Signature and Name of Invigilator

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

OMR Sheet No. : .....
(To be filled by the Candidate)

Roll No. | | | | | | | | |
(In figures as per admission card)

Roll No. _____
(In words)

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PAPER - III
ENVIRONMENTAL SCIENCES

Time : 2½ hours] **[Maximum Marks : 150**

Number of Pages in this Booklet : **16**

Number of Questions in this Booklet : **75**

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of seventy five 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 and duplicate copy of OMR Sheet 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 पचहत्तर 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 तथा OMR पत्रक की डुप्लीकेट प्रति 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 - III

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

1. The sum of the internal energy and product of pressure and volume is known as :

(1) Enthalpy (2) Gibbs free energy

(3) Entropy (4) Helmholtz free energy

2. If at latitude $\phi = 30°$, pressure gradient is 15 mb per 1000 km, the geostrophic wind velocity will be :

(1) ~ 20.54 m/s (2) ~ 15.92 m/s (3) ~ 7.96 m/s (4) ~ 10.27 m/s

3. In a cloud free weather, there is an atmospheric window, which is transparent to terrestrial radiation in the wavelength band :

(1) 1618 nm - 23400 nm (2) 2168 nm - 4610 nm

(3) 12500 nm - 17000 nm (4) 7000 nm - 13500 nm

4. If $\Gamma_{env} < \Gamma_d$, where Γ_{env} and Γ_d are environmental and dry adiabatic lapse rates respectively, which of the following types of plume emitted from a stack of a thermal power plant is observed ?

(1) Fanning (2) Fumigating (3) Looping (4) Coning

5. Out of the following two statements, identify the correct one(s) :

(a) An aqueous solution of sodium carbonate is alkaline.

(b) An aqueous solution of carbon dioxide is acidic.

(1) (a) is correct, (b) is incorrect (2) (a) is incorrect, (b) is correct

(3) Both (a) and (b) are incorrect (4) Both (a) and (b) are correct

6. The photodissociation of NO_2 yields which oxygen species ?

(1) $O(^3P)$ (2) $O(^1D)$ (3) O^+ (4) O^-

7. The vapour pressure of bromobenzene above its ideal dilute aqueous solution of molality 0.1 mol kg^{-1} is 24.0 kPa. Calculate the Henry's law constant of bromobenzene :

(1) 240 kPa kg mol^{-1} (2) 220 kPa kg mol^{-1}

(3) 460 kPa kg mol^{-1} (4) 400 kPa kg mol^{-1}

8. In the Spectrophotometric Study, if a sample has transmittance of 50%, then its absorbance is :

(1) 0.5 (2) 0.3 (3) 1.0 (4) 0.7

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

Assertion (A) : Sandy soil helps promote good drainage and aeration.

Reason (R) : Sandy soil particles have size in the range 0.05 - 2.0 mm.

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.

10. Night–time tropospheric chemistry is dominated by which of the following radicals ?

(1) NO_3 (2) OH (3) HO_2 (4) O

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

Assertion (A) : Chlorine, which is widely used as an effective and relatively inexpensive disinfectant in water, generates toxic organochlorine compounds in water.

Reason (R) : Hypochlorous acid reacts rapidly with humic acids and hydroxobenzenes.

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.

12. In the context of argentometric titration of chloride ions in a water sample, identify the **incorrect** statement :

(1) Titrant is silver nitrate solution

(2) Indicator is potassium chromate

(3) Colour of the end - point is lemon - yellow

(4) pH of water sample should be less than 5

13. The reaction of OH radicals with which of the following species generates hydrogen atom ?

(1) CH_4 (2) NH_3 (3) CO (4) NO_2

14. Which of the following statements is **true** for an ideal dilute solution ?

(1) Solute and solvent both obey Raoult's law

(2) Solute obeys Raoult's law and solvent obeys Henry's law

(3) Solute obeys Henry's law and solvent obeys Raoult's law

(4) Solute and solvent both obey Henry's law

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

Assertion (A) : The living components of ecosystems are not immortal.

Reason (R) : Depending on the biological longevity, all living systems become abiotic constituents.

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.

16. The movement of energy from primary producers to consumers is effected by :

(1) The process of eating (2) The rate of rainfall

(3) The rate of evaporation (4) The rate of transpiration

17. The result of removal of primary producers and subsequent reduction in population size leading to change in community attributes is referred to as :

(1) Top - down cascade (2) Bottom - up cascade

(3) Population decline (4) Community collapse

18. The amount of accumulated dead organic matter in different forest types :

(1) Decreases from pole to equator.

(2) Increases from tropic of cancer to tropic of Capricorn.

(3) Increases from pole to equator.

(4) Stabilizes at any point between two poles.

19. Which one of the following termite gut microbe contributes to degradation of cellulose ?

(1) *Trichonympha* sp. (2) *Enterococcus* sp.

(3) *Enterobacter* sp. (4) *Citrobacter* sp.

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

	List - I (Group of Plankton)		**List - II (Example)**
(a)	Macroplankton	(i)	Rotifera
(b)	Nanoplankton	(ii)	Copepoda
(c)	Mesoplankton	(iii)	Pyrrophyta
(d)	Microplankton	(iv)	Amphipoda

Code :

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

21. The size of the Femtoplankton is in the range :

(1) 0.2 - 2.0 μm (2) < 0.2 μm (3) > 5.0 μm (4) 0.5 - 1.0 μm

22. As of July 2017, the total number of National Parks existing in India is :

(1) 127 (2) 103 (3) 97 (4) 100

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

Assertion (A) : Some infectious particles loose their infectious - ability in territories closer to equator, with high average of daily sunshine hours.

Reason (R) : UV incidence can determine the survival of infectious particles.

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.

24. An organism that represents both primary producer and primary consumer of an aquatic ecosystem is :

(1) Phytoplankton (2) Bacterioplankton

(3) Benthic algae (4) Zooplankton

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

Assertion (A) : The $^{18}O/^{16}O$ ratio in a natural system can be used as a thermometer.

Reason (R) : The fractions of $^{18}O/^{16}O$ depend on temperature.

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.

26. Most suitable spectral region for studying Urban Heat Island (UHI) effect is :

(1) 3 - 5 μm (2) 8 - 10 μm (3) 10 - 12 μm (4) 1 - 3 μm

27. Which factor(s) may affect species richness on island ?

(a) Area of the island

(b) Distance from the mainland

(c) Shape of the island

Choose the **correct** code :

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

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

28. Delineation of water - nonwater boundary in remote sensing is best done using :

(1) 0.5 - 0.6 μm (2) 0.6 - 0.7 μm (3) 0.7 - 0.9 μm (4) 1 - 3 μm

29. Environmentalists oppose the mining of antarctic mineral resources because :

(1) The demand for minerals is expected to decline as the world's nations become more industrialized.

(2) Environment of Antarctica is extremely vulnerable and fragile to the disturbance that would occur with the development.

(3) Territorial claims to Antarctica are unresolved.

(4) Currenty known reserves of minerals and metals are considered inexhaustible.

30. Which of the following statements is **not** true for the solubility of CO_2 in seawater ?

(1) It increases with increase in partial pressure of CO_2.

(2) It increases with increase in pH.

(3) It increases with increase in temperature.

(4) It decrease with increase in salinity.

31. What was the theme for the International Ozone Day (year 2017) ?

(1) 'Caring for all life under the Sun'

(2) 'Ozone : All there is between you and UV'

(3) 'Ozone and Climate : Restored by a World United'

(4) '30 years of healing Ozone Together'

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

Assertion (A) : OTEC power plants have low efficiences.

Reason (R) : Efficiency is governed by 2^{nd} law of thermodynamics.

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.

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

Assertion (A) : The efficiency of a silicon solar cell decreases with increase in temperature.

Reason (R) : The intrinsic resistance of the solar cell increases with rise in temperature.

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.

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

Assertion (A) : The rotor blades of wind - turbine execute rotational motion when moving air impinges on them.

Reason (R) : The momentum of the moving air is transferred to the moving blades.

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.

35. A tidal power station has basin area $=10{,}000\ m^2$ and water trapped at height $=2.0$ m above low tide. If the density of sea water is 1025 kgm^{-3}, the potential energy available for every tidal period is :

(1) ~ 201 MJ (2) ~ 402 MJ (3) ~ 240 MJ (4) ~ 480 MJ

36. A typical fission reaction involving an atom of $^{235}_{92}U$ leads to a mass defect $=0.37\times10^{-27}$kg.

How much energy is going to be released by 1.0 g of $^{235}_{92}U$?

(1) 3.33×10^{-11}MJ (2) 2.23×10^{12}MJ (3) 2.56×10^{4} MJ (4) 8.53×10^{4} MJ

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

Assertion (A) : To exploit renewable energy, quite large structures are required relative to the power produced.

Reason (R) : Power flux densities of renewable energy sources are appreciably lower compared to fossil fuels.

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.

