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Booklet Serial No. 044247

Test Booklet Series

JUNIOR ENVIRONMENTAL ENGINEER
OMR Examination - 2023

C

Time Allowed: 120 Minutes

Maximum Marks: 120

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET **DOES NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
 2. Please note that it is the candidate's responsibility to encode and fill in the Roll Number, Booklet Serial No. and Test Booklet Series Code A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Answer /Response Sheet. Any omission/discrepancy will render the Response Sheet liable for rejection.
 3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside.
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- | | | | |
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4. This Test booklet contains 120 items (questions). Each item comprises of four responses (answers). You will select the response which you want to mark on the Answer Sheet/Response Sheet. In case you feel that there is more than one correct response, mark the response which you consider the appropriate. In any case, choose **ONLY ONE** response for each item.
 5. You have to mark all your responses **ONLY** on the separate Answer /Response Sheet provided. See directions in the Response Sheet.
 6. All items carry equal marks.
 7. After you have completed filling in all your responses on the Response Sheet and the examination has concluded, you should hand over to the Invigilator **only the Answer /Response Sheet**. You are permitted to take away with you the Test Booklet and **Candidate's Copy of the Response Sheet**.
 8. Sheets for rough work are appended in the Test Booklet at the end.
 9. While writing Centre Code and Roll No. on the top of the Answer Sheet/Response Sheet in appropriate boxes use "**ONLY BLUE/BLACK BALL POINT PEN**".
 10. **Penalty for wrong answers:**
THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY THE CANDIDATE IN THE WRITTEN TEST (OBJECTIVE TYPE QUESTIONS PAPERS).
 - (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, ($\frac{1}{4}$) of the marks assigned to that question will be deducted as penalty.
 - (ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above for that question.
 - (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be no penalty for that question.

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(Set - C)



Identify the correct statements:

- a. Thermal oxidation involves a reaction with O_2 and heat.
- b. Incinerators are suitable for efficient oxidations of mixed waste streams.
- c. Fly ash has pozzolanic properties.

Choose the correct option from the following:

- A) a only
- B) a and c only
- C) b and c only
- D) a, b, and c

Consider the properties of water:

- a. Water is less dense in its solid state compared to its liquid state.
- b. The bipolar nature of water contributes to its viscosity.
- c. The thermal properties of water enable it to exist only in liquid and solid states.

Which of the above statements is/are correct?

- A) a and b
- B) b and c
- C) Only a
- D) a, b and c

Match the technologies with their descriptions.

- | | |
|------------------------------|---|
| a. Sequencing Batch Reactors | 1. Operates using membranes instead of gravity settling |
| b. Activated Sludge Process | 2. Operates in a batch mode with events in a sequence. |
| c. Membrane Bioreactor | 3. Aeration keeps microbial cells in suspension |
| d. Trickling Filters | 4. Treatment involves wastewater trickling or spraying over media |

Choose the correct option from the following:

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

Match the columns:

Column A

- a. Hybrid
- b. Suspended Growth
- c. Fixed Film
- d. Biofilm

Column B

- 1. Combination of biofilm and suspended growth
- 2. Uses gravity settling for separation.
- 3. Microbial cells are kept in motion, not attached to surfaces.
- 4. Microbial growth occurs on surfaces.

- A) a-1, b-3, c-2, d-4
- C) a-3, b-2, c-1, d-4

- B) a-2, b-1, c-3, d-4
- D) a-4, b-2, c-3, d-1

5.

Match the phase changes with their respective definitions:

Phase change

- a. Condensation
- b. Evaporation
- c. Freezing
- d. Melting

Definition

- 1. Solid → Liquid
- 2. Vapor → Liquid
- 3. Liquid → Solid
- 4. Liquid → Vapor

Choose the correct option from the following:

- A) a-2, b-3, c-1, d-4
- C) a-2, b-4, c-3, d-1

- B) a-1, b-2, c-3, d-4
- D) a-4, b-3, c-1, d-2

6. Arrange the following processes in the order they might typically be applied to treat industrial wastewater:

- a. Flocculation
- b. Chemical Precipitation
- c. Solidification
- d. Oxidation

Choose the correct option from the following:

- A) b → a → d → c
- C) b → a → c → d

- B) a → b → d → c
- D) a → d → b → c

7. Arrange the following in sequences in the operation of Sequencing Batch Reactors (SBRs):

- a. React
- b. Settle
- c. Fill
- d. Decant

Choose the correct option from the following:

- A) c → a → b → d
- C) d → b → a → c

- B) a → c → d → b
- D) b → d → c → a

8. Arrange the following processes in order as carbon dioxide interacts with water:

- a. Carbonic acid dissociates.
- b. Carbon dioxide dissolves in water.
- c. Carbonic acid forms from carbon dioxide and water.
- d. Carbonate reacts with cations, causing them to precipitate out.

Choose the correct option from the following:

- A) a, b, c, d
- C) b, a, c, d

- B) b, c, a, d
- D) d, c, b, a

(Set - C)

(4)

Consider the following statements about the nitrogen cycle.

- a. Nitrogenase functions best in the presence of oxygen.
- b. Atmospheric nitrogen is very stable and does not readily combine with other elements.
- c. The atmosphere is composed of 78% nitrogen gas.
- d. Denitrifying bacteria prefer environments rich in free oxygen.

Identify the correct statements:

- A) a and d only ✓
- C) a, b, and c only

- B) b and c only
- D) b, c, and d only

10. Match the terms with their descriptions:

Term
a. Thermocline

b. Baseline

c. NABL

d. Coliforms

Description

i) A layer in a large body of water, such as a lake, that sharply separates regions differing in temperature

ii) All stations shall be initially classified as these

iii) Bacteria that are always present in the digestive tracts of animals, including humans, and are often used as markers for water contamination

iv) An agency for providing accreditation to labs.

Choose the correct option from the following:

- A) a-i, b-iii, c-iv, d-ii ✓
- C) a-i, b-ii, c-iv, d-iii

- B) a-iii, b-ii, c-iv, d-i ✗
- D) a-iv, b-i, c-ii, d-iii

11. Sequence the treatment processes for waste in the distillery industry:

- a. Aerobic digestion
- b. Primary sedimentation
- c. Anaerobic digestion
- d. Evaporation and drying

Choose the correct option from the following:

- A) b, c, a, d
- C) d, a, b, c

- B) a, b, c, d
- D) b, a, c, d

12. Arrange the following processes in the sequence they are often carried out in a safety management system:

- a. Taking action
- b. Recognizing hazards as well as those at risk
- c. Monitoring as well as reviewing
- d. Deciding on precautionary action

Choose the correct option from the following:

- A) b, d, a, c
- C) d, b, a, c

- B) a, b, c, d
- D) c, a, b, d

13. According to EPA 1986:

- a. The central government may restrict areas in which industries operate
- b. Environmental pollution only refers to air pollution
- c. The Act empowers the Central Government to coordinate actions by State Governments.
- d. The Central Government may issue directions to prohibit or regulate any industry.

Choose the correct option from the following:

- A) a and c
- B) b and d
- C) a, c, and d
- D) a, b, c and d

14. Match the the term with its appropriate description.

Activity	Description
a. <u>Environmental management program</u>	1. A method to predict environmental consequences of proposed decisions
b. <u>Environmental impact assessment</u>	2. Management of environmental impacts including uncertainties
c. <u>Environmental risk assessment</u>	3. An approach to evaluate potential negative impacts and their probabilities
d. <u>Environmental enhancement</u>	4. Positive interventions to improve the environment

Choose the correct option from the following:

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

15. Match the component of risk assessment with its description:

Component	Description
a. <u>Source assessment</u>	1. Evaluates the nature and magnitude of human or ecological contact
b. <u>Exposure assessment</u>	2. Identifies the types and amounts of emissions
c. <u>Effect assessment</u>	3. Describes profiles of toxicological properties
d. <u>Integrative risk characterization</u>	4. Summarizes the three assessments to evaluate the actual or potential human health risks

Choose the correct option from the following:

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

(Set - C)

(6)

6. Which of the following are mentioned in the Disaster Management Act 2005?
- Establishment of the National Disaster Management Authority (NDMA)
 - Creation of the National Institute of Disaster Management (NIDM)
 - Establishment of the State Disaster Management Authorities (SDMAs)
 - Managing disaster in a reactive, relief-centric manner

Choose the correct option from the following:

- | | |
|---------------|---------------|
| A) a, b and c | B) a, b and d |
| C) b, and d | D) a, and b |

17. Arrange the following events in chronological order from old to the recent:

- Indian Ocean Tsunami
- Kedarnath Cloud Burst
- Gujarat Earthquake.
- Odisha Super Cyclone

Choose the correct option from the following:

- | | |
|---------------|---------------|
| A) a, b, c, d | B) a, c, b, d |
| C) b, a, c, d | D) c, b, a, d |

18. Which of the following statements about the Water Pollution Act 1974 in India are correct?

- The Water Act aims to control water usage.
- The Water Act was enacted based on discussions at the Stockholm Conference.
- Pollution of water implies contamination and alteration of its properties.
- The main objective of the Water Pollution Act 1974 is taxation on water usage.

