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PAPER - II

ENVIRONMENTAL SCIENCES

Time : 2 hours]   **[Maximum Marks : 200**

Number of Pages in this Booklet : 24   Number of Questions in this Booklet : 100

Instructions for the Candidates	**परीक्षार्थियों के लिए निर्देश**

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of hundred 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 on the edge of this cover page. Do not accept a booklet without sticker-seal 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 Test Booklet Number should be entered on the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.

4. Each item has four alternative responses marked (1), (2), (3) and (4). You have to darken the circle as indicated below on the correct response against each item.

   Example : ① ② ● ④   where (3) 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 your response 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, such as change of response by scratching or using white fluid, 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 original question booklet 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 are no negative marks for incorrect answers.**

परीक्षार्थियों के लिए निर्देश

1. इस पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
2. इस प्रश्न-पत्र में सौ 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 को फाड़ लें। खुली हुई या बिना स्टीकर-सील 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 प्रश्न-पुस्तिका का नंबर OMR पत्रक पर अंकित करें और OMR पत्रक का नंबर इस प्रश्न-पुस्तिका पर अंकित कर दें।

4. प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (1), (2), (3) तथा (4) दिये गये हैं। आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है।

   उदाहरण : ① ② ● ④   जबकि (3) 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, जैसे कि अंकित किये गये उत्तर को मिटाना या सफेद स्याही से बदलना 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। हालांकि आप परीक्षा समाप्ति पर मूल प्रश्न-पुस्तिका अपने साथ ले जा सकते हैं।

10. केवल नीले/काले बाल प्वाईंट पेन का ही प्रयोग करें।

11. किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।

12. गलत उत्तरों के लिए कोई नकारात्मक अंक नहीं हैं।

ENVIRONMENTAL SCIENCES

PAPER - II

Note : This paper contains **hundred (100)** objective type questions of **two (2)** marks each. **All** questions are **compulsory**.

1. For a thermally comfortable, seated bare bodied person at 25°C, the maximum energy loss is due to :

    (1) Radiation   (2) Convection   (3) Conduction   (4) Evaporation

2. High concentrations of pollutants at ground level during winter season are due to :

    (1) Radiation inversion   (2) Subsidence inversion
    (3) Frontal inversion   (4) Landscape induced inversion

3. The theme 'Transforming our world : 2030 Agenda' pertains to :

    (1) Protection of ozone layer   (2) Climate change - Action plans
    (3) Sustainable development goals   (4) Millennium development goals

4. At a latitude of 30°, there is pressure gradient of 5.0 mb per 100 km. Given the density of air ~ 1.25 kg/m^3, the geostrophic winds will have velocity (m/s) :

    (1) 5.48 m/s   (2) 54.86 m/s   (3) 109.72 m/s   (4) 27.43 m/s

5. The basic nature of lithosphere does not arise from element(s) :

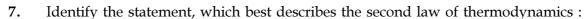   (1) Na and K   (2) Ca   (3) Mg   (4) Si

6. If the tropospheric lapse rate be 6.5°C/km and if T denotes temperature and Z denotes the altitude then :

    (1) $\dfrac{dT}{dZ} = 6.5°C/km$ (2) $\dfrac{dT}{dZ} = -6.5°C/km$

    (3) $\dfrac{dZ}{dT} = 6.5°C/km$ (4) $\dfrac{dZ}{dT} = -6.5°C/km$

7. Identify the statement, which best describes the second law of thermodynamics :
   (1) The internal energy of the universe is constant.
   (2) Energy can be neither created nor destroyed.
   (3) At absolute zero, entropy of a substance is considered to be zero.
   (4) When an isolated system undergoes a spontaneous change, the entropy of the universe increases.

8. Tropical cyclones occur on :
   (1) Meso - scale   (2) Micro - scale
   (3) Planetary scale   (4) Synoptic scale

9. If e and p are vapour pressure of water and total pressure of moist air, the equation of state for moist atmosphere can be written as :

   (1) $PV \simeq RT\left[1 + \dfrac{e}{p}\right]$

   (2) $PV \simeq RT\left[1 - \dfrac{e}{p}\right]$

   (3) $PV = RT\left[1 + 0.38\,\dfrac{e}{p}\right]$

   (4) $PV = RT\left[1 + 0.62\,\dfrac{e}{p}\right]$

10. Select the **incorrect** statement about the redox potential of aqueous solutions :
    (1) As the concentration of molecular oxygen increases, the redox potential increases.
    (2) As the concentration of hydrogen ions increases, the redox potential increases.
    (3) As the concentration of molecular oxygen decreases, the redox potential decreases.
    (4) As the concentration of hydrogen ions decreases, the redox potential increases.

