (C) Zooparasites
- (D) Homoparasites

Answer: (B)

35. Which of the following material is not easily broken down?

- (A) Cellulose
- (B) Hemicellulose
- (C) Chitin
- (D) Amino acids

Answer: (C)

36. Melting of polar ice is expected to cover a sea level rise of approximately

- (A) 10 metre
- (B) 20 metre
- (C) 60 metre
- (D) 100 metre

Answer: (C)

37. Pleistocene represents period of

- (A) Cold climate
- (B) Warm climate
- (C) Alteration of cold and warm climate with high proportion of cold period
- (D) Alteration of cold and warm climate with very high proportion of warm period

Answer: (C)

38. GIS is applied to study

- (A) View shed analysis
- (B) Environmental Impact Assessment
- (C) Wildlife habitat analysis and migration routes planning
- (D) All of the above

Answer: (D)

39. Tectonic control in landscape evolution is manifested by

- (A) Tilted river terraces
- (B) Alluvial forms
- (C) Increased boulder proportions in the river belt
- (D) River meandering

Answer: (A)

40. Difference between mineral resource and reserve is

- (A) Reserve implies high degree of economic viability
- (B) Resource implies high degree of geological knowledge
- (C) Reserve implies high degree of economic viability and high degree of geological knowledge
- (D) Resource implies high degree of economic viability and high degree of geological knowledge

Answer: (C)

41. Characteristic difference between two polar Ice Caps is

- (A) Arctic Ice Cap is on land
- (B) Antarctic Ice Cap is on land

(C) Both are on land but Antarctic Ice Cap is thicker

(D) Both are on sea but Arctic Ice Cap is thicker

Answer: (B)

42. Laterite represents

(A) Regolith soil

(B) Glacial soil

(C) Black cotton soil

(D) Red soil

Answer: (A)

43. In a whole-rock chemical analysis the dividing criterion between major and trace element on weight percent basis is

(A) 1 %

(B) 0.1 %

(C) 0.01 %

(D) 0.001 %

Answer: (B)

44. The mineral, most resistant to chemical weathering is

(A) Olivine

(B) Quartz

(C) K-feldspar

(D) Biotite

Answer: (B)

45. Assertion (A): Phosphorus cycle is not an exogenic elemental cycle.

Reason (R): Phosphorus cycle does not have a gaseous component.

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 correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

Answer: (A)

46. The El Nino disappears in March and re-appears in

(A) May

(B) August

(C) October

(D) December

Answer: (D)

47. The elemental composition of earth's crust in the descending order of weight percent is

(A) Silicon > Aluminium > Iron > Calcium

(B) Aluminium > Iron > Calcium > Silicon

(C) Iron > Calcium > Silicon > Aluminium

(D) Calcium > Silicon > Aluminium > Iron

Answer: (A)

48. Bio-oil can be obtained from lignocellulose by

(A) Combustion

- (B) Fast pyrolysis
- (C) Gasification
- (D) Transesterification

Answer: (B)

49. For an ideal Magneto-hydrodynamic power generator, the power output (P) varies with the hot fuel velocity u as

- (A) $P \propto u$
- (B) $P \propto u^2$
- (C) $p \propto u^{3/2}$
- (D) $p \propto u^3$

Answer: (B)

50. Assuming that due to large scale change in land use pattern of the world, the earth's albedo changes from 0.32 to 0.3. If the climate sensitivity factor is $0.5\text{ }^{\circ}\text{C w}^{-1}\text{ m}^2$, the change in surface temperature of earth will be (take solar constant $S = 1400\text{ w/m}^2$)

- (A) $3.5\text{ }^{\circ}\text{C}$
- (B) $0.25\text{ }^{\circ}\text{C}$
- (C) $7.0\text{ }^{\circ}\text{C}$
- (D) $1.5\text{ }^{\circ}\text{C}$

Answer: (A)

51. Global Warming Potential (GWP) of a greenhouse gas (GHG) is a factor comparing the global warming impacts of

- (A) 1 m^3 of GHG with 1 m^3 of CO_2
- (B) 1 kg of GHG with 1 kg of CO_2
- (C) 1 gram mole of GHG with 1 gram mole of CO_2

(D) 1 kg of GHG with 1 mole of CO₂

Answer: (B)

52. The energy released during combustion of methane is ~ 900 kJ/mol. The carbon intensity of methane is

(A) ~ 0.05 gram C/kJ

(B) ~ 0.013 gram C/kJ

(C) ~ 0.018 gram C/kJ

(D) ~ 1.08 gram C/kJ

Answer: (B)

53. The term B10 implies

(A) Blending of 10 percent biodiesel with 90 percent conventional diesel.

(B) Blending of 90 percent biodiesel with 10 percent conventional diesel.

(C) Blending of 50 percent biodiesel with 50 percent conventional diesel.

(D) Blending of 1 percent biodiesel with 10 percent conventional diesel.