Choose the correct option from the following:

- | | |
|------------|----------------|
| A) a and b | B) b and c |
| C) c and d | D) a, b, and c |

19. Identify the correct statements regarding coal mining.

- Surface mining disrupts land more than subsurface mining.
- All coal mines, regardless of depth or location, have negligible environmental impact.
- Strip mining involves digging trenches to extract coal.
- Coal is usually found on the surface.

Choose the correct option from the following:

- | | |
|------------|------------|
| A) a and b | B) c and d |
| C) a and c | D) b and d |

20. Which of the following is considered an "environmental pollutant" according to the Environment (Protection) Act, 1986?
- A) A gaseous substance beneficial to the environment
 - B) Any solid substance present in high concentration beneficial to the environment
 - C) A liquid substance present in a concentration injurious to the environment
 - D) Fresh air

21. Agenda 21 is one of the outcome documents of which of the following:
- A) Earth Summit
 - B) Bonn Convention
 - C) Paris Agreement
 - D) Kigali Agreement

22. For determination of optimum coagulant dosage for coagulation the impurities present in water which test is conducted?
- A) Seechi disc test
 - B) Jar test
 - C) Turbidity test
 - D) Settling test

23. In the purification of drinking water, the purpose of aeration is not to:
- A) Remove dissolved gases such as H_2S
 - B) Remove volatile organic compounds
 - C) Oxidize soluble Fe^{2+} to Fe^{3+}
 - D) Precipitate colloidal particles

24. The National Green Tribunal has jurisdiction over which of the following acts:
1. Wildlife Protection Act, 1972
 2. Forest Rights Act, 2006
 3. The Public Liability Insurance Act, 1991
 4. The Biological Diversity Act, 2002

Select the correct answers from the following codes.

- A) 1 and 2 only
- B) 1, 2 and 4 only
- C) 3 and 4 only
- D) 1, 2, 3, 4

25. The settling of discrete, non-flocculating particle in a dilute suspension is known as:
- A) Class-I sedimentation
 - B) Class-II sedimentation
 - C) Class-III sedimentation
 - D) Compression

(Set - C)

(8)

26. Global Invasive Species Database belongs to which one of the following organizations?
- A) WHO
B) IUCN
C) UNEP
D) WWF

27. The drastic reduction in the number of intestinal pathogens during activated sludge process is the overall result of:
- A) Competition
B) Competition and adsorption
C) Predation, competition and adsorption
D) Competition, adsorption, predation and settling

28. Langmuir model is related with:
- A) Nitrification
B) Denitrification
C) Adsorption
D) Absorption

29. Match the List — I with List — II and choose the correct answer from the given codes:

List — I (Lakes)

- a. Oligotrophic lakes
b. Dystrophic lakes
c. Eutrophic lakes
d. Volcanic lakes

List — II (Characteristics)

- i. More nutrient concentration
ii. Magmatic water
iii. Low nutrient concentration
iv. Low pH and high humic acid conditions

Codes:

- | | | | | |
|----|-----|-----|-----|-----|
| | a | b | c | d |
| A) | i | ii | iii | iv |
| B) | ii | i | iv | iii |
| C) | iii | iv | i | ii |
| D) | iv | iii | ii | i |

30. Match the List — I and List — II. Identify the correct answer from the codes given below:

List — I (Process/Event)

- a. Assimilative capacity
b. Critical water parameter
c. Itai-Itai disease,
d. Excess nitrate in water

List — II (Consequences/Links)

- i. DO, BOD, Coliform
ii. Cadmium
iii. Blue baby syndrome
iv. Waste discharge

Codes:

- | | | | | |
|----|----|-----|-----|-----|
| | a | b | c | d |
| A) | i | ii | iii | iv |
| B) | iv | i | ii | iii |
| C) | ii | i | iii | iv |
| D) | ii | iii | i | iv |

(Set - C)

(9)

[P.T.O.]

31. Which of the following are included in the new categorization of industries based on their pollution load by the Environment Ministry?

