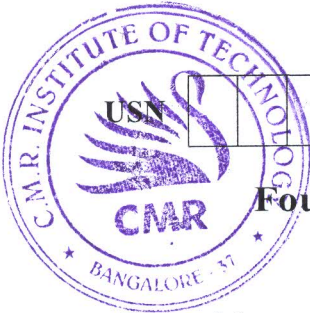


CBCS SCHEME

21CV43



Fourth Semester B.E. Degree Examination, June/July 2023 Public Health Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Briefly explain various type of water demand. (10 Marks)
- b. Explain the factor affecting the design period. (05 Marks)
- c. Explain the method of sampling of water. (05 Marks)

OR

- 2 a. Discuss the importance of physical, chemical and biological characteristics of water. (08 Marks)
- b. Explain Titrimetric method of determining Alkalinity of given water ample. (08 Marks)
- c. Discuss the factor effecting the rate of water demand. (04 Marks)

Module-2

- 3 a. Draw a flow chart of conventional water treatment plant and indicate various units. (05 Marks)
- b. Design a rectangular sedimentation tank to treat 2.4 million liters of raw water per day. The detention period may be assumed to be 3 hours. (05 Marks)
- c. Briefly explain theory of filtration. (05 Marks)
- d. Explain the limitation of aeration process. (05 Marks)

OR

- 4 a. Design six sand filter beds from the following data :
Population to be served = 50,000
Persons per capita demand = 150 liters/head/day
Rate of filtration = 180 liters/hr/SQ.M
Length of each Bed = twice the breadth.
Assume Max. Demand as 1.8 times the average daily demand. Also assume that one unit, out of six, will be kept as stand by. (08 Marks)
- b. Briefly explain, how you will determine the optimum coagulant quantity by jar test. (08 Marks)
- c. Briefly explain theory of sedimentation. (04 Marks)

Module-3

- 5 a. With the help of chemical formula explain Zeolite process of removing hardness. (05 Marks)
- b. Explain break point chlorination. (05 Marks)
- c. Briefly explain types of sewerage system. (05 Marks)
- d. The 5 day 30°C BOD of sewage sample is 110MG/L. Calculate its 5 days 20°C BOD. Assume the deoxygenation constant at 20°C, K_{20} AS 0.1. (05 Marks)

OR

- 6 a. Explain theory of chlorination of water with chemical equation. (05 Marks)
- b. With the help of chemical formula explain Lime-SODA process of removing hardness. (05 Marks)
- c. A city discharges 1500 liters per second of sewage into a stream whose minimum rate of flow is 6000 liters per second. The temperature of sewage as well as water is 20°C. The 5 day BOD AT 20°C for sewage is 200MG/L and that of river water is 1MG/L. The D.O. content of sewage is 2 ERO and that of stream is 90% of the saturation D.O. If the minimum D.O to be maintained in the stream is 4.5MG/L. Find out the degree of sewage treatment required. Assume the de-oxygenation coefficient as 0.1 and de-oxygenation coefficients as 0.3. [Assume saturation D.O AT 20°C is 9.17 mg/ℓ]. (10 Marks)

Module-4

- 7 a. With neat flow diagram, explain unit operation and process of municipal waste water treatment. (06 Marks)
- b. Discuss briefly with neat sketch grit chamber and oil and grease removal tank. (08 Marks)
- c. With a neat diagram, explain activated sludge process. (06 Marks)

OR

- 8 a. With a neat sketch explain the working of Manhole and CATCH basin. (10 Marks)
- b. Explain the importance of screens and types of screens in the sewage treatment process. (10 Marks)

Module-5

- 9 a. With a neat sketch explain construction and operation of trickling filters. (08 Marks)
- b. With a neat sketch explain oxidation pond. (07 Marks)
- c. Briefly explain stages in the sludge digestion process. (05 Marks)

OR

- 10 a. Design suitable dimensions of a circular trickling filter units for treating 5 million liters of sewage per day. The BOD of the sewage is 150 MG/L. (08 Marks)
- b. Briefly explain factors affecting sludge digestion and their control. (08 Marks)
- c. Explain the advantages of two stage digestion. (04 Marks)
