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**BPSC Assistant
Previous Year Paper
Sanitary and Waste
Management Officer 13
Nov 2022 Paper-II**



1. Which one of the following methods can be employed for plastic and rubber waste disposal?

(A) Composting (B) Sanitary landfill (C) Pyrolysis (D) Incineration

2. Which one of the following statements related to C/N (carbon/nitrogen) ratio is **not** correct?

(A) Higher initial C/N ratio leads to cell destruction to obtain nutrition.
 (B) Higher initial C/N ratio leads to lower conservation of nitrogen in the finished composting.
 (C) An initial C/N ratio of 30 to 50 is optimal for composting.
 (D) Lower initial C/N ratio leads to loss of nitrogen and slows down the rate of decomposition.

3. The description of solid waste collected is as follows :

Rubbish—30 t
 Night soil—25 t
 Debris—40 t
 Garbage—40 t

The organic solid in the above composition is

(A) 65 t (B) 70 t (C) 80 t (D) 30 t

4. Which one of the following comprehensive classifications is used for different types of solid waste?

(A) Residential, commercial and treatment plant waste
 (B) Municipal, industrial and hazardous waste
 (C) Rubbish, special waste and waste from open areas
 (D) Food, demolition and construction waste

5. The term 'refuse' generally does **not** include

(A) non-putrescible solid
 (B) ashes
 (C) excreta
 (D) putrescible solid

6. Which of the following materials can be recycled multiple times?

(A) Wood
 (B) Organic materials
 (C) Plastic
 (D) Aluminium

7. _____ is the cutting and tearing of municipal solid waste.

(A) Shredding
 (B) Pulverization
 (C) Composting
 (D) Landfill

8. _____ is the crushing and grinding of municipal solid waste.

- (A) Shredding
- (B) Pulverization
- (C) Composting
- (D) Landfill

9. The WHO has classified the bio-medical waste into _____ categories.

- (A) 4
- (B) 3
- (C) 2
- (D) 5

10. The process of heating a solid waste and splitting its organic substance by thermal cracking and condensation is called _____.

- (A) incineration.
- (B) pulverization
- (C) gasification
- (D) pyrolysis

11. Which of the following correctly describes 'bio-magnification'?

- (A) Observation of micro-organisms under a microscope
- (B) Ability of microorganisms to form zoogelat film
- (C) Concentration of toxic materials in the food chain
- (D) Reproduction of micro-organisms

12. Developing countries have _____ per capita daily solid waste generation rate than/as developed countries.

- (A) lesser
- (B) greater
- (C) same
- (D) None of the above

13. Leftover food items require _____ time to disintegrate.

- (A) 1 month
- (B) 1 year
- (C) 24 hours
- (D) 1 to 2 weeks

14. Standard BOD is measured at

- (A) 25 °C-3 days
- (B) 20 °C-5 days
- (C) 30 °C-5 days
- (D) 20 °C-1 day

15. The correct relation among theoretical oxygen demand (TOD), biochemical oxygen demand (BOD) and chemical oxygen demand (COD) is given by

- (A) TOD>COD>BOD
- (B) BOD>COD>TOD
- (C) COD>BOD>TOD
- (D) TOD>BOD>COD

16. A septic tank is a/an

- (A) digestion tank
- (B) aeration tank
- (C) combination of sedimentation and digestion tanks

(D) sedimentation tank

17. Sludge volume index is defined as the ratio of

- (A) percentage of sludge by volume to percentage of total solids by weight
- (B) percentage of suspended solids by weight to percentage of sludge by volume
- (C) percentage of total solids by weight to percentage of sludge by volume
- (D) percentage of sludge by volume to percentage of suspended solids by weight

18. The gas from sludge digestion tank is mainly composed of

- (A) carbon dioxide
- (B) hydrogen sulphide
- (C) methane
- (D) nitrogen

19. Industrial wastewater enters a stream having BOD concentration of 10 mg/L and flow of $20 \text{ m}^3/\text{s}$. If the flow of wastewater is $1.5 \text{ m}^3/\text{s}$ and its BOD concentration is 250 mg/L, then the BOD concentration in the stream at a point downstream of the point of confluence of wastewater with the stream will be