1. Red category
2. Orange category
3. Green category
4. Yellow category

Choose the correct option:

- | | |
|-------------------|-----------------|
| A) 1,2 and 3 only | B) 2 and 3 only |
| C) 2,3 and 4 only | D) 1 and 4 only |

32. Miyawaki Technique is associated with:

- | | |
|------------------------|--|
| A) Air purification | B) Solar energy harvesting |
| C) Urban Afforestation | D) Harvesting wind energy in coastal areas |

33. Where is the headquarter of World Wildlife Fund for Nature (WWF) located?

- | | |
|------------|----------|
| A) Kyoto | B) Gland |
| C) Nairobi | D) Bonn |

34. IAlA stands for:

- A) International Assembly of Impact Assessment
- B) International Association of Impact Assessment
- C) Indian Association of Impact Assessment
- D) Indian Assembly of Impact Assessment

35. Which of the following is termed as free available chlorine?

- A) Hypochlorous acid
- B) Hypochlorite ions
- C) Molecular chlorine
- D) Hypochlorous acid, Hypochlorite ions, Molecular chlorine

36. Which of the following is/are correct with reference to the scheme of Common Effluent Treatment Plants?

1. It targets small-scale industries that are unable to afford installation of pollution control equipment.
2. It is an initiative of the Ministry of Environment, Forest and Climate Change.

Select the correct answer using the code given below.

- | | |
|-----------------|--------------------|
| A) 1 only | B) 2 only |
| C) Both 1 and 2 | D) Neither 1 nor 2 |

37. The chlorine, which serve as a disinfectant is

- A) Free chlorine
C) Chlorine demand

- B) Free Residual chlorine
D) Residual demand

38. With respect to small hydel power projects, consider the following statements:

1. Projects under 75MW are classified under this category.
2. Environmental Impact Assessment (EIA) is not required for these projects.
3. They come under the Ministry of Power.

Choose the correct option:

- A) 1 and 2 only
C) 2 only

- B) 1 and 3 only
D) 1, 2 and 3

$$\begin{array}{r} 20 \\ 15 \overline{) 300} \\ \underline{30} \\ 0 \end{array}$$

39. A 300ml BOD bottle filled with 15ml of wastewater and the rest seeded dilution water experiences a drop of Dissolved Oxygen (DO) level 7.2mg/L in 5 days, the initial and final DO of seeded dilution water is 8 and 7 mg/l respectively. What would be BOD_5 of the sample?

- A) 125 mg/L
C) 200 mg/L

- B) 100 mg/L
D) 250 mg/L

$$8 - 7 = 1$$

in final 200

40. Which committee under MoEF and CC reviews the EIA and EMP development projects?

- A) Environmental Clearance Committee
B) Project Evaluation Committee
C) Project Assessment Committee
D) Environmental Appraisal Committee

$$\frac{3 \times 100}{100}$$

41. Sludge Density Index is calculated by using which formula:

- A) $SDI = 100/SVI$
C) $SDI = 1000/SVI$

- B) $SDI = SVI/100$
D) $SDI = SVI/1000$

42. Progressive increase in concentration of xenobiotic compound when it passes through the food chain is called:

- A) Hyperaccumulation
C) Bioaccumulation

- B) Biomagnification
D) Eutrophication

43. Step aeration is used in which process:

- A) Up flow Anaerobic Sludge UASB
C) Activated sludge process

- B) Trickling filter
D) Sedimentation tank

44. Consider the following statements about the National Green Tribunal (NGT)?

1. The Tribunal consist of a full time Chairperson
2. It consists of not less than 10 but subject to maximum of 20 full time Judicial members.
3. It consists of not less 5 but subject to maximum of 10 full time Expert Members.

Choose the correct option:

- A) 1 only
C) 2 and 3 only

- B) 1 and 2 only
D) 1, 2 and 3 only

(Set - C)

(11)

[P.T.O.]

45. 'Bioprospecting' is known as:
- A) Discovering a novel habitat for endangered species.
 - B) Crossbreeding two distinct species to create new species.
 - C) Exploring for economically valuable genetic and biochemical resources in nature.
 - D) Investigating substitute keystone species for an ecosystem.

46. The biological mass generated in the aeration tank consists of:

- 1. Bacteria
- 2. Protozoa
- 3. Rotifers
- 4. Fungi

Choose the correct options:

- A) 1 and 2 only
- B) 2 and 3 only
- C) 1, 2 and 4 only
- D) All the above

47. In a polluted lake, the index of pollution is measured by the:

- A) Presence of frogs
- B) Artemisia
- C) Daphnia
- D) Hydrilla

48. Which method is used to estimate the residual chlorine in the wastewater:

- A) Iodometric method
- B) Winkler's Method
- C) Jar test
- D) Kjeldahl Test

49. What is the name of the web-based portal developed for online submission and monitoring of proposals seeking environmental clearances in India?

