

Exam.Code:0911
Sub. Code: 6721

1078
B.E. (Biotechnology)
Seventh Semester
BIO-701: Environmental Biotechnology

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1. Write briefly:

(1×10 = 10)

- a) Which salts causes permanent hardness of water?
- b) What are the limitations of BOD test?
- c) What is F/M ratio in activated sludge process?
- d) What are the stages of conventional waste water treatment?
- e) What is TDS of water?
- f) What is head loss in screen chamber?
- g) What is proportional weir?
- h) What is MEOR?
- i) Which bacteria help in desulfurization of coal?
- j) Define Stoke's law.

SECTION-A

2. A) Discuss the following:

(a) Why is it necessary to provide the grit chamber in sewage treatment plant? (b) Give a longitudinal section and cross-section of a grit chamber.

B) Design a grit chamber for a population of 50000 people with water consumption of 135 LPCD. Consider sewage generation is 80% of the water supply. Consider the peak factor as 2.5, horizontal flow velocity as 0.2 meter/sec. Detention time is 1 minute. Consider width of the chamber as 1 meter. Provide 25% more to overcome turbulence, 0.3 meter free board and 0.25 meter for grit accumulation (5, 5)

3. A) A bar screen chamber is asked to design for average sewage flow of 30 MLD, minimum sewage flow of 15 MLD and maximum flow of 40 MLD. Assume manual cleaning and angle of inclination of bars with horizontal as 30° . Assume size of bars 9 mm x 50 mm, 9 mm facing the flow. A clear spacing of 30 mm between the bars is provided. Assume velocity of flow normal to screen as 0.3 m/sec at average flow. Assume velocity of flow normal to the screen as 0.75 m/sec at maximum flow.

B) Compare between activated sludge process and trickling bed filter.

(5, 5)

4. A) Discuss about different applications of anaerobic treatment processes.
B) Determine the (i) size and dimensions of the UASB reactor and (ii) detention time. The following design criterias are given: Flow rate (Q) = 2000 m³/day, COD (Influent) S_o = 3200 g/m³, Average organic loading = 15 kg COD/m³.d, Reactor volume effectiveness factor = 90%, Wastewater upflow velocity = 1.5 m/h. (5, 5)

SECTION-B

5. A) What are the unit operations and processes are included during sludge treatment?
B) What are available methods for handling and disposal of hazardous wastes? (5, 5)
6. A) What are the mechanisms of microbial enhanced oil recovery?
B) Discuss about biodegradation of environment pollutants with specific example. (5, 5)
7. Write short notes on,
i) Biodischarge of gold and uranium
ii) Biogas production. (5, 5)

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