11. Match the **List - I** and **List - II**. Identify the **correct** answer from the codes given below :

List - I		List - II	
(Analyte)		(Method)	
(a)	Lead	(i)	Winkler Method
(b)	Dissolved oxygen	(ii)	Gravimetric Method
(c)	SO_2	(iii)	GC-MS
(d)	PAH	(iv)	West Gaeke Method

    Code :

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

12. The main acidic component of the present atmosphere is :
    (1) HCl   (2) NO_x (3) SO_2 (4) CO_2

13. Identify the **incorrect** statement regarding PCBs :
    (1) These are water soluble and hence bioaccumulate.
    (2) These are fire resistant.
    (3) These are stable at high temperatures.
    (4) These have high electrical resistance.

14. Toxicity of which of the following metals is **not** due to reaction with sulfhydryl group ?
    (1) Arsenic   (2) Cadmium
    (3) Lead   (4) Chromium

15. By chemical reaction, the hydroxyl radicals fail to remove which of the following trace gases from the atmosphere ?
    (1) CO   (2) NO   (3) SO_2 (4) CFCs

16. How many gram of acetic acid (molar mass = 60 g/mole) are present in 100 ml of 0.1 M acetic acid ?
    (1) 0.6 g   (2) 0.06 g   (3) 6.0 g   (4) 60.0 g

17. Three coloured sheets of equal thickness are placed in a light beam. Each sheet absorbs 20% of light incident upon it. What is the intensity of light transmitted after the third plate ?
    (1) 9.0%   (2) 10.5%
    (3) 51.2%   (4) 40.0%

18. In a volumetric titration, a 20 ml aqueous HCl solution, needs 10 ml of 0.1 N NaOH for complete neutralization.
    The concentration of HCl solution is :
    (1) 0.2 N   (2) 0.002 N
    (3) 0.01 N   (4) 0.05 N

19. The best way for assessing the organic component of a water sample is the determination of :
    (1) TOC   (2) COD   (3) BOD   (4) DO

20. Biogas produced by the anerobic digestion is a mixture of :
    (1) CO_2, SO_2, N_2O, CH_4 and H_2O
    (2) CO, CO_2, H_2S, CH_4 and natural gas
    (3) CH_4, CO_2 NH_3, H_2S and H_2O
    (4) CO_2, NH_3, C_2H_5OH and H_2O

21. The percentage concentration of which of the following ions is highest in sea water ?

(1) Bicarbonate   (2) Chloride

(3) Sulfate   (4) Sodium

22. In which of the following ecosystems, the food web involves more species and more trophic levels ?

(1) Rain forest   (2) Ocean

(3) Desert   (4) Glacier

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

Assertion (A) : The available energy of an ecosystem decreases with the length of food chain.

Reason (R) : At each transfer of energy in food chain, a large proportion of potential energy is lost as heat.

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.

24. The origin of eukaryotic cell on earth took place :

(1) 1500 Million years ago   (2) 1850 Million years ago

(3) 850 Million years ago   (4) 1000 Million years ago

25. Ratio of energy transfer at different trophic levels in the food chain is called :

(1) Metabolic efficiency   (2) Ecological efficiency

(3) Energy flow rate   (4) Food chain complexity

26. At which stage of ecological succession, an ecosystem exhibits, photosynthesis (P) = Respiration (R) :

(1) Pioneer stage   (2) Mid seral stage

(3) Climax stage   (4) Early seral stage

27. The species determining the ability of large number of other species to persist in a community, are called :

(1) Indicator species   (2) Keystone species

(3) Dominant species   (4) Endemic species

28. Biodiversity :

    (a) Increases towards the Arctic region

    (b) Decreases towards the Arctic region

    (c) Increases towards the equator

    (d) Decreases towards the equator

    Choose the **correct** code :

    (1) (a) and (d)   (2) (a) and (b)

    (3) (a) and (c)   (4) (b) and (c)

29. Arctic Tundra is situated around :

    (1) 66.5° N   (2) 55.5° N

    (3) 45° N   (4) 66.5° S

30. Main limiting factor governing primary productivity in pelagic zone of the ocean is :

    (a) Light

    (b) Available nutrients

    (c) Number of primary producers

    (d) Tidal current

    Choose the **correct** code :

