

UGC NET PAPER 3 JUNE 28, 2015 SHIFT 1 ENVIRONMENTAL SCIENCES QUESTION PAPER

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

1. Biological zonation in the ocean is determined by :

- (I) Ocean depth
- (II) Light availability
- (III) Bottom substrate

Choose the correct answer :

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

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

Assertion (A) : Methanogenic archae (methanogens) grow in swamps and sewage.

Reason (R) : Methanogens are obligate anaerobes

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, but **(R)** is true.

3. Filamentous Cyanobacteria differentiate 5 to 10% of their vegetative cells into heterocysts. Heterocysts are characterized by :

- (I) Thick cell wall
- (II) Only PSI activity
- (III) Nitrogenase activity

Choose the correct answer :

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

4. A critically endangered species :
- (1) Do not exist in wild habitat
 - (2) Face extremely high risk of extinction in immediate future
 - (3) Face high risk of extinction in the medium term future
 - (4) Will not face any risk of extinction in future 1000 years
5. Which of the following characteristics of desert animals are physiological adaptation to conserve water ?
- (I) Thick outer covering
 - (II) Release dry faeces
 - (III) Avoid exposure to direct sunlight
- Choose the correct answer :
- (1) (I) and (III) only
 - (2) (II) and (III) only
 - (3) (I) and (II) only
 - (4) (I), (II) and (III)
6. The balance between photosynthesis and photorespiration is related to :
- (I) The ratio of O_2 and CO_2 in the atmosphere
 - (II) Temperature
 - (III) Kranz anatomy
 - (IV) The ratio of CO_2 and H_2O
- Choose the correct answer :
- (1) (I) and (II) only
 - (2) (II), (III) and (IV) only
 - (3) (I), (II) and (III) only
 - (4) (I), (II), (III) and (IV)
7. Individual organism respond to environmental change through short-term adjustment(s) by :
- (1) Physiological changes
 - (2) Cytological changes
 - (3) Genetic changes
 - (4) Phytochemical and genetic alterations
8. The hurricanes have spatial scale of :
- (1) 100 Km - 1000 Km
 - (2) 10 Km - 100 Km
 - (3) 100 m - 100 Km
 - (4) 100 m - 10 Km

9. In SDS - PAGE :
- (1) Polymeric proteins are not only converted into monomers, but monomers are also denatured by SDS.
 - (2) Polymeric proteins converted into monomeric units, but monomers are not denatured.
 - (3) Polymeric proteins are retained as single unit.
 - (4) SDS donot have any negative impact on native structure of monomers.
10. Which of the following is the major source of mercury pollution in India ?
- (1) Coal based thermal power plants
 - (2) Pesticides manufacturing
 - (3) Dental amalgam fillings
 - (4) Electrical and electronic gadgets
11. A non-metal 'X' occurs in nature in free state. It combines with hydrogen to form a gas, which is colourless and highly toxic. Apart from this, 'X' is oxidized to ' XO_2 ' which is a colourless, pungent and irritating gas. 'X' represents :
- (1) Sulphur
 - (2) Carbon
 - (3) Phosphorus
 - (4) Nitrogen
12. Elemental carbon influences the regional climate because :
- (1) It influences the radiative flux in the atmosphere due to its absorbing properties.
 - (2) It reacts with other pollutants.
 - (3) It coagulates with other atmospheric pollutants.
 - (4) Its concentration is usually more in the atmosphere.
13. Bioremediation of xenobiotics (like melathion) through hydrolysis involves their detoxification by :
- (1) Removal of water
 - (2) Addition of water
 - (3) Both removal and addition of water
 - (4) Removal of phosphate
14. To determine the cation-exchange capacity, it is necessary to calculate the total positive charge associated with ions like :
- (1) Ca^{2+} , Mg^{2+} , K^+ , Na^+
 - (2) Ca^{2+} , Mn^{2+} , Fe^{3+} , Cr^{3+}
 - (3) Mg^{2+} , Fe^{3+} , Ni^{2+} , Cd^{2+}
 - (4) K^+ , BO^{2+} , Pb^{2+} , Hg^{2+}

15. Given below are two statements. One labeled as **Assertion (A)** and the other labeled as **Reason (R)** :

Assertion (A) : Organometals/organometalloids such as trimethylarsine and dimethylmercury are more toxic to living systems (including humans) compared to their inorganic forms.

