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202CV003

Ph.D./M.S. (Engg.) by Research Degree Examination, Aug./Sep. 2023
Water Pollution and Treatment Technology

Time: 3 hrs. Max. Marks: 100

Note : 1. ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***Missing data may be assumed suitably.***

Module-1

1 a. Define Water Pollution. Briefly discuss the sources and control methods of Water Pollution. **(10 Marks)**

b. Discuss Importance of Bacteriological examination. Explain determination of E – Coli using MPN equation. **(10 Marks)**

OR

2 a. What are the objectives of treating water? Explain Point and non – point sources of water pollution. **(10 Marks)**

b. Enumerate the Important characteristics of Water. **(10 Marks)**

Module-2

3 a. With neat sketch, explain the flow diagram of water supply project and highlight the importance of each unit operation. **(10 Marks)**

b. What are the design consideration used while design of Sedimentation tank. **(10 Marks)**

OR

4 a. What is Aeration? Write the importance and limitation of aeration. **(10 Marks)**

b. What are Intake structures? Discuss the various types of Intake structure. **(10 Marks)**

Module-3

5 a. Discuss the various types of coagulant used in water treatment with merits and demerits. **(10 Marks)**

b. What is meant by Coagulation? With neat sketch, discuss various types of coagulant feeding devices. **(10 Marks)**

OR

6 a. With neat sketch, explain Jar test for determining Optimum dosage of coagulant. **(10 Marks)**

b. The coagulation – Sedimentation plant clarifies 50MLD. The water has an alkalinity equivalent of 4mg/ℓ as $CaCO_3$. The filter alum required at the plant is 20mg/ℓ. Determine the filter alum and quick lime (88% CaO) required per year by the plant. (Aℓ = 27) S = 32 , O = 16 , H = 1 , Ca = 40 , C = 12 Molecular wt. **(10 Marks)**

Module-4

7 a. Explain basic principles and theory of Filtration. **(10 Marks)**

b. With neat sketch, explain Rapid sand filter. **(10 Marks)**

OR

8 a. Discuss the various operational problems in Slow and Sand filter and Rapid Sand filter. **(10 Marks)**

b. Design a rapid sand gravity filter to treat 30MLD of water. Assume 1 hour required for back washing and 2% allowance given for wash water. **(10 Marks)**

Module-5

9 a. Explain different forms of Chlorination. **(10 Marks)**

b. Briefly highlight the importance of Flouride in water. Discuss Fluoridation and Defluoridation techniques. **(10 Marks)**

OR

10 a. Discuss the effects of hardness in water. Explain Zeolite process with their advantages. **(10 Marks)**

b. Calculate the quantity of bleaching powder required per day for disinfection 4 million lit/day. The dose of chlorine has to be 0.5 PPm and the bleaching powder contains 30% of available chlorine. **(05 Marks)**

c. With neat sketch, explain Break point chlorination. **(05 Marks)**

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