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Department of Microbiology

Question Bank

Paper XV: Environmental Microbiology

Q.1 Rewrite the sentences by selecting correct alternatives: 8 Marks

1. ----- is used as an oxidizing agent in COD determination.
a) $K_2Cr_2O_7$ b) $MnSO_4$
c) $CaSO_4$ d) KH_2PO_4
2. ----- is a measure of combined content of all inorganic and organic matter in wastewater.
a) Total solids b) Total dissolved solids
c) Total volatile solids d) Total suspended solids
3. When the wastewater is evaporated, then the solids remaining are called as -----
a) volatile solids b) fixed solids
c) total solids d) organic solids
4. As per standards prescribed by MPCB, the treated wastewater intended to discharge into inland surface water should have BOD less than -----mg/l.
a) 15 b) 30
c) 45 d) 60
5. As per standards prescribed by MPCB, the treated wastewater intended to discharge into inland surface water should have COD less than -----mg/l.
a) 150 b) 250
c) 350 d) 450
6. -----occurs when sewage is discharged into the water.
a) Eutrophication b) Biosparging
c) Increase in oxygen d) bioremediation
7. ----- is used to treat sewage on small scale.

a) Activated sludge b) Septic tank

c) Disinfection d) Trickling filter

8. ----- treatment removes suspended and dissolved biological matter.

a) Primary b) Secondary

c) Tertiary d) Quaternary

9. Trickling filter contains the thin film of organisms developed over inert material, which is called as -----.

a) paragleal b) phytogleal

c) zoogleal d) mesogleal

10. In anaerobic digestion treatment method, ----- gas is produced.

a) NO₂ b) CO₂

c) SO₂ d) CH₄

11. In ----- lakes quantity of nutrients is very low.

a) hypereutrophic b) eutrophic

c) mesotrophic d) oligotrophic

12. The value of Secchi depth (metres) is usually low in case of ----- lakes.

a) Oligotrophic b) mesotrophic

c) Eutrophic d) both oligo and mesotrophic

13. In eutrophication, ----- gas is produced from rotting algae and has foul smell.

a) NO₂ b) CO₂

c) SO₂ d) H₂S

14. The value of Secchi depth (metres) is usually high in case of ----- lakes.

a) oligotrophic b) mesotrophic

c) eutrophic d) both oligo and mesotrophic

15. Eutrophic lake is having ----- level of nutrients.

a) low b) moderate

c) high d) intermediate

16. An oligotrophic lake is having ----- primary productivity.

a) low b) moderate

c) high d) very high

17. The size of HEPA filters which are used in cleanrooms is ----- micrometer.
- a) 30 b) 3
c) 0.3 d) 0.03
18. The environmental conditions in clean rooms are defined in terms of the -----.
- a) stagnant b) occupancy
c) moderate d) low
19. ----- is an apparatus at a container designed to accommodate a petridish containing a nutrient agar.
- a) Surface air system sampler b) Sieve sampler
c) Centrifugal sampler d) Slit to agar sampler
20. ----- applied clean room concept in pharmaceutical industries.
- a) Pasteur b) Lister
c) Eli Lilly d) Tyndall
21. The number of bacteria living on a surface that has not been sterilized is called as -----
- a) biomass b) bioburden
c) bioaccumulation d) biomagnification
22. ----- is the waste generated by distillery industry.
- a) Spent wash b) Bagasse
c) Molasses d) Pressmud
23. The aerobic biological method used in wastewater treatment is -----
- a) Septic tank b) Anaerobic digestion
c) Trickling filter d) All of these
24. The anaerobic biological method used in wastewater treatment is -----
- a) Septic tank b) Activated sludge process
c) Trickling filter d) All of these
25. In wastewater treatment, skimmers are used to remove -----from wastewater.
- a) grit b) oil and grease
c) dissolved solids d) colloidal solids
26. Combustible waste constitutes ----- % of total hospital wastes.
- a) 9.2 b) 92

c) 2.9 d) 29

27. Hospital waste treatment starts from ----- of waste.

a) collection b) segregation

c) classification d) transportation

28. In hospital waste, human anatomical waste is categorized as category number ----

a) 1 b) 2

c) 3 d) 4

29. During the treatment of distillery waste with anaerobic lagoon, production of soluble sulphides is prevented by the addition of ----- salts in waste.