- (A) 12.09 mg/L
- (B) 13.00 mg/L
- (C) 26.74 mg/L
- (D) 2.67 mg/L

20. Most of the bacteria in sewage are

- (A) saprophytic
- (B) pathogenic
- (C) anaerobic
- (D) parasitic

21. The compounds which cannot be degraded during conventional biological treatment are known as

- (A) retro-factories
- (B) heterogeneous
- (C) halogens
- (D) refractories

22. The purpose of screening sewage is

- (A) to remove the floating solids
- (B) to remove the solids from the sewage which will form ugly sludge banks at the site of disposal
- (C) to remove solids which will clog the trickling filters
- (D) All of the above

23. Before discharging the foul sewage in the rivers, it is generally treated by

- (A) screen chamber and grit removal tank
- (B) primary sedimentation tank
- (C) activated sludge process followed by disinfection
- (D) All of the above

24. The wastewater from bathrooms, kitchens, washing places and washbasins is known as

- (A) sullage
- (B) rubbish
- (C) refuse
- (D) None of the above

25. ASP is a/an _____ treatment.

- (A) anaerobic
- (B) aerobic
- (C) facultative
- (D) None of the above

26. Medium bar screens have clear openings of _____ mm.

- (A) 20 to 50
- (B) 50 to 75
- (C) 75 to 100
- (D) 10 to 20

27. Pick out the odd one.

- (A) Grit chamber
- (B) PST
- (C) Septic tank
- (D) Screen chamber

28. Detention period varies from _____ sec in grit chambers.

- (A) 45 to 90
- (B) 100 to 150
- (C) 10 to 45
- (D) None of the above

29. The influent BOD_5 of a low-rate trickling filter is 300 mg/L and effluent BOD_5 is 30 mg/L. The efficiency of the trickling filter is equal to

- (A) 50%
- (B) 0-9%
- (C) 90%
- (D) 80%

30. In ASP, contact stabilization is also known as

- (A) adsorption
- (B) absorption
- (C) chemisorption
- (D) biosorption

31. Bacteria-algal symbiosis is observed in

- (A) ASP
- (B) trickling filter
- (C) oxidation pond
- (D) None of the above

32. Oxidation ditch is essentially _____ process.

- (A) trickling filter
- (B) RBC
- (C) UASB
- (D) extended aeration

33. DO deficit = DO_{sat} - _____.

- (A) Initial DO
- (B) Final DO
- (C) Actual DO
- (D) None of the above

34. A reactor in which the randomly packed solid medium provides the surface area for biofilm growth is

- (A) a bio-tower
- (B) a trickling filter
- (C) an anaerobic sewage lagoon
- (D) an oxidation pond

35. Composting and lagooning are the methods of

- (A) sedimentation
- (B) sludge digestion
- (C) sewage disposal
- (D) filtration

36. The CETP treating sewage jointly with industrial waste is known as

- (A) combined CETP
- (B) homogeneous CETP
- (C) heterogeneous CETP
- (D) complex CETP

37. When the recirculation ratio in a high-rate trickling filter is unity, then the recirculation factor is

- (A) more than 1
- (B) less than 1
- (C) zero
- (D) 1

38. Which one of the following pairs is not correctly matched?

(A) Nitrate —Methemoglobinemia ✓

(B) Methane—Product of anaerobic decomposition

(C) COD—Biodegradability of wastewater

(D) BOD—Strength of sewage

39. _____ is a process which involves further removal of the nitrogen.