Reason (R) : Organometals/organometalloids are more hydrophilic than their inorganic forms and hence can move easily across lipid bilayer.

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, but **(R)** is true.

16. Project elephant was launched in the year :

- (1) 1973 (2) 1985 (3) 1992 (4) 1998

17. Biological communities in a stream vary based on :

- (I) Water velocity
- (II) Allochthonous material
- (III) Size of the particle on the stream bed
- (IV) Depth of the stream

Choose the correct answer :

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

18. Champion and Seth (1968) classify Indian forests based on :

- (I) Floristic Composition
- (II) Precipitation
- (III) Distance from Sea

Choose the correct answer :

- (1) (I) Only
- (2) (I) and (II) only
- (3) (II) only
- (4) (I), (II) and (III)

19. Which one of the following statements is **not** correct ?
- (1) The solubility of gases varies considerably with pressure.
 - (2) Hydrocarbons chiefly occur in coal, natural gas and petroleum.
 - (3) Polynuclear aromatic hydrocarbons are present in coal tar and fossil fuels.
 - (4) All hydrocarbons are hydrophilic in nature.
20. Gauss exclusion principle states that :
- (1) Complete competitors co-exist
 - (2) Complete competitors cannot co-exist
 - (3) Complete competitors tend to co-operate
 - (4) Symbionts evolve into complete competitors
21. Parasites in a population/community can :
- (I) Influence host population cycles
 - (II) Change ecological communities
 - (III) Change community structure
- Choose the correct answer :
- (1) (I), (II) and (III)
 - (2) (II) and (III) only
 - (3) (III) only
 - (4) (I) only
22. Long - term patterns of evolution are shaped by large scale process(s) such as :
- (I) Speciation
 - (II) Mass extinction
 - (III) Adaptive radiation
- Choose the correct answer:
- (1) (I) only
 - (2) (II) and (III) only
 - (3) (I) and (III) only
 - (4) (I), (II) and (III)
23. Match the **List - I** with **List - II**. Identify the correct answer from the **codes** given below the lists :

List - I
(Organism)

- (a) *Albugo* and Indian mustard
- (b) *Penicillium* and *Staphylococcus*
- (c) Lichens
- (d) Barnacles and whales

List - II
(Interaction)

- (i) Symbiosis
- (ii) Ammensalism
- (iii) Commensalism
- (iv) Parasitism

Codes :

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

24. Extreme of seasonal variation (as much as 80°C swing) from summer to winter is represented by :
- (1) Boreal forest (2) Tropical forests
(3) Deciduous forest (4) Evergreen forest
25. Aeromycoflora can be trapped and quantified by :
- (1) Rotorod air sampler (2) Anderson air sampler
(3) Gregory air sampler (4) Respirable dust sampler
26. Which among the following frequencies in microwave region of electromagnetic spectrum is better suited for determination of tree height ?
- (1) C - band (4 - 8 GHz) (2) X - band (8 - 12.5 GHz)
(3) P - band (0.3 - 1.0 GHz) (4) K - band (18 - 26.5 GHz)
27. Which of the common mineral is not a silicate ?
- (1) Quartz (2) Calcite (3) Pyroxene (4) Feldspar
28. Which among the following is the best model in GIS spatial relationships ?
- (1) Spaghetti model (2) Topological model
(3) Relational database model (4) Parent-child model
29. One of the warning signs of an impending volcanic eruption is volcanic tremor, which is :
- (1) A change in ground levels
(2) Inflation of a volcano as magma rises
(3) Ground shaking lasting for minutes or hours
(4) Emission of large quantities of gases
30. Time slot for measuring thermal inertia (TI) differences between land and water is :
- (1) 1000 hrs. (2) 1100 hrs. (3) 1200 hrs. (4) 1400 hrs.
31. Slump is a complex slide which consists of :
- (1) Curved shear surface (2) Curved and planar shear surfaces
(3) Planar shear surface (4) No definite shear surface
32. In rainwater harvesting, the purpose of percolation tank is :
- (1) Recharge groundwater only
(2) Surface water supply for irrigation
(3) Both surface water supply and groundwater recharge
(4) Drinking water supply