a) Sulphate b) phosphate

c) carbonate d) iron

30. Biodegradable organic matter in sewage is measured by ----- test.

a) MPN b) Flask

c) BOD d) COD

31. ----- species is used in copper bioleaching.

a) Bacillus b) Pseudomonas

c) Thiobacillus d) Lactobacillus

32. -----method is used in copper bioleaching.

a) Direct b) Indirect

c) Direct and indirect d) only in situ

33. The representative microflora isolated from controlled environment of ATCC strain preparations of these isolates may also be used to test media in ----- promotion test.

a) growth b) death

c) survival d) UV survival

34. Phytoremediation involves the use of ----- for removal of pollutants from the environment.

a) bacteria b) plant

c) protozoa d) fungi

35. The example of ex situ bioremediation is ----

a) Biosparging b) Bioslurping

c) Biopiling d) Bioventing

36. In wastewater treatment, primary treatment methods refers to -----

- a) Physical unit operations
- b) chemical and biological unit processes
- c) physical and biological unit processes
- d) physico-chemical and biological processes

37. Huge amount of sludge is generated when the wastewater is treated by -----biological methods.

- a) aerobic b) anaerobic
- c) facultative d) both facultative aerobic and anaerobic

38. The bioremediation techniques applied to excavated materials is called as ----- bioremediation.

- a) in situ b) ex situ
- c) artificial d) both in situ and artificial

39. Root zone technology, a method of wastewater treatment contain -----zones where biodegradation occurs.

- a) aerobic b) anoxic
- c) anaerobic d) aerobic, anoxic and anaerobic

40. The process of assessing the possible effects of a proposed project on environment is called as -----.

- a) EPA b) EBA
- c) EIA d) EDA

Q.2 Attempt any two (Long answer questions). 16 Marks

1. Describe in detail characteristics and treatment of waste generated by dairy industry.

2. Describe in detail characteristics and treatment of waste generated by sugar industry.

3. Describe in detail characteristics and treatment of waste generated by distillery industry.

4. Describe in detail characteristics and treatment of hospital waste.

5. Discuss bioremediation process with respect to its types and applications.
6. Define sewage and discuss any two aerobic sewage treatment methods.
7. Define sewage and discuss any two anaerobic sewage treatment methods.
8. Discuss in detail Biosafety levels and good laboratory practices.
9. Define bioleaching and explain microbiology and chemistry of bioleaching.
10. Describe physical, chemical and biological characteristics of sewage.
11. Describe routine environmental monitoring programme in pharmaceutical industry with reference to air monitoring.
12. What is cleanroom? Describe cleanroom classification in detail.
13. Define bioleaching and discuss bioleaching of copper.
14. What is eutrophication? Explain eutrophication with reference to sources, effects and its control.
15. Define bioleaching and discuss bioleaching of uranium.

Q. 3 Write short notes (Any Four) 16 Marks

1. Environmental impact assessment
2. Bioburden test
3. Microbial control in clean room
4. Classification of lakes
5. Chemical oxygen demand
6. Biological oxygen demand
7. Container colour codes used in hospitals
8. Root zone technology
9. Airlift percolator
10. Microbiology of bioleaching process
11. Septic tank
12. Chlorination
13. Activated sludge treatment process
14. Anaerobic digestion
15. Trickling filter
16. Classification of hospital waste
Chemistry of bioleaching.

17. Good laboratory practices
18. Process of eutrophication
19. Bioleaching of Uranium
20. Applications of bioremediation
21. Biological safety in laboratory
22. General characteristics of solid waste
23. Total solid content of wastewater
24. Oxidation ponds
25. Clean room classification
26. Prevention and control of eutrophication
27. In situ leaching technique
28. Preliminary treatment methods used in wastewater treatment
29. Sewage microflora
30. Types of bioremediation