(A) Denitrification ✓

(B) Ammonification

(C) Reduction

(D) Nitrification

40. In rotating biological contractors, what percent of corrugated plastic discs are submerged?

(A) 40

(B) 80

(C) 100

(D) 20

41. What percentage of solids does wastewater contain?

(A) 1%

(B) 0.5%

(C) 5%

(D) 0.1%

42. What is/are the product gas/gases released at the end of the UASB process?

(A) Carbon dioxide only ✓

(B) Oxygen and carbon dioxide

(C) Methane and carbon dioxide ✓

(D) Methane only ✓

43. In which stage of the SBR is aeration performed?

(A) Second

(B) Third

(C) Fourth

(D) First

44. Which of the following is not correct with respect to MBBR?

(A) Expandable ✓

(B) Multiple-pass process ✓

(C) Load responsive ✓

(D) Compact design ✓

45. The ions are desorbed after _____ by the biofilm in MBBR.

(A) denitrified

(B) adsorbed

(C) absorbed

(D) nitrified

46. MBBR was developed based on the activated sludge process and
 (A) clarifier process
 (B) aeration process
 (C) biofilter process
 (D) sedimentation process

47. When was the Water (Prevention and Control of Pollution) Act enacted by the Indian Parliament?
 (A) 1974
 (B) 1980
 (C) 1986
 (D) 1970

48. The following three stages are known to occur in the biological action involved in the process of sludge digestion :
 1. Acid fermentation
 2. Alkaline fermentation
 3. Acid regression
 The correct sequence of these stages is
 (A) 2, 3, 1
 (B) 3, 1, 2
 (C) 1, 3, 2
 (D) 1, 2, 3

49. Which one of the following pairs is **not** correctly matched?
 (A) Trickling filter—Attached growth process
 (B) Oxidation ditch—Algae
 (C) Channel grit chamber—Proportional weir
 (D) Activated sludge—Aeration

50. 'Sewage sickness' is a term used for
 (A) a treatment plant which does not function properly
 (B) a stream where the flora and fauna die due to sewage flow
 (C) the condition of land where sewage is applied continuously for a long period
 (D) persons who become sick after drinking polluted water

51. In a high-rate trickling filter, the problem of ponding can be solved by
 (A) chlorination and air supply
 (B) raking and chlorination
 (C) flooding and air supply
 (D) flooding and raking

52. Hazard identification mainly focuses on
 (A) chemical exposure
 (B) chemical analysis
 (C) chemical pathway
 (D) chemical source and concentration

53. The different ways a person can come into contact with hazardous chemicals are called
 (A) toxic pathways
 (B) exposure pathways
 (C) hazard pathways
 (D) chemical pathways

54. When was the Hazardous Waste Management Act enacted in India?

- (A) 1989
- (B) 1990
- (C) 1991
- (D) 1988

55. Which of the following data is not required for hazard identification?

- (A) Contaminant level
- (B) Estimation of risk
- (C) Affected population
- (D) Land use

56. What is the main purpose of hazard identification?

- (A) For better risk management
- (B) To characterize adverse effect of toxins
- (C) To reduce probability of occurrence
- (D) To minimize the effect of a consequence

57. Which of the following techniques can be implemented to reduce hazardous waste?

- (A) Transportation
- (B) Transboundary movement
- (C) Chemical exchange
- (D) Analysis

58. The process used to destroy toxicity of waste by changing oxidation state is

- (A) oxidation process
- (B) waste analysis
- (C) chemical analysis
- (D) reduction process

59. Electroplating wastes can be treated from _____ process.

- (A) neutralization
- (B) chemical precipitation
- (C) oxidation and reduction
- (D) hydrolysis

60. Which among the following is the commonest waste treated by reduction?

- (A) Lead
- (B) Mercury
- (C) Sodium hypochlorite
- (D) Chromate

61. Which treatment is better suitable for remediation of contaminated hazardous waste site?

- (A) Neutralization
- (B) Chemical precipitation
- (C) Stabilization and solidification
- (D) Hydrolysis

62. Stabilization refers to changes in the _____ properties of hazardous waste.

- (A) chemical $\xrightarrow{\text{Toxic}} \xrightarrow{\text{Non-toxic}}$
- (B) biological
- (C) physico-chemical
- (D) physical

63. The end product resulting from solidification process is

- (A) silt
- (B) waste block
- (C) organic
- (D) liquid waste

64. Precipitation by _____ is widely used method for treating hazardous waste.

- (A) sodium hydroxide
- (B) potassium hydroxide
- (C) lead oxide
- (D) calcium hydroxide

65. _____ of hazardous waste plays a major role in designing combustion unit.

- (A) Chemical value
- (B) Calorific value
- (C) Fuel value
- (D) Energy value

66. Neutralization process is extensively applied for _____ hazardous waste.

- (A) neutral
- (B) corrosive
- (C) chemical
- (D) reactive

67. What is the main objective of risk assessment?

- (A) Remediation of contaminated sites
- (B) Hazard management
- (C) To know source of pollutants
- (D) To evaluate hazard and minimize the risks

68. For a selected hazardous landfill site if water table is within 2.0 m to 6.0 m, which of the following liners is opted?

- (A) Double-liner
- (B) Triple-liner
- (C) Multi-liner
- (D) Single-liner

69. The residues produced from evaporation treatment are

- (A) more
- (B) undetermined
- (C) No residue
- (D) less

70. Evaporation units may be operated without obtaining a permit if

- (A) resins are associated
- (B) unit is enclosed
- (C) waste is reused
- (D) chemicals are used

71. Under the ~~Solid Waste Management Rules, 2016~~, 'bulk waste generator' does ~~not~~ include

- (A) universities
- (B) housing societies
- (C) places of worship
- (D) hospitals

72. What is the full form of MRF?

- (A) Material Recycling Facility
- (B) Material Redevelopment Facility
- (C) Material Recycling Factory
- (D) Materials Recovery Facility

73. Separating various components and categories of recyclables such as paper, plastic, cardboards, metal, etc., from mixed waste as may be appropriate to facilitate recycling is called

- (A) stabilizing
- (B) segregation
- (C) recycling
- (D) sorting

74. The State Level Advisory Body shall meet at least once in

- (A) three months
- (B) four months
- (C) six months
- (D) two months

75. The Ministry of Environment, Forest and Climate Change constitutes ~~a committee~~ namely

- (A) Central Monitoring Committee
- (B) Metropolitan Area Planning Committee
- (C) Metropolitan and District Planning Committee
- (D) Pollution Control Committee

76. Under the Plastic Waste Management Rules, 2016, no person shall ~~manufacture~~ plastic carry bags, multi-layered plastic pouch without ~~obtaining~~ registration certificate from the

- (A) District Industries Centre
- (B) State Pollution Control Board
- (C) Municipal Authority concerned
- (D) State Level Advisory Body

77. Which of the following forms is prescribed for application for registration of units engaged in processing or recycling of plastic waste under the Plastic Waste Management Rules, 2016?

- (A) Form II
- (B) Form III
- (C) Form IV
- (D) Form I

78. The E-Waste (Management) Rules, 2016 came into force from the

- (A) 1st day of January, 2017
- (B) 1st day of December, 2016
- (C) 1st day of October, 2016
- (D) 1st day of February, 2017

79. Under the E-Waste (Management) Rules, 2016, the Extended Producer Responsibility Authorization shall be valid for a period of

- (A) four years
- (B) five years
- (C) six years
- (D) three years

80. Under the Bio-Medical Waste Management Rules, 2016, any person aggrieved by an order made by the prescribed authority may prefer an appeal to the

- (A) Secretary (Environment) of the State Government or Union Territory
- (B) High Court
- (C) Supreme Court
- (D) Central Pollution Control Board

81. Under Rule 14 of the Bio-Medical Waste Management Rules, 2016, every authorized person shall maintain records for a period of

- (A) five years
- (B) six years
- (C) eight years
- (D) three years

82. According to Rule 7.3 of the Guidelines on Implementation of E-Waste (Management) Rules, 2016, what is the minimum area required for a recycler of capacity of 1 ton per day?