33. Which of the following minerals causes fluoride pollution in the groundwater ?
(1) Fluorite and Apatite (2) Olivine and Haematite
(3) Calcite and Magnetite (4) Quartz and Orthoclase
34. Indian monsoon is greatly influenced by :
(I) Sea surface temperature in pre-monsoon season
(II) El Nino
(III) La Nina
(IV) Depression over Tibet
Choose the correct answer :
(1) (I) and (II) only (2) (II) and (III) only
(3) (III) and (IV) only (4) (IV) only
35. The important continental silicate mineral weathering process of lowering carbon dioxide levels is :
(1) Hydrolysis (2) Oxidation (3) Carbonation (4) Reduction
36. The set of processes by which soil and rock are loosened and move downhill are called :
(1) Erosion (2) Saltation (3) Weathering (4) Abrasion
37. Wind mills are most suited for :
(I) Deserts (II) Offshore
(III) High altitude (IV) Roof tops
Choose the correct answer :
(1) (I) and (II) only (2) (II) and (III) only
(3) (I) and (III) only (4) (II), (III) and (IV) only
38. Main source of energy for a tropical cyclone formation comes from :
(I) Heat of condensation of water vapours in the atmosphere
(II) Torrential rains
(III) Large ocean waves
Choose the correct answer :
(1) (I) only (2) (II) only
(3) (III) and (II) only (4) (I) and (III) only
39. In the following nuclear fusion reaction ${}_1^2\text{D} + {}_1^2\text{D} = {}_2^3\text{He} + {}_0^1\text{n} + \text{E}$ the value of the energy E is :
(1) 17.6 MeV (2) 18.3 MeV (3) 4.03 MeV (4) 3.27 MeV

40. Fast neutrons produced in nuclear fission reactions involving ^{235}U have average energy of the order of :
(1) 2 MeV (2) 5 MeV (3) 100 MeV (4) 200 MeV
41. As the population growth rate increases the doubling time :
(1) Increase (2) Double
(3) Remain constant (4) Decrease
42. A tidal estuary of tidal range 2 m has trapped water area 5000 m^2 . If $g = 9.8 \text{ m/s}^2$, the maximum energy available per tidal cycle is :
(1) 2.45 kW (2) 9.8 kW (3) 98 kW (4) 19.6 kW
43. The power (P) from an ocean wave varies with time period (T) of the wave as :
(1) $P \propto T$ (2) $P \propto T^2$ (3) $P \propto \frac{1}{T}$ (4) $P \propto \frac{1}{T^2}$
44. With reference to pre-industrial times, the present day average global surface temperature is higher approximately by :
(1) $\sim 0.56^\circ\text{C}$ (2) $\sim 0.85^\circ\text{C}$ (3) $\sim 1.3^\circ\text{C}$ (4) $\sim 1.5^\circ\text{C}$
45. Burning of 1 mol of CH_4 liberates 890 kJ of energy and 1 mol of CO_2 . Since 1 mol of CO_2 has 12 g of carbon, the higher heating value (HHV) of methane is :
(1) 13.5 gC/MJ (2) 18.5 gC/MJ (3) 12.0 gC/MJ (4) 10.0 gC/MJ
46. pH of 1 mM HCl is :
(1) 1 (2) 2 (3) 3 (4) 11
47. Priority air pollutants included in the air quality index for urban areas in India are :
(1) CO , NO_x , PM_{10} and $\text{PM}_{2.5}$, SO_x , O_3 , ammonia and Pb
(2) CO , NO_x , SO_x and Pb
(3) NO_x , SO_x , O_3 and Pb
(4) PM_{10} and $\text{PM}_{2.5}$, NO_x , SO_x , O_3 and Pb
48. Present day advanced anaerobic digestors can generate power in the range :
(1) 2 - 10 MW (2) 20 - 100 MW (3) 100 - 200 MW (4) 200 - 500 MW
49. Cement dust is characterized by very fine particulates. Which of the following air pollution control devices is appropriate for removing them from hot exhaust gases emanating from cement kiln ?
(1) Baghouse (2) Cyclones
(3) Venturi scrubber (4) Electrostatic precipitator