    (1) (a) only   (2) (a) and (b) only

    (3) (a), (b) and (c) only   (4) (a), (b), (c) and (d)

31. The nature of food web at the developmental stage of a succession is :

    (1) linear, predominantly grazing   (2) linear, predominantly detritus

    (3) weblike, predominantly detritus   (4) weblike, predominantly grazing

32. Based on the casualties reported worldwide, which one of the following is most deadly airborne bacterial disease ?

    (1) Diphtheria   (2) Whooping cough

    (3) Pneumonia   (4) Meningitis

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

List - I   List - II
(Endangered animals)   (Distribution)
(a)   Lion tailed Macaque   (i)   Himalayan foothills
(b)   Golden Langur   (ii)   Jammu and Kashmir
(c)   Spotted Linsang   (iii) Western Ghats
(d)   Pallas's cat   (iv)   Central and Eastern Himalayas

Code :

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

34. Reproductive isolation of populations leads to :
    (1)   infertility   (2)   population explosion
    (3)   speciation   (4)   population decline

35. In the context of local environment, heleoplankton refers to :
    (1)   Saltwater plankton   (2)   Pond plankton
    (3)   Stream plankton   (4)   Lake plankton

36. According to India State Forest Report (ISFR), 2017 of MOEFCC, GOI, the increase in forest cover of the country with reference to the year 2015 is :
    (1)   1.8%   (2)   2.0%   (3)   2.2%   (4)   1.0%

37. Which one of the following is a cultivable species of tropical earthworm ?
    (1)   *Elsenia fetida*   (2)   *Lumbricus rubellus*
    (3)   *Drawida nepalensis*   (4)   *Polypheretima elongata*

38. Slow downslope movement of water saturated rock mass which is not confined to a definite channel, is called :
    (1)   Soil creep   (2)   Debris flow   (3)   Mudslide   (4)   Solifluction

39. Isogons are the points which join beds of :
    (1)   Equal dip amount   (2)   Same strike direction
    (3)   Equal thickness   (4)   Opposite strike direction

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

	List - I		List - II
	(Ecosystem service)		(Function)
(a)	Provisioning	(i)	Nutrient cycling
(b)	Regulating	(ii)	Recreational
(c)	Cultural	(iii)	Carbon sequestration
(d)	Supporting	(iv)	Pharmaceuticals

Code :

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

41. Cartostat - 2 satellite has a spatial resolution of :
(1) better than 1 m   (2)   2 m   (3)   5.8 m   (4)   23 m

42. L - band in microwave remote sensing provides information about scattering from :
(a) Volume   (b) Soil   (c) Canopy   (d) Trunks and boles
Choose the **correct** code :
(1) (a) only   (2) (a), (b), only
(3) (a), (b), (c)   (4) (a), (b), (d) only

43. In temperate lakes upwelling replenishes nutrients turnover during :
(a) Autumn and spring   (b) Autumn and winter
(c) Summer and winter   (d) Summer and spring
Choose the **correct** code :
(1) (a) only   (2) (b) only   (3) (c) only   (4) (d) only

44. Soil pollution is caused by :
(a) Industrial waste   (b) Agrochemicals
(c) Petrochemicals   (d) Detergents
Choose the **correct** code :
(1) (a) and (b) only   (2) (b), (c) and (d) only
(3) (a), (b), (c) and (d)   (4) (c) and (d) only

45. In an aquifer having a coefficient of permeability k = 0.1 mm/s and water table sloping at a rate of 1 m over a distance of 200 m, the value of groundwater flow is :

(1)   0.005 mm/s   (2)   0.0010 mm/s

(3)   0.0015 mm/s   (4)   0.0025 mm/s

46. Seismic waves travel faster through :

(1)   Gas   (2)   Liquid   (3)   Solid   (4)   Lava

47. Urban Heat Island effect is best studied using remote sensing in the following spectral region :

(a)   0.5 - 0.9 μm   (b)   3 - 5 μm   (c)   10 - 12 μm   (d)   3 - 6 cm

Choose the **correct** code :

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

48. In landscape ecological studies, the term landscape process includes :

(a)   The exchange of materials and energy

(b)   Exchange or movement of organisms

(c)   Patch, matrix and corridor

(d)   Porosity

Choose the **correct** code :

(1)   (a) only   (2)   (a) and (b) only

(3)   (a), (b) and (c) only   (4)   (a), (b), (c) and (d)

49. A drowned river valley estuary is formed when ?

(1)   a barrier island or sand bar separates a section of the coast where fresh water enters.