- A) EnviroPortal
- B) Green Web
- C) EcoClear
- D) PARIVESH

50. Consider the following statements:

- 1. An ecotone is a zone of junction between two or more ecosystems.
- 2. Sometimes the number of species and their density increases in a transition zone between two ecosystems. This is called the 'Edge effect'.

Select the correct code from the following:

- A) 1 only
- B) 2 only
- C) Both 1 and 2
- D) Neither nor 2

51. Spent wash is the effluent produced from which industry?

- A) Textile
- B) Tannery
- C) Distillery
- D) Pulp and water

52. Which article provides that the State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties?

- A) Article 19
- B) Article 21
- C) Article 47
- D) Article 48

53. Which of the following ecological factors is/are responsible for Coral Bleaching?

1. Overexposure to high solar irradiance ✓
2. Extreme low tides
3. Increase in ocean temperature

Choose the correct option:

- | | |
|-----------------|-----------------|
| A) 1 and 2 only | B) 1, 2 and 3 |
| C) 2 and 3 only | D) 1 and 3 only |

54. Electrodialysis process used for wastewater treatment is a:

- A) Physical treatment technique
- B) Biological treatment technique
- C) Chemical treatment technique
- D) Advanced treatment technique

55. What is the objective of an environmental audit?

- A) Maximizing profits of the industrial unit
- B) Ensuring compliance with environmental regulations
- C) Promoting employee engagement
- D) Increasing production capacity

56. A landfill cannot be constructed within how much distance of a river:

- | | |
|----------------|----------|
| A) 100m | B) 200m |
| C) <u>500m</u> | D) 1000m |

57. Category A projects divided in EIA notification 2006, does NOT require which of the following process?

- | | |
|-----------------------------|------------------------|
| A) Scoping | B) Screening |
| C) Environmental Management | D) Public Consultation |

58. What is the ISO code for Occupational Safety and health?

- | | |
|--------------|--------------|
| A) ISO 9001 | B) ISO 14001 |
| C) ISO 45001 | D) ISO 27001 |

59. Monod equation is used to calculate:

- | | |
|------------------------------|------------------------|
| A) Growth of microorganisms | B) Energy estimation |
| C) Organic carbon estimation | D) Chlorine estimation |

60. According to the Biomedical Waste Management Rules 2016, which colored non-chlorinated plastic bags should be used for the collection of human anatomical waste?

- | | |
|-----------|----------|
| A) Red | B) Black |
| C) Yellow | D) Blue |

61. Which agreement proposed to remove F_{12} and F_{22} refrigerants from their use due to health hazard?

- | | |
|------------------------|---------------------|
| A) Radiation-Agreement | B) Hazard-Agreement |
| C) Earth-Agreement | D) Kiro-Agreement |

(Set - C)

(13)

[P.T.O.]

62. Which is the non-renewable resource radioactive element below the earth's surface?
- A) Natural gas
B) Crude oil
C) Uranium
D) Sodium thiosulphate

63. Consider the following pairs:
- | | |
|----------------------|----------------------------|
| a. NGT | 1. Ferroin indicator |
| b. Blue baby disease | 2. Nitric acid |
| c. CO_2 | 3. National Green Tribunal |
| d. HNO_3 | 4. Nation Green Test |
- Which of the above pairs are correctly matched?
- A) a-3, d-2
B) a-4, b-3
C) a-4, b-1
D) c-4, d-2

64. Consider the following statements:
- a. Eutrophication causes the water pollution and death of aquatic lives.
b. Phosphorous and Nitrogen causes the eutrophication.
c. Smog causes the eutrophication.
d. Water Hyacinth is the source of water pollution.
- Which of the above statements is/are correct?
- A) a and d
B) a and b
C) b and c
D) b and d

65. Arrange the following non-renewable fossil fuel in the sequence of lower to higher heating values.
1. Coal
2. Hydrogen
3. Petroleum.
4. Natural Gas
- A) 2,4,3,1
B) 3,4,2,1 ✓
C) 2,3,1,4
D) 3,2,4,1 ✗

66. What is formed when heat and sunlight cause chemical reactions between oxides of nitrogen (NO_x) and Volatile Organic Compounds (VOC)?
- A) CO_2
B) Ozone
C) NO_2
D) SO_2

67. Which colour of AQI indicates good air condition?
- A) Green
B) Red
C) Orange
D) Yellow

Consider the following statements:

- a. Chloroscope comparator box is used to determine residual chlorine content in water.
- b. Orthotolidine indicator is used to determine MPN count for E-coli. ✗
- ✓ c. Orthotolidine is used to determine residual chlorine content in water.
- A) ONLY-a ✗ B) ONLY-b ✗
- C) a and b ✗ D) a and c

Consider the following pairs:

- | | |
|--------------------|----------------------|
| a. Sodium | 1. Gravity filter |
| b. Denitrification | 2. Bacterial density |
| c. RSF | 3. Threshold number |
| d. Methane | 4. Rising of sludge |

Which of the above pairs are correctly matched?