50. The sources of aliphatic hydrocarbons in indoor environment are :
- (1) Paints, adhesives and gasoline (2) Aerosol sprays and solvents
 - (3) Spirits and cleansers (4) Solvents and vinyl flooring
51. Given the following data of sound pressure levels measured at equal intervals: 60 dB, 62 dB, 63 dB, 59 dB, 60 dB, 80 dB, 58 dB, 59 dB, 65 dB, 57 dB, 62 dB. The value of the background noise level (L_{90}) is :
- (1) 62.5 dB (2) 57 dB (3) 61 dB (4) 58 dB
52. The air-to-fuel ratio (A/F) for complete combustion in an internal combustion engine is about :
- (1) 14.6 (2) 11.2 (3) 12.1 (4) 15.5
53. Phytovolatalization of mercuric pollutants involves volatalization of mercury in :
- (1) Elemental state (2) Ionic state
 - (3) Organic state (4) Both ionic and organic state
54. Match the **List - I** with **List - II**. Identify the **correct** answer from the **codes** given below the lists :
- | List - I | List - II |
|------------------|----------------------------|
| (a) Texture | (i) Vertical zonation |
| (b) Profile | (ii) Land degradation |
| (c) Erosion | (iii) Planting tree |
| (d) Conservation | (iv) Mineral particle size |
- Codes :**
- | | (a) | (b) | (c) | (d) |
|-----|------------|------------|------------|------------|
| (1) | (iv) | (i) | (ii) | (iii) |
| (2) | (i) | (ii) | (iii) | (iv) |
| (3) | (ii) | (iii) | (iv) | (i) |
| (4) | (iii) | (iv) | (i) | (ii) |
55. Environmental Management Plan is associated with :
- (1) EIS (2) Environmental audit
 - (3) ISO 14000 (4) LCA
56. ISO 14000 is connected with :
- (1) Adoption of environmental safety guideline
 - (2) Energy audit in Industries
 - (3) Adoption of clean development
 - (4) Adoption of environmental management system in industry/organisation

