ENVIRONMENTAL SCIENCES (November 2017)
PAPER - II

Note : This paper contains fifty (50) objective type questions of two (2) marks each. All questions are compulsory.

1. The innermost layer of the earth is made up of :
   (1) Silicon and alumina
   (2) Silicon and magnesium
   (3) Silicon and nickel
   (4) Nickel and iron

2. The heat is distributed through a vertical mixing process called :
   (1) Advection
   (2) Diffusion
   (3) Convection
   (4) Turbulance

3. Which of the following statement(s) is/are true for an isothermal process ?
   (a) There is no change in enthalpy
   (b) There is no change in internal energy
   (c) There is change in temperature

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

4. Match the List-I and List-II. Identify the correct answer from the code given below :

	List-I (Aerosol)		List-II (Source)
(a)	Primary natural aerosol	(i)	Organic matter from biogenic gases
(b)	Secondary natural aerosol	(ii)	Soot from biomass burning
(c)	Primary anthropogenic aerosol	(iii)	Sulphate aerosol from powerplant SO_2 emissions
(d)	Secondary anthropogenic aerosol	(iv)	Soil dust

   Code :

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

5. Which of the following is not a heavy metal ?
   (1) Lead
   (2) Mercury
   (3) Bismuth
   (4) Aluminum

6. The dominant dissolved carbon dioxide species in sea water is :
   (1) Bicarbonate ion
   (2) Carbonate ion
   (3) Carbonic acid
   (4) Aquated carbon dioxide

7. A solution of chemical 'A' having its 0.14 mol L^{-1} concentration has an absorbance of 0.42. Another solution of 'A' under the same conditions has an absorbance of 0.36. What is the concentration of this solution of 'A' ?

   (1) 0.108 mol L^{-1} (2) 0.35 mol L^{-1} (3) 0.12 mol L^{-1} (4) 0.10 mol L^{-1}

8. Which one of the following is **not** a soil micronutrient ?

   (1) Sulphur   (2) Boron   (3) Iron   (4) Zinc

9. If life of NO_2 be 0.693 day, its residence time is :

   (1) 1.44 days   (2) 1.0 day   (3) 0.693 day   (4) 0.48 day

10. The general molecular formula of PAN type compound is :

    (1) $C_X H_Y OONO_2$ (2) $C_X H_Y OO_2NO_2$ (3) $C_X H_X OO_2NO_2$ (4) $C_X H_Y ONO_2$

11. In an ecosystem, which one of the following is a micro-consumer ?

    (1) Herbivores   (2) Omnivores   (3) Carnivores   (4) Saprotrophs

12. A structure with hundreds of species non-linearly interlinked for their livelyhood is called :

    (1) Guild   (2) Food chain   (3) Food web   (4) Pyramid

13. The process of examination of change in species diversity between ecosystems is a measure of :

    (1) Alpha diversity   (2) Beta diversity
    (3) Gamma diversity   (4) Genetic diversity

14. Red tide is caused by :

    (1) Diatoms   (2) Dianoflagillates (3) Navicula   (4) Desmids

15. The unidirectional series of changes from an uninhabited water body to a water body inhabited by a stable aquatic community are called :

    (1) Eutrophication (2) Succession   (3) Regeneration (4) Reclamation

16. Under the clear Sunny day, the maximum depth of the ocean at which photosynthesis can occur is :

    (1) 10 m   (2) 250 m   (3) 80 m   (4) 600 m

17. The organism likely to be most similar to the first life form that evolved on the earth is :
    (1) Blue - green algae   (2) Methane producing bacteria
    (3) Protozoan   (4) Red algae

18. A landform that results from free fall of rocks is called :
    (1) Alluvial fan   (2) Debris flow   (3) Talus slope   (4) Valley fills

19. In India lignite is mined in :
    (1) Neyveli   (2) Jharia   (3) Singrauli   (4) Singareni

20. Tree height can be measured using remote sensing data from :
(1) Resourcesat   (2) Landsat   (3) Cartosat   (4) RISAT

21. Ecosystem restoration deals with restoring :
(1) Ecosystem integrity   (2) Biodiversity
(3) Physical environment   (4) Ecosystem resistance

22. A single solar cell (10 cm×10 cm) produces a voltage of 0.5 V and a current upto 2.5 A. If the solar insolation is 800 W/m^2, the efficiency of the solar cell is :
(1) ~ 15.6 %   (2) ~ 24.6 %   (3) ~ 12.3 %   (4) ~ 10.2 %

23. Which of the following atoms is not fissile ?
(1) $^{238}_{92}U$ (2) $^{235}_{92}U$ (3) $^{233}_{92}U$ (4) $^{239}_{94}U$

24. Which of the following fuels has minimum nitrogen content ?
(1) Crude oil   (2) CNG   (3) Producer gas   (4) LPG

25. Maximum sulfur content is found in which grade of coal ?
(1) Bituminous   (2) Sub - bituminous
(3) Lignite   (4) Anthracite

26. Which of the following solar cell materials has maximum efficiency ?
(1) Cd Te, thin film   (2) Si, polycrystalline
(3) Amorphous Si : Ge : H film   (4) Ga As, single crystal

27. Noise level of 70 dB corresponds to sound intensity of :
(1) $10^{-5} Wm^{-2}$ (2) $10^{-7} Wm^{-2}$ (3) $10^{-4} Wm^{-2}$ (4) $10^{-3.5} Wm^{-2}$

28. At 258C and 1 atm. pressure, 1 ppm concentration of SO_2 is equivalent to :
(1) 1310 $\mu g/m^3$ (2) 1826 $\mu g/m^3$ (3) 2620 $\mu g/m^3$ (4) 5240 $\mu g/m^3$

29. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :
Assertion (A) : Arsenic (III) is more toxic than arsenic (V).
Reason (R) : Arsenic (V) binds the sulfhydryl group more strongly than arsenic (III). 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.