- A) a-4, c-2 ✗ B) b-4, c-1.
- C) a-2, c-4 ✗ D) a-4, c-1

Arrange the following laboratory test procedure in the correct sequence to determine BOD₅ of sewage sample.

1. Incubation of diluted sewage sample for 05 days in BOD incubator
2. (D.O. depletion) X Dilution factor
3. Present day initial D.O.
4. 5th day final D.O.

- A) 3,1,4,2 B) 3,4,1,2
- C) 4,1,3,2 ✗ D) 4,3,1,2 ✗

Which process helps to achieve nitrification in wastewater?

- A) C/N ratio B) COD
- C) BOD D) ASP

Consider the following pairs:

- | | |
|-----------------------------------|-----------|
| a. Turbidity | 1. Tesla |
| b. Specific conductivity of water | 2. AQI |
| c. Air Pollution | 3. NTU |
| d. BOD | 4. Siemen |

Which of the above pairs are correctly matched?

- A) b-3, d-2, c-1 ✗ B) a-2, b-3, c-2
- C) a-3, b-4, c-2 D) c-1, d-2, b-4

73. What term is used to describe the process of adding chemicals to wastewater which enhance the removal of suspended solids and organic matter by coagulation and flocculation?

- A) Chemical precipitation
- B) Chemical oxidation
- C) Chemical neutralization
- D) Chemical disinfection

74. What is the formula to calculate number of filtration beds require in Rapid Sand Filter?

- A) $N = 100 (Q)^{0.5}$
- B) $N = 3.22 (Q)^{0.5}$
- C) $N = 1.22 (Q)^{0.5}$
- D) $N = 1000 (Q)^{0.5}$

75. What is the Sludge Volume Index for bulked sludge?

- A) 200 ml/gm or more
- B) 100-150ml/gm
- C) 0-50 ml/gm
- D) 50-100 ml/gm

76. Consider the following statements:

- a. Membrane Filter Technique is used for E-coli test.
- b. Equalization tank is used for grit removal.
- c. E-coli test requires 37° Celsius temperature for incubation.

Which of the above statements is/are correct?

- A) a and c
- B) ONLY-b
- C) b and c
- D) ONLY-c

77. Consider the following statements:

- a. Alum is the coagulant used in water treatment.
- b. Ozone is the coagulant used in water treatment.
- c. Chlorinated Copperas is the coagulant used in water treatment.

Which of the above statements is/are correct?

- A) b and c
- B) a and c
- C) a and b
- D) ONLY-b

78. Consider the following statements:

- a) Disease causing bacteria are called pathogens.
- b) Fungi contain chlorophyll and pigments.
- c) Algae contain chlorophyll and pigments.

Which of the above statements is/are correct?

- A) b and c
- B) a and c
- C) a and b
- D) ONLY-b

79. What is the length of turbidity rod?

- A) 105 mm
- B) 307 mm
- C) 203 mm
- D) 409 mm

80. Which IS code stands for basic requirements for water supply, drainage and sanitation?

- A) IS 10500
- B) IS 4050
- C) IS 1172
- D) IS 893

81. Which of the following process is employed to gain sufficient head for the wastewater?

- A) Fermentation
- B) Oxidation
- C) Screening
- D) Pumping

82. What is the concentration of $[H^+]$ ions in water sample of $pOH = 06$?

- A) 10^{-8} moles/L
- B) 10^{-7} moles/L
- C) 10^{-14} moles/L
- D) 10^{-6} moles/L

$$\begin{aligned} pH + pOH &= 14 \\ pH &= 14 - 6 = 8 \\ &= 10^{-8} \text{ mol/L} \end{aligned}$$

83. Which among the following is NOT a chemical characteristic of water?

- A) Colour
- B) pH
- C) Hardness
- D) Alkalinity

(Set - C)

(17)

[P.T.O.]