57. CAPART in India stands for :
- (1) Committee for Advancement and Promotion of Rural Technology
 - (2) Council for Advancement of Rural Technology
 - (3) Council for Advancement of People's Action and Rural Technology
 - (4) Committee for Advancement and Privatization of Rural Technology
58. EIA of Port and Harbour projects involve impact assessment on :
- (I) Biological environment
 - (II) Air environment
 - (III) Soil environment
 - (IV) Social environment
- Choose the correct answer :
- (1) (I) only
 - (2) (II) only
 - (3) (III) only
 - (4) (I), (II) and (IV) only
59. Which act provided provisions for enforcing levy and collection of a tax on water consumed by industries ?
- (1) Water (prevention and control of pollution) Act 1974
 - (2) Water (prevention and control of pollution) Cess Act 1977
 - (3) Environment (protection) Act 1986
 - (4) Public Liability Insurance Act 1991
60. Disaster risk reduction in degraded wilderness areas is better achieved using :
- (1) People's participation
 - (2) Ecosystem based management
 - (3) Strengthening of people's economic conditions
 - (4) Afforestation
61. The major conventions of Rio Earth Summit are :
- (1) CBD and climate change
 - (2) Kyoto protocol and Montreal protocol
 - (3) CDM and Nagoya protocol
 - (4) Basel convention and Bameco convention
62. If $\Gamma_s < \Gamma_e < \Gamma_d$ where Γ_s , Γ_e and Γ_d are saturated adiabatic lapse rate, environmental lapse rate and dry adiabatic lapse rate, the atmosphere is :
- (1) Stable
 - (2) Conditionally unstable
 - (3) Unstable
 - (4) Neutral

- List - I**
(Tests)

- (d) F - test

- List - II**
(Application)

- (iv) Compare sample variance to a theoretical population variance

(a) (b) (c) (d)

- (4) (i) (iv) (iii) (ii)

- (1) 7.2 (2) 6.0 (3) 12.0 (4) 33.3

- (1) The range is equal to 5 standard deviation
- (2) The range is larger than the inter quartile range
- (3) The mean is much smaller than the median
- (4) There are no outliers

- (1) ± 4.0 (2) ± 1.96 (3) ± 0.25 (4) ± 0.30

- (1) Caring for Earth (2) Caring of Biosphere
(3) Our Common Future (4) The Silent Spring

68. According to Gaussian Plume Model, the maximum ground level concentration (**C**) varies with height (**H**) of chimney :

- (1) $C \propto \frac{1}{H}$ (2) $C \propto H^{-2}$ (3) $C \propto H^{-1/2}$ (4) $C \propto H^{-3/2}$

69. Given below are two statements. One labeled as **Assertion (A)** and the other labeled as **Reason (R)** :

Assertion (A) : A wetland of international importance is brought under the 'Montreux Record'.

Reason (R) : The country in which the wetland is located should enact a law to prohibit any human activity within five kilometers from the edge of the wetland.

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, but (**R**) is true.

70. Which of the following methods related to fly ash utilization has future ecofriendly and economic benefits ?

- (I) Direct application to cropland
(II) Converting to Bricks
(III) Using as a road-sub-base material

Codes :

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

71. Which of the following is **NOT** one of the twelve principles of green chemistry ?

- (1) Minimize or eliminate the need for waste cleanup by emphasizing waste prevention
(2) Minimize energy consumption
(3) Maximize use of products from green plants
(4) Avoid the use and generation of hazardous substances that may harm humans or the environment

72. Match the **List - I** with **List -II**. Identify the **correct** answer from the **codes** given below the lists :

List - I		List - II	
(Halocarbons)		(Atmospheric residence time)	
(a)	CF ₄	(i)	~ 50 years
(b)	CF ₂ Cl ₂	(ii)	~ 50,000 years
(c)	CFCl ₃	(iii)	~ 65 years
(d)	CF ₃ Br	(iv)	~ 102 years

Codes :

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

73. Climate change has become a buzz word throughout the world. In case of the Himalayas the best way to infer whether there is a climate change or not is to :

- (I) Monitor tree line
- (II) Monitor migration of glaciers
- (III) Study alteration in species composition

Choose the **correct** answer :

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

74. Landslide hazards in the Himalayan region are the consequence of :

- (I) Road cutting
- (II) Seismic activity
- (III) Deforestation
- (IV) Urbanization

Choose the **correct** answer :

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

75. Consider the following International agreements.

- (I) The International Treaty on Plant Genetic Resources for Food and Agriculture
- (II) The United Nations Convention to Combat Desertification
- (III) The World Heritage Convention

Which of the above has/have a bearing on the biodiversity ?

Choose the **correct** answer :

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

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