30. The half life period of a radioactive substance is 32 h. How much time it would take for its 75% disintegration ?
(1) 16 h   (2) 96 h   (3) 128 h   (4) 64 h

31. Match the List-I and List-II. Identify the correct answer from the code given below :

	List-I		List-II
	(Pesticides)		(Target)
(a)	Avicide	(i)	Fish
(b)	Disinfectant	(ii)	Plants
(c)	Herbicide	(iii)	Birds
(d)	Piscicide	(iv)	Micro-organisms

Code :

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

32. Nitrogen fixation in nature is not accomplished by :
    (1) Lightning
    (2) Cyanobacteria
    (3) Rotifers
    (4) Bacteria in root nodules of Leguminous plants

33. Which country has opted out of Paris Agreement on climate change ?
    (1) USA
    (2) Canada
    (3) Australia
    (4) Russia

34. Under the EIA notification of 14TH September, 2006, preparation of EIA is not required for the projects falling in the :
    (1) Category 'A' projects
    (2) Category 'B' projects
    (3) Category B1 projects
    (4) Category B2 projects

35. Which type of projects usually require an EIA ?
    (1) Community garden development
    (2) Mining and mineral development projects
    (3) Outdoor recreation
    (4) Development of community wells

36. Match the List-I and List-II. Identify the correct answer from the code given below :

	List-I		List-II
	(Series)		(Environmental labelling)
(a)	ISO 14021	(i)	Principles and procedures
(b)	ISO 14022	(ii)	Self declaration of environmental claims
(c)	ISO 14023	(iii)	Symbols
(d)	ISO 14024	(iv)	Testing and verification methods

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

37. Match the List-I and List-II. Identify the correct answer from the code given below :

	List-I (Acts)		List-II (Year)
(a)	Environmental Protection Act	(i)	1991
(b)	Air (Prevention and Control of Pollution) Act	(ii)	1977
(c)	Water (Prevention and Control of Pollution) Act	(iii)	1981
(d)	Public Liability Insurance Act	(iv)	1986

Code :

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

38. Articles 21, 48-A and 51-A(g), which aim to protect and improve the environment and safe guard forests and wildlife, incorporate which of the following principles of environmental law ?

    (1) Polluter pays principle
    (2) Precautionary principle
    (3) Principle of strict liability
    (4) Moral duty of the state

39. Which is the correct classification of forests under the Indian Forest Act, 1927 ?
    (1) Grasslands, tropical forests, wetlands
    (2) Protected forest, reserved forest, village forest
    (3) Wildlife sanctuary, national parks, biosphere reserve
    (4) Private forest, social forest, town forest

40. Hardening of the steel releases the hazardous waste containing :
    (1) Brine sludge containing mercury
    (2) Cyanide - nitrate containing sludge
    (3) Lead bearing residues
    (4) Tar containing waste

41. Red coloured containers in the hospitals are used to dump :
    (1) Waste from laboratory cultures
    (2) House keeping waste
    (3) Human anatomical waste
    (4) Waste sharps

42. Mercury pollution is considered hazardous to human health because,
    (1) Mercury is a pure metal and hard to digest
    (2) Mercury accumulates and its concentration increases high up in the food chain
    (3) Mercury is highly soluble in water and easily absorbed by human body
    (4) Mercury is heavy and is not dispersed by the wind

43. In the context of Gaussian Plume Dispersion model assumptions, consider the following statements :

    (a)   The pollutants have the same density as the air surrounding them.
    (b)   The atmosphere is stable.
    Choose the **correct** code :
    (1) Both (a) and (b) are true   (2) (a) is true, (b) is false
    (3) (a) is false, (b) is true   (4) Both (a) and (b) are false

44. Graphically depicting a group of numerical data through their Quartile is :
    (1) Histogram   (2) Frequency polygon
    (3) Box plot   (4) Pie chart

45. If, out of 50 fish of a pond, 12 had no ectoparasite and remaining had varying numbers of parasites on them, then how many of fish had at least one parasite ?
    (1) 4   (2) 24   (3) 38   (4) 16

46. In a One-way ANOVA, explained variance was found to be 8.0 and unexplained variance was 3.67. The F-ratio is :
    (1) 0.46   (2) 4.26   (3) 2.0   (4) 2.18

47. In total global emissions of CO_2 , India's contribution is about :
    (1) ~ 3%   (2) ~ 6%   (3) ~ 9%   (4) ~ 12%

48. According to IPCC, in order to restrict global mean temperature rise to $2^\circ C$ by the year 2050, global energy related CO_2 emissions (reference year 2005) need to be cut down by the year 2050 by :
    (1) ~ 50%   (2) ~ 90%   (3) ~ 40%   (4) ~ 30%

49. Global average water consumption (L/person/day) is :
    (1) ~ 53   (2) ~ 20   (3) ~ 42   (4) ~ 80

50. In a city, half a million cars travel approximately 20 km on a given day. The average HC emission rate is 2.0 g per car km. Assuming that the average molecular weight of all the emitted HCs is equal to that of CH_4 , how much volume of HC is released in the city each day ?
    (1) $1.4 \times 10^4 \, m^3$ /day   (2) $2.8 \times 10^4 \, m^3$ /day
    (3) $6.1 \times 10^4 \, m^3$ /day   (4) $11.3 \times 10^4 \, m^3$ /day

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