84. What is the colour of septic wastewater?
 A) Brown
 B) Black
 C) Colourless
 D) Grey
85. What is the validity period of environmental clearance for mining projects in India?
 A) 10 years
 B) 20 years
 C) 30 years
 D) 50 years
86. What is the main purpose of an Environmental Management Plan (EMP)?
 A) To implement and monitor mitigation measures to reduce the environmental impacts of a proposed project
 B) To provide information to the public about the environmental impacts of a proposed project
 C) To assess the potential environmental impacts of a proposed project
 D) Description of the proposed project
87. A State-level Environment Impact Assessment Authority (SEIAA), is constituted by the central government as the Environmental Clearance Issuing Authority under which act,
 A) The Water (Prevention and control of pollution) Act 1974
 B) The Air (Prevention and control of pollution) Act 1981
 C) Environment (Protection) Act 1986
 D) Rio Declaration (Earth Chapter)
88. Which of the following factors is NOT considered for screening of projects for EIA in India?
 A) Location of the project
 B) Size of the project
 C) Type of the project
 D) Cost of the project
89. When was the Environment Protection Act 1986 enacted by the Parliament of India?
 A) 23rd May 1986
 B) 19th November 1986
 C) 2nd December 1984
 D) 5th June 1972
90. When was the Environment (Protection) Act, 1986 enacted by the Parliament of India?
 A) After the United Nations Conference on Human Environment held in Stockholm in 1972
 B) After the Bhopal Gas Tragedy that occurred on Dec 2, 1984
 C) After the Wildlife Protection Act, 1972
 D) After the Water (Prevention and Control of Pollution) Act, 1974

91. Consider the following statements about sound exposure level.

- a. It is a measure of the total sound energy received by a listener over a given time period.
- b. It is expressed in decibels (dB) relative to a reference sound pressure level.
- c. It is independent of the duration and frequency spectrum of the sound.
- d. It can be used to compare the impact of different noise sources or events on human health and well-being.

Which of the following statements is/are correct?

- A) a, b and c
- B) a, c and d
- C) a, b and d
- D) c and d

92. Arrange the following environmental movements in chronological order.

- 1. Narmada Bachao Andolan
- 2. Silent Valley movement
- 3. Chipko movement
- 4. Appiko movement

- A) 1, 2, 3, 4
- B) 3, 4, 2, 1
- C) 4, 3, 2, 1
- D) 3, 2, 4, 1

93. Consider the following international convention

- a. Basel Convention
- b. Stockholm Convention
- c. Rotterdam Convention
- d. India Convention

What is/are the name of the international convention that aims to protect human health and the environment from the adverse effects of hazardous chemicals and wastes?

- A) a and d
- B) a, b and c
- C) ONLY-d
- D) b, c and d

94. What is the name of the Indian Standard that provides guidance on conducting safety audits in industrial units?

- A) IS 14489:1998 - Code of Practice on Occupational Safety and Health Audit
- B) IS 15656:2006 - Safety of Machinery - General Principles for Design
- C) IS 18001:2007 - Occupational Health and Safety Management Systems
- D) IS 1948:1961 - Code of Practice for Industrial Lighting

95. How often should an off-site emergency plan be reviewed and updated?

- A) Annually
- B) Every two years
- C) Every three years
- D) As needed

(Set - C)

(19)

[P.T.O.]

96. Following statements are given in relation with the difference between a safety audit and a safety inspection:

- a. A safety audit is more comprehensive than a safety inspection.
- b. A safety audit is conducted by a qualified safety auditor, while a safety inspection can be conducted by anyone.
- c. A safety audit is typically conducted less frequently than a safety inspection.
- d. A safety inspection is in more detail than A safety audit.

Which is/are statements true

- A) c and d
- B) a, b and c
- C) a, b and d
- D) b and c

97. Which of the following is/are NOT the critical element of an on-site emergency plan?

- a. Hazard identification and assessment
- b. Emergency response procedures ✓
- c. Recovery and rehabilitation procedures
- d. Public relations plan ✓

- A) ONLY-c
- B) a, b and c
- C) ONLY-d
- D) b and c

98. Which of the following is an example of a socio-economic impact of a project?

- A) Noise pollution
- B) Employment generation
- C) Water quality degradation
- D) Habitat fragmentation

99. Consider the following pairs:

- | | |
|--------------------------|-------------------------------------|
| a. pH of potable water | 1. Chemical characteristic of water |
| b. Domestic water demand | 2. Physical characteristic of water |
| c. Pathogens | 3. 6.5-8.5 |
| d. BOD | 4. 7 |

Which of the above pairs are correctly matched?