Answer: (A)

54. The validity period of Environmental Clearance after Environmental Impact Assessment is least for

(A) Mining projects

(B) River valley projects

(C) Harbour projects

(D) Area development projects

Answer: (D)

55. In Environmental assessment study, interpretation and evaluation should consider

- (A) Uncertainty of possible impacts
- (B) Significance of measured impacts
- (C) Comparison of alternatives
- (D) All of the above

Answer: (D)

56. Who are responsible for the public consultation process of EIA?

- (A) State Pollution Control Board
- (B) State Pollution Control Board and District Collector
- (C) State Pollution Control Board and CPCB Chairman
- (D) State Pollution Control Board and Civil Society

Answer: (B)

57. Arrange the following components of an environmental management system in a sequential order. Choose the correct answer from the codes given below:

I. Planning

II. Environmental policy

III. Implementation

IV. Monitoring

V. Review

Codes:

- (A) I, II, III, V, IV
- (B) II, I, III, IV, V
- (C) I, III, II, IV, V
- (D) I, V, III, II, IV

Answer: (B)

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

List – I

List – II

a. Life Cycle Assessment

1. 14010 series

b. Environmental Auditing

2. 14030 series

c. Environmental Performance Evaluation

3. 14040 series

d. Environmental Labelling

4. 14020 series

Codes:

	a	b	c	d
(A)	1	4	3	2
(B)	3	1	2	4
(C)	2	3	4	1
(D)	4	2	1	3

Answer: (B)

59. Which statement is not correct for hazardous wastes?

(A) They contain one or more of 39 toxic compounds

(B) They catch fire easily

(C) They are nonreactive and stable

(D) They are capable of corroding metal containers

Answer: (C)

60. Right to clean environment is guaranteed in Indian Constitution by

(A) Article 14

(B) Article 19

(C) Article 21

(D) Article 25

Answer: (C)

61. National Ambient Air Quality Standards for major pollutants were notified by CPCB in

(A) 1994

(B) 1984

(C) 2004

(D) 1974

Answer: (A)

62. Public Liability Insurance Act came into existence in the year

(A) 1986

(B) 1989

(C) 1991

(D) 1995

Answer: (C)

Answer: (B)

64. The standard deviation of weights of certain 1 kg packets of milk is 10 grams. A random sample of 20 packets showed a standard deviation of 15 grams. The value of χ^2 -statistic for the sample is

(A) 30

(B) 45

(C) 1.5

(D) 0.66

Answer: (C)

65. Assertion (A): According to Gaussian Plume Model, the downward concentration of pollutant appears to be inversely proportional to average wind speed at effective stack height.

Reason (R): Plume rise does not depend on wind speed. It only depends on buoyancy flux parameter.

Identify the correct answer:

(A) Both (A) and (R) are true 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.

Answer: (C)

66. The population of an urban area increased from 5 million to 15 million over a period of 50 years. If the growth of population has been exponential at a constant rate over this period, the growth rate is

(A) ~ 0.693 %

(B) ~ 1.2 %

(C) ~ 1.38 %

(D) ~ 2.2 %

Answer: (D)

67. A random sample of size 26 has a mean of 20. The sum of squares of the deviations taken from the mean is 200. If the population mean is 18, what is the value of t-statistic?

(A) ~ 0.9

(B) ~ 2.1

(C) ~ 3.6

(D) ~ 5.2

Answer: (C)

68. In Y-shaped energy flow model, one arm represents herbivore and the other

(A) Carnivore

(B) Decomposer

(C) Omnivore

(D) Secondary consumer

Answer: (B)

69. The population of a certain fish species in a pond follows logistic equation $dN/dt = \alpha N - \beta N^2$. When $\alpha = 0.5$ and $\beta = 0.01$, the maximum sustainable yield is

(A) 25

(B) 50

(C) 20

(D) 5

Answer: (A)

70. A change in a population's gene pool over time is called

(A) Microevolution

(B) Macroevolution

(C) Chemical evolution

(D) Inorganic evolution

Answer: (A)

71. The scale length of variation of pressure in vertical direction in atmosphere is

(A) ~ 2.5 km

(B) ~ 5 km

(C) ~ 7 km

(D) ~ 8.5 km

Answer: (C)

72. Assertion (A): Planetary, synoptic and mesoscale motions in earth's atmosphere are essentially quasi-horizontal.

Reason (R): The vertical component of wind velocity is more than an order of magnitude smaller than its horizontal component for all motions in atmosphere.

Identify the correct answer:

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

(B) Both (A) and (R) are true 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.

Answer: (A)

73. GLOBE stands for__

(A) Global Leading Occupations to Benefit the Environment

(B) General Learning and Observations to Benefit the Environment

(C) Global Learning and Observations to Benefit the Environment

(D) Global Leaders and their Observations to Benefit the Environment

Answer: (C)

74. Which one of the following is not the goal of sustainable agriculture in India?

- (A) Maintaining productive topsoil
- (B) Reduce the use of chemical fertilizer and pesticides
- (C) Mechanised farming
- (D) Keep farms economically viable

Answer: (C)

75. The term of Kyoto Protocol has been extended beyond December 2012 by

- (A) 5 years
- (B) 7 years
- (C) 8 years
- (D) 3 years

Answer: (A)