- (A) 600 square metres
- (B) 750 square metres
- (C) 1000 square metres
- (D) 500 square metres

83. Under the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016, the occupiers of facilities may store the hazardous and other wastes for a period not exceeding

- (A) forty-five days
- (B) sixty days
- (C) ninety days
- (D) thirty days

84. Under the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016, every appeal filed to Appellate Authority shall be disposed of within a period of

- (A) seventy-five days
- (B) ninety days
- (C) one hundred and twenty days
- (D) sixty days

85. Rule 6 of the Solid Waste Management Rules, 2016 deals with

- (A) duties of the Ministry of Environment, Forest and Climate Change
- (B) duties of the Ministry of Urban Development
- (C) duties of the Department of Fertilizers, the Ministry of Chemicals and Fertilizers
- (D) duties of waste generators

86. All decisions of the State Level Environment Impact Assessment Authority shall ordinarily be taken

- (A) by three-fourths majority
- (B) by simple majority
- (C) unanimously
- (D) by two-thirds majority

87. Under the Environment Impact Assessment Notification, 2006, the Expert Appraisal Committee shall meet at least once in

- (A) three months
- (B) two months
- (C) every month
- (D) four months

88. Under the Environment Impact Assessment Notification, 2006, the Expert Appraisal Committee shall be reconstituted after every

- (A) three years
- (B) four years
- (C) five years
- (D) two years

89. Which of the following projects or activities is not required to undertake public consultation?

- (A) Mining of minerals
- (B) Thermal power plants
- (C) Nuclear power projects and processing of nuclear fuel
- (D) Modernization of irrigation projects

90. The Environment Impact Assessment Notification, 2006 Form A-1 is only for

- (A) manufacturing/fabrication
- (B) construction projects
- (C) materials processing
- (D) physical infrastructure including environmental services

91. It is mandatory to submit half-yearly compliance reports in respect of the stipulated prior environmental clearance terms and conditions to the regulatory authority, on

- (A) 1st June and 1st December of each calendar year
- (B) 31st March and 30th September of each calendar year
- (C) 30th June and 31st December of each calendar year
- (D) 1st March and 1st September of each calendar year

92. All such compliance reports submitted to the regulatory authority by the project management

- (A) shall be confidential documents and cannot be displayed on the Web site
- (B) shall be public documents and not necessary to display on the Web site
- (C) shall be private documents
- (D) shall be public documents and shall be displayed on the Web site

93. A prior environmental clearance granted for a specific project or activity to an applicant may be transferred during its validity to another legal person entitled to undertake the project or activity on application

- (A) by the transferee with the permission of the Ministry of Environment and Forests
- (B) by the transferor or transferee with a written 'no objection' by the transferor
- (C) by the transferor only with the permission of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned
- (D) by the transferor only

94. Which appendix of the Environment Impact Assessment Notification, 2006 deals with the procedure for conduct of public hearing?

- (A) Appendix II
- (B) Appendix III
- (C) Appendix IV
- (D) Appendix I

95. The Chairman of State Level Environment Impact Assessment Authority shall have a fixed term of

- (A) two years
- (B) three years
- (C) five years
- (D) one year

96. The term ISWM refers to
(A) Integrated Solid Waste Management
(B) Integrated Solid Waste Machine
(C) International Solid Waste Mechanism
(D) International Solid Waste Management

97. Under which rule of the Government, the guidelines for solid waste management are followed today?
(A) The Municipal Solid Wastes (Management and Handling) Rules, 2016
(B) The Solid Waste Management Rules, 2000
(C) The Solid Waste Management Rules, 2016
(D) The Municipal Solid Wastes (Management and Handling) Rules, 2000

98. Which of the following is not the landfilling method?
(A) Area method
(B) Depression method
(C) Trench method
(D) Bangalore method

99. _____ is a liquid that passes through solid waste and extracts suspended impurities from it.
(A) Sludge
(B) Distilled water
(C) Municipal waste
(D) Leachate

100. Which of the following is not the municipal solid waste?
(A) Ash
(B) Radioactive substance
(C) Rubbish
(D) Food waste

101. In which method of composting, decomposition of anaerobic waste takes place?
(A) Depression method
(B) Trench method
(C) Bangalore method
(D) Indian method

102. Why is burning waste not an acceptable practice of solid waste management?
(A) Because it requires modern technologies
(B) Because it causes several environmental issues
(C) Because it requires lot of space
(D) Because it is very costly