(2)   sea level rose at the end of the last glacial age invading low lands and rivers.

(3)   a deep valley is created by retreating glaciers.

(4)   land sinks due to movements of the crust.

50. Fringing reef generally develops :

(1)   as a narrow band close to a shore.

(2)   at some distance from the coast.

(3)   as a ring around central lagoon.

(4)   as a patch in the pelagic zone of the sea.

51. According to River Continuum Concept of Vannote et. al (1980), the major sources of energy in medium - sized streams are :

(a) Fine particulate organic matter

(b) Coarse particulate organic matter

(c) Algae

(d) Aquatic plants

Choose the **correct** code :

(1) (a) only

(2) (b) and (c) only

(3) (a), (c) and (d) only

(4) (a), (b), (c), and (d)

52. Self purification of running streams may be due to :

(1) oxidation, sedimentation and coagulation

(2) sedimentation, dilution and oxidation

(3) dilution, sedimentation and coagulation

(4) dilution, oxidation and coagulation

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

Assertion (A) : The efficiency of a PV cell is limited by the quantum processes involving incident photons and the electrons in the cell.

Reason (R) : The band gap energy of the semiconducting material used to fabricate PV cell is less in comparison to the energies of photons of insolation.

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.

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

Assertion (A) : The recoverable renewable energy is a fraction of the resource base of the renewable sources available in the world.

Reason (R) : Much of the renewable energy is either of high entropy or too inaccessible to use.

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.

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

Assertion (A) : Tidal range is a critical factor in determining whether an estuary would be useful for tidal power generation.

Reason (R) : Tidal power is proportional to tidal range.

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.

56. A single solar cell on illumination by insolation of about $800 \ Wm^{-2}$ produces a voltage of 0.5 V and a current upto 2.0 A. The efficiency of the solar cell is 12.5%. The area of the cell is :

(1) $2 \times 10^{-2} \ m^2$ (2) $5 \times 10^{-3} \ m^2$

(3) $4 \times 10^{-4} \ m^2$ (4) $10^{-2} \ m^2$

57. If the ion density in a high temperature fusion plasma consisting of deuterium and tritium fuel is $2.5 \times 10^{20} \ m^{-3}$, the minimum confinement time required for nuclear fusion to produce net energy will be :

(1) 0.5 s   (2) 0.4 s   (3) 0.25 s   (4) 4.0 s

58. At present, which geothermal resource is exploited on commercial scale in the world ?

(1) Magma   (2) Hot dry rock

(3) Geopressured   (4) Hydrothermal

59. Which of the following substances has the maximum energy content (MJ/m^3) ?

(1) Methane gas   (2) Liquid butane

(3) Natural gas   (4) Hydrogen gas

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

Assertion (A) : The nuclei of elements such as plutonium and uranium have extremely large energy potentials.

Reason (R) : They are in states of thermodynamic non-equilibrium.

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.

61. In a nuclear fission reaction involving U_{92}^{235} and a slow neutron, the mass defect is found to be 0.223 u. How much energy will be released from 5.0 gram of U_{92}^{235} ? ($1u = 1.66 \times 10^{-27} kg$)

(1) 426.7 GJ   (2) 85.3 GJ   (3) 170.6 GJ   (4) 42.6 GJ

62. Which of the following biofuels is produced from acidification and distillation of woody crops ?

(1) Methanol   (2) Ethanol   (3) Producer gas   (4) Esters

63. How thick a sound barrier be made if it is to attenuate efficiently sound transmitted at 5.0 kHz ?

(1)   ~ 2.0 cm   (2)   ~ 3.3 cm   (3)   ~ 6.6 cm   (4)   ~ 2.0 m

64. Identify the most reducing water sample as inferred from pE values given below :

(1)   pE = 15   (2)   pE = 12   (3)   pE = 7   (4)   pE = 5

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

Assertion (A) :   In an unpolluted and dust free atmosphere, rainwater pH is ~ 5.6.

Reason (R) :   Dissolution of carbon dioxide in rainwater produces hydrogen ions.

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.

66. As per BIS, the recommended pH for drinking water is :

(1)   5.0 - 6.5   (2)   6.5 - 8.5   (3)   7.5 - 9.0   (4)   8 - 10

67. In the disinfection of water by chlorine, the most reactive chlorine species is :

(1) Cl_2 (2) ClO^- (3) $HOCl$ (4) Cl^-

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

Assertion (A) : Black carbon contributes to global warming.