38. Biodiesel is produced from oils and fats using :

(1) Transesterification (2) Anaerobic digestion

(3) Pyrolysis (4) Fermentation

39. On take - off, an aeroplane generates noise level of 120 dB. If 5 such aeroplanes take - off simultaneously what will be the noise level ?

(1) ~ 126.98 dB (2) ~ 124.98 dB

(3) ~ 123.86 dB (4) ~ 122.98 dB

40. CRIEGEE intermediate is formed in which of the following atmospheric reactions ?

(1) Olefin and Ozone (2) Ethane and Ozone

(3) Acedaldehyde and Ozone (4) NO_2 and Ozone

41. In the purification of drinking water, the purpose of aeration is **not** to :

(1) Remove dissolved gases such as H_2S

(2) Remove volatile organic compounds

(3) Oxidize soluble Fe^{2+} to Fe^{3+}

(4) Precipitate colloidal particles

42. Which of the following is an organocarbamate insecticide ?

(1) Parathion (2) Chloropyritos (3) Aldicarb (4) Malathion

43. A bag containing a mixed feitilizer is labelled 5 - 10 - 5. It indicates :

(1) 5% P ; 10% N ; 5% K

(2) 5% N ; 10% P_2O_5 ; 5% K_2O

(3) 5% N_2O ; 10% PH_3 ; 5% K_2O

(4) 5% N ; 10% PH_3 ; 5% K_2O

44. The bioremediation technique of a contaminated soil does **not** require the fulfilment of which of the following conditions ?

(1) Waste must be present in a physical form that is susceptible to microbes.

(2) Waste must be susceptible to biodegradation.

(3) Environmental conditions such as pH, temperature and oxygen level must be appropriate.

(4) Microbes of any type must be available.

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

Assertion (A) : Organophosphate insecticides have lower values of partition coefficient, K_{ow}, than organochlorine pesticides.

Reason (R) : Organophosphate insecticide molecules have lower ability to form hydrogen bonds with water than organochlorine pesticides.

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.

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

Assertion (A) : NO_X and volatile organic compounds (VOCs) are primary precursors in photochemical smog formation.

Reason (R) : NO_X and VOCs form oxidants by thermal reactions.

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.

47. The dominant species, which removes hydroxyl radical in troposphere, is :

(1) CH_4 (2) CO (3) NO (4) NO_2

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

List - I (EIA methods)	**List -II (Features)**
(a) Overlays	(i) Environmental Evaluation System
(b) Networks	(ii) Adaptive environmental assessment
(c) Battelle Columbus	(iii) Environmental Systems as a complex web
(d) Simulation modelling	(iv) Composite impact by superimposing maps

Code :

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

49. The baseline studies in EIA pertain to :

(1) Collection of demographic data only

(2) Prediction of significant residual environmental impact

(3) Existing environmental setting of the proposed development area

(4) Selection of the best project option available

50. Which one of the following steps is *not* included in the scoping process ?

(1) Baseline descriptions and potential additional data collection needs

(2) Description of environmental impacts and creation of contingency plan

(3) Defining a set of criteria to assess the project

(4) Setting of experts team that will conduct EIA

51. A company conducted an environmental risk assessment to evaluate the possible impacts of releasing various levels of pollutants from a chemical plant. An environmental risk assessment should focus on :

(1) Beneficial aspects of the products produced by the plant

(2) The legislative requirements related to the human health effects as a result of exposure to the pollutant

(3) The quantification of hazards to the local environment from pollutants released

(4) Detailed outline of the management process to reduce the health effects related to exposure to the pollutants

52. In EIA the multi - attribute utility theory is used to describe :

(1) The identification of the alternatives to be evaluated and structuring of environmental parameters

(2) Existing environmental quality of study area

(3) The socio - economic status of the area

(4) The risk involved in a development project

53. Under the Air Act, 1981, which body is empowered to set standard for ambient air quality ?

(1) MOEFCC

(2) Ministry of Home Affairs

(3) Central Pollution Control Board (CPCB)

(4) State Ministry of Home Affairs

54. What is meant by the doctrine of riparian rights ?

(1) Prevention is better than cure.

(2) One who pollutes the water, must pay for it.

(3) Every owner has a right to get unpolluted water without alteration.

(4) All of the above.

55. Which environmental legislation in India makes it compulsory to obtain prior approval of the Central Government for diversion of forest lands for non - forest purposes ?