103. What is called for the process of burning municipal solid waste in a properly designed furnace under suitable temperature and operating conditions?
(A) Recycling
(B) Vermicomposting
(C) Incineration
(D) Landfill

104. The term 'municipal solid waste' is used to describe which kind of solid waste?

- (A) Toxic
- (B) Non-hazardous
- (C) Non-toxic
- (D) Hazardous

105. Which of the following methods cannot be used for waste disposal?

- (A) Gasification
- (B) Incineration
- (C) Open sea disposal
- (D) Dumping

106. Which of the following temperatures is optimum for incinerators?

- (A) 100 °C-110 °C
- (B) 90 °C-110 °C
- (C) 100 °C-11000 °C
- (D) 900 °C-1100 °C

107. Which of the following is not an idea behind solid waste management?

- (A) Stop waste generation
- (B) Disposal
- (C) Control of waste generation
- (D) Storage and collection

108. In terms of hierarchy, what is the order of the three R's?

- (A) Reuse, Recycle, Reduce
- (B) Reuse, Reduce, Recycle
- (C) Recycle, Reduce, Reuse
- (D) Reduce, Reuse, Recycle

109. Transfer stations are designed to

- (A) minimize haul distance
- (B) minimize cost
- (C) minimize time
- (D) None of the above

110. The point where the plots of direct haul and transfer operation costs intersect is called

- (A) zero point
- (B) direct haul point
- (C) feasibility point
- (D) break-even point

111. Which of the following vehicles is generally used as transfer vehicle for solid waste?

- (A) Truck
- (B) Trailer
- (C) Railcar
- (D) All of the above

112. Curbside pick-up facility is provided for

(A) medium-rise apartments
 (B) high-rise apartments
 (C) institutional buildings
 (D) single residences

113. What is the purpose of transfer station?

(A) To minimize costs when waste is hauled long distances
(B) To transform the waste into useful energy
(C) To measure waste amount
 (D) All of the above

114. What is the most expensive component of solid waste handling?

(A) Collection
(B) Treatment
(C) Separation
(D) Storage

115. When the organic matter present in the sanitary landfill decomposes, it generates

(A) methane
(B) nitrogen
(C) hydrogen
 (D) All of the above

116. Non-disposal of solid waste may cause the spread of

(A) rodents-related plague
(B) typhoid
(C) dysentery
(D) malaria

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

1. Lime
2. Sand
3. Bentonite
4. Fly ash
5. Butyl rubber

Select the correct answer using the codes given below.

(A) 4 and 5
 (B) 3 and 5
(C) 1, 2 and 4
(D) 1, 2 and 3

118. Aerobic method of composting practised in India is called

(A) Nagpur method
(B) Delhi method
 (C) Indore method
(D) Bangalore method

119. Which one of the following statements explains the term 'pyrolysis'?

(A) Solid waste is heated in closed containers in oxygen-free atmosphere.

(B) Solid waste is incinerated in the presence of oxygen.

(C) Wastewater is treated with oxygen.

(D) None of the above

120. The daily cover of MSW landfills consists of which one of the following?

(A) Compacted soil

(B) Geocomposite

(C) Geomembrane

(D) Geotextile

121. Expand RCRA.

(A) Recovery Conservation and Resource Act

(B) Resource Conservation and Reduction Act

(C) Resource Conservation and Recycling Act

(D) Resource Conservation and Recovery Act

122. Which of the following is needed to be considered for the design of waste collection systems?

(A) Determining number of vehicles

(B) Determining vehicles time on the route

(C) Routing

(D) All of the above

123. While designing the pick-up route for Indian cities, which of the following points is not valid?

(A) Volume per truck

(B) Right turns are preferred

(C) No U turns

(D) Loading time

124. The quantity of waste generated is estimated using which of the following methods?

(A) Load-count analysis

(B) Material balance

(C) Weight-volume analysis

(D) All of the above

125. The typical density in kg/cu m (in situ) of well-compacted municipal solid waste in landfill is in the range of MSW

(A) 310-500

(B) 550-850

(C) 900-1100

(D) 100-300