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

100. Consider the following pairs:

- | | |
|------------|---------------------|
| a. Ca | 1. Gravity filter |
| b. E-coli | 2. Screen |
| c. SSF | 3. Threshold number |
| d. Methane | 4. B-coli |

Which of the above pairs are correctly matched?

- A) a-4, c-2 ✗
- B) b-4, c-1
- C) a-2, c-4 ✗
- D) a-4, c-1

101. Which certification guideline is mentioned as requiring external environmental audits?

- A) Energy Star
- B) LEED
- C) ISO 14001
- D) Forest Stewardship Council

102. The Silent river valley hydroelectric project was primarily controversial because:

- A) It aimed to generate a large amount of electricity.
- B) It was the first EIA ordered in India.
- C) It posed a significant threat to the biodiversity and forest ecosystem of the Silent valley.
- D) It had the approval of the Public Investment Board and Planning Commission.

103. Who is primarily responsible for public hearings in the EIA process?

- A) Environmental Appraisal Committee (EAC)
- B) Ministry of Environment and Forest (MoEF)
- C) Central Pollution Control Board (CPCB)
- D) State Pollution Control Boards (SPCBs)

104. According to the U.S. EPA (1972), noise is defined as any sound that is:

- A) Desirable and does not interfere with speech.
- B) Intense enough to damage hearing.
- C) Harmonious and melodic.
- D) Silent and soothing.

105. An ecosystem's biodiversity is defined as the variability among:

- A) Living organisms only on land.
- B) Only plant species.
- C) Living organisms, including terrestrial and aquatic ecosystems.
- D) Only marine organisms.

106. What does air quality directly link with?

- A) Economic growth
- B) Chronic health problems
- C) Project budgeting
- D) Political stability

107. Section 8 of the Environment (Protection) Act, 1986 mandates:

- A) Emission of pollutants.
- B) Compliance with prescribed procedures and safeguards while handling hazardous substances.
- C) Furnishing of information to authorities.
- D) Inspection of industry operations.

108. In which part of the phosphorus cycle can phosphorus be lost for millions of years?

- A) Through assimilation by plants
- B) During decomposition of organisms
- C) When deposited on the seafloor
- D) Through the actions of seabirds

109. Which coal type is known to have the highest heat-producing capacity?

- A) Lignite
- B) Subbituminous coal
- C) Bituminous coal
- D) Anthracite

110. If the Chemical Oxygen Demand (COD) value exceeds 20 mg/L, which other test should also be done?

- A) Pesticides
- B) Biochemical Oxygen Demand (BOD)
- C) TOC
- D) THM

111. What is the primary function of the impeller in a centrifugal pump?

- A) To create a low-pressure zone.
- B) To seal the pump.
- C) To convert velocity to pressure.
- D) To hold the water.

112. Which treatment removes suspended and floating particles such as sand and silt?

- A) Tertiary treatment
- B) Secondary treatment
- C) Primary treatment
- D) Quaternary treatment

113. Which type of wastewater treatment system channels contaminated water through sand beds and plants?

- A) Individual septic systems
- B) Constructed wetlands
- C) Trickling filters
- D) Activated sludge process

(Set - C)

(22)

114. What is the benefit of longer SRTs in the treatment of micropollutants?
- A) Reduced cost
 - B) Quicker processing
 - C) Enhanced degradation
 - D) Increased sludge production

115. In the activated sludge process, filamentous bulking is usually caused by:
- A) Excessive growth of filamentous microorganisms
 - B) High levels of dissolved oxygen
 - C) High nutrient levels
 - D) Absence of chlorine or hydrogen peroxide

116. What is the change of phase from vapor to solid called?
- A) Sublimation
 - B) Frost Formation
 - C) Melting
 - D) Evaporation

117. What is referred to as the triple point of water?
- A) Point where water is only in liquid state.
 - B) Point where water can exist as solid, liquid, and vapor simultaneously.
 - C) Point where water can exist only as vapor.
 - D) Point where water exists only as a solid.

118. Which type of wastewater consists of domestic wastes and significant amounts of industrial wastes?
- A) Domestic wastewater
 - B) Industrial wastewater
 - C) Sanitary wastewater
 - D) Combined wastewater

119. In wastewater treatment, what is the solid organic matter that is recovered from a sewage treatment process and often used as fertilizer?
- A) Effluent
 - B) Grit
 - C) Biosolids
 - D) Scum

120. The term "Septic" in wastewater refers to:
- A) Wastewater that is high in pH.
 - B) Wastewater with no dissolved oxygen and generally with a rotten egg odor.
 - C) Wastewater that is rich in organic content.
 - D) Wastewater that has a high turbidity.