Reason (R) : Black carbon behaves like a black body.

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.

69. Which of the following air pollutants are responsible for photochemical smog ?

(a) Oxides of nitrogen   (b) Ozone

(c) Unburnt hydrocarbons   (d) Sulphur dioxide

Choose the **correct** code :

(1) (a), (b) and (d) only   (2) (a), (b) and (c) only

(3) (c) and (d) only   (4) (a) and (c) only

70. Temporary hardness is caused by :

(1) Calcium sulfate   (2) Magnesium sulfate

(3) Magnesium carbonate   (4) Magnesium chloride

71. Bioremediation of soil is **not** achieved readily if :

(1) Contaminant is a lighter molecule.

(2) Contaminant has high aromaticity.

(3) Contaminant is a polar molecule.

(4) Contaminant is non-halogenated.

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

Assertion (A) : Traffic policemen in urban centres generally suffer from oxygen deficiency.

Reason (R) : Carbon dioxide forms a very strong complex with haemoglobin.

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.

73. A bar graph whose bars are drawn in decreasing order of frequency is :

(1) histogram   (2) frequency polygon

(3) pareto chart   (4) cumulative bar chart

74. If four groups of vehicles consisting of 5, 10, 12 and 8 cars reported the gaseous pollutant emissions of 1.2 kg, 2.1 kg, 3.0 kg and 1.5 kg per day respectively, then the mean emission of gaseous pollutant from all cars is :

(1) 4.43 kg/day   (2) 2.14 kg/day   (3) 4.80 kg/day   (4) 3.12 kg/day

75. A sample of 10 measurements of diameter of trees in a survey gives a mean of 43.8 cm and a standard deviation of 0.6 cm. Given t = 2.26, the 95% confidence limit for the actual diameter is in between :

(1) 41.54 and 46.06 cm   (2) 43.348 and 44.252 cm

(3) 43.20 and 44.812 cm   (4) 43.252 and 44.348 cm

76. In a fish population of a pond it is believed that males and females are in equal proportion. If out of 200 fish in a catch, 120 are male and 80 are female, then the Chi square (χ^2) value is :

(1) 8   (2) 4   (3) 16   (4) 12

77. In multiple regression analysis, the value that refers to the extent of possible variance in the dependent variable that can be accounted for, by the independent variable is :

(1) R Value

(2) Adjusted R^2 Value

(3) 'r' Value

(4) 1/R Value

78. A population size at $t=0$ is 80 and has a growth rate of 0.12. If the population follows logistic growth, what is the growth rate constant if the carrying capacity is 240 ?

(1) 5.32   (2) 9.60   (3) 0.18   (4) 3.80

79. In a city of area (8 km $\times$ 8 km), the vehicular traffic is releasing 10^{-5} g/m^2$-$s of CO during the winter season between 4 pm and 8 pm. During this period mixing height is 100 m. The wind is blowing in the city at a speed of 4.0 m/s along the side of the city. If the initial concentration of CO at 4 pm was negligible, the estimated concentration of CO after 4 hours should be :

(1) 0.2 mg/m^3

(2) 3.2 mg/m^3

(3) 2.0 mg/m^3

(4) 20.0 mg/m^3

80. In the Gaussian plume model, the effective stack height is the sum of actual stack height and the plume rise which depends on :

(a) buoyancy of exhaust gases

(b) momentum of exhaust gases

(c) stability of the atmosphere

(d) emission rate of the pollutants

Choose the **correct** code :

(1) (a), (b) and (d)

(2) (a), (b), (c) and (d)

(3) (a), (c) and (d)

(4) (a), (b) and (c)

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

Assertion (A) : Global shipping is a source of net cooling of atmosphere.

Reason (R) :   Ships are responsible for significant amounts of sulphur emissions.

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.

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

Assertion (A) : Ozone depletion in stratosphere causes melanoma.

Reason (R) :   Ozone is a gas which largely absorbs UV - A radiation.

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.

83. Identify the **incorrect** statement with regard to saline and alkaline soil :

(1) These show white incrustation of salts of calcium, magnesium and sodium on the soil surface.

(2) These soils are infertile.

(3) These soils are poor in drainage.

(4) These soils are pervious.

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

Assertion (A) : Phosphorus limits eutrophication if nitrogen is eight times more abundant (weight wise) than phosphorus in fresh water.

Reason (R) : About eight times more nitrogen (weight wise) is required than phosphorus for plant growth.

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.

85. World Biodiversity day is celebrated every year on :

(1) March 22   (2) May 22   (3) July 22   (4) November 22

86. To achieve its objectives, the International Solar Alliance aims to mobilize financial investment over :

(1) $ 1 trillion

(2) $ 100 billion

(3) $ 500 billion

(4) $ 200 billion

87. A Ramsar site not able to perform its ecological functions comes under :

(1) Montreal protocol

(2) Montreux record

(3) Montreal record

(4) Montreaux protocol

88. Which of the following bacterium is called as the superbug that could clean up oil spills ?

(1) *Bacillus denitrificans*

(2) *Pseudomonas denitrificans*

(3) *Pseudomonas putida*

(4) *Bacillus subtillis*

89. For the scientific research or investigations, the chief wildlife warden may grant the permission to public to enter a sanctuary under the section :

(1) 35 of The wildlife (Protection) Act 1972

(2) 28 of The Wildlife (Protection) Act 1972

(3) 72 of The Indian Forest Act 1922

(4) 73 of The Indian Forest Act 1927

90. Power to issue notification reserving the trees or class of trees in a protected forest lies with :

(1) Ministry of Environment, Forest and Climate Change, GOI

(2) Biodiversity Board

(3) State Government

(4) Central Government

91. In which stage of decomposition of landfilled waste, the bacteria acetogen helps to reduce the pH of leachate and allows heavy metals to be solubilized ?

(1) Aerobic Phase

(2) Acid Phase

(3) Unsteady Methanogenisis Stage

(4) Steady Methanogenisis Stage

92. Choose the **correct** sequence in resource recovery for mixed solid waste :

(1) Screening → Air classifier → Shredder → Magnetic separation

(2) Magnetic separation → Shredder → Screening → Air classifier

(3) Shredder → Screening → Air classifier → Magnetic separation

(4) Screening → Shredder → Magnetic separation → Air classifier

93. Onsight mulching and composting of waste is a component of integrated solid waste management under the process of :

(1) recycling

(2) disposal

(3) source reduction

(4) disinfection

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

List-I	List-II
(Waste types)	**(Disposal methods)**
(a) Human tissues	(i) Disinfection and shredding
(b) Laboratory wastes	(ii) Disinfection and discharge into drains
(c) Waste sharps	(iii) Autoclaving
(d) Liquid waste	(iv) Incineration and deep burial

Code :

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

95. Which of the following materials are used as landfill sealants for the control of gas and leachate ?

(a) Fly ash

(b) Lime

(c) Bentonite

(d) Butyl rubber

Choose the **correct** code :

(1) (a) and (b) only

(2) (b) and (c) only

(3) (c) and (d) only

(4) (d) and (a) only

96. Select the **correct** sequence with reference to Environmental Management System ISO1401 :

(1) Environmental policy → Implementation and operation → Checking and corrective action → Management review

(2) Implementation and operation → Checking and corrective action → Management review → Environmental policy

(3) Implementation and operation → Environmental policy → Checking and corrective action → Management review

(4) Checking and corrective action → Management review → Implementation and operation → Environmental policy

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

	List-I		**List-II**
	(EIA process)		**(Features)**
(a)	Environmental Baseline	(i)	Systematic Appraisal of EIS
(b)	Development Action	(ii)	Avoid, reduce and remedy for impacts
(c)	Mitigation measures	(iii)	Rationale of the project
(d)	Review	(iv)	Establishment of present and future state of environment

Code :

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

98. The type of project in 'B' category in the schedule attached with EIA notification of 14th September 2006, needs environmental clearance from :

(a) Central Govt. without the recommendation of the Expert Appraisal Committee.

(b) State Govt. on the recommendation of the State Expert Appraisal Committee.

(c) State Environmental Impact Assessment Authority on the recommendation of State Expert Appraisal Committee.

Choose the **correct** code :

(1) (a) and (b) only

(2) (b) and (c) only

(3) (c) only

(4) (c) and (a) only

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

List-I
(Process)

List-II
(Description)

(a) Development action

(i) Compensation for adverse impacts

(b) Environmental baseline

(ii) Development stages and processes

(c) Impacts prediction

(iii) Establishment of future and present state of environment

(d) Mitigation measures

(iv) Magnitude of identified change in environment

Code :

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

100. Battelle - Columbus environmental evaluation system is used to assess the impact of :

(1) Mining development projects.

(2) Pulp and paper mill projects.

(3) Water resources projects.

(4) Highway projects.

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Space For Rough Work