(1) Environment (Protection) Act, 1986

(2) Indian Forest Act, 1927

(3) Forest Conservation Act, 1980

(4) Traditional forest - Dwellers (Forest rights) Act, 2006

56. The Lime stabilization and drying of biosolids ensure :

(a) Creating unfavourable condition to vector

(b) High pH of contents in biosolids

(c) Reduction of all toxic elements

Choose the **correct** answer :

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

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

57. Which one of the following waste may undergo exothermic self - accelerating decomposition ?

(1) Organic peroxides (2) Arsenic bearing sludges

(3) Organo - Chlorines (4) Vinylchlorides

58. According to Plastic Waste (Management and Handling) Rules 2011, recycling of the plastic should be done according to :

(1) IS/ISO 14852 : 1991 (2) IS/ISO 17088 : 2008

(3) IS 9833 : 1981 (4) IS 14534 : 1998

59. Which of the following is **not** a Millennium Development Goal ?

(1) Ensuring environmental sustainability

(2) Eradicating extreme hunger and poverty

(3) Developing global partnership for development

(4) Achieving universal energy security

60. The definition of 'air pollutant' as per section 2(a) of Air Act, 1981 includes :

(1) Liquid and gaseous substances

(2) Solid, liquid and gaseous substances including noise

(3) Gaseous substances

(4) Solid, liquid and gaseous substances

61. In a population of 210 individuals, 72 are smokers and 138 are non - smokers. If a person is selected with an equal chance to each category, what is the probability of that person being a smoker ?

(1) 0.25 (2) 0.50 (3) 0.34 (4) 0.75

62. If the mean value $(\overline{X})$ of a normally distributed data is 10 and number of observation (n) = 36 with an standard deviation (sd) of 0.3, then 90% confidence interval is :

(1) 10 ± 0.08 (2) 10 ± 8.23 (3) 10 ± 0.16 (4) 10 ± 4.15

63. Consider a tall stack emitting a pollutant at the rate 5.0 gms^{-1} in the atmosphere where wind is blowing in X-direction with an average velocity of 2.0 ms^{-1} at the stack height. What will be the maximum ground level concentration if the effective stack height is 30.0 m and the Gaussian plume is assumed with dispersion parameters $\sigma_y = 50.0$ m and $\sigma_z = 30.0$ m ?

(1) ~ 180 μgm^{-3} (2) ~ 320 μgm^{-3} (3) ~ 240 μgm^{-3} (4) ~ 415 μgm^{-3}

64. Which of the following material(s) are used as land fill liner for the control of gas and leachate movement ?

(a) Sand (b) Bentonite (c) Fly ash (d) Butyle rubber

Choose the **correct** code :

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

65. Assume that the population (N) of a species follows the logistic growth represented by following equation -

$$\frac{dN}{dt} = 0.8N - 0.01N^2$$

At what value of N, the population exhibits maximum growth ?

(1) 40 (2) 80 (3) 160 (4) 800

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

Assertion (A) : In regression analysis, smaller the p - values, the more significant is the result of the experiment.

Reason (R) : The magnitude of p - value is an indicator of the association between the changes in the predictor's value and the changes in the response variable.

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.

67. The mean and median of a moderately skewed distribution are 21 and 20 respectively. The mode of the distribution is :

(1) 24 (2) 12 (3) 18 (4) 26

68. The 90^{th} percentile value for the data : 6, 6, 6.5, 7.0, 7.5, 6.5, 6, 7.5 and 8 is :

(1) 7.50 (2) 6.50 (3) 7.75 (4) 7.00

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

Assertion (A) : Sustainable mountain development should be the global priority.

Reason (R) : Mountain people are particularly vulnerable to impacts of climate change and natural disasters.

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.

70. In the total global ecological footprint, which country has the maximum share :

(1) USA (2) China (3) India (4) Brazil

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

Assertion (A) : Climate change induced monsoon variability may have serious consequences for Indian agriculture.

Reason (R) : Two third ($2/3^{rd}$) of area under cultivation in India is rain dependent.

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.

72. Namami Gange (Integrated Ganga Conservation Mission / Programme under National Ganga River Basin Authority) programme was launched in which year ?

(1) 2014 (2) 2015 (3) 1989 (4) 2012

73. Which state in India is pioneer in making rain water harvesting as a compulsory measure in towns to avoid ground water depletion ?

(1) Kerala (2) Arunachal Pradesh

(3) Tamilnadu (4) Maharashtra

74. Environmental education :

(a) Increases public awareness

(b) Provides knowledge of environmental issues

(c) Does not provide disciplinary focus

(d) Sensitizes individuals about the necessity of sustainable development

Choose the **correct** answer :

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

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

75. The greenhouse gas, ozone, absorbs and emits long wave radiation near the wavelength :

(1) 9.6 μm (2) 11.2 μm (3) 6.9 μm (4) 17.3 μm

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Space For Rough Work