

Basavarajeswari Group of Institutions
BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT
 (Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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Fourth Semester B.E. Degree Examinations, September/October 2024

PUBLIC HEALTH ENGINEERING

Duration: 3 hrs

Max. Marks: 100

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

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>												
<u>MODULE – 1</u>															
1.	a. List all the types of water demands and explain any two water demands.	10	(2 : 1 : 1.3.1)												
	b. List and explain the factors affecting the per capita demand.	10	(2 : 1 : 1.3.1)												
OR															
2.	a. In a town it has been decided to provide 200 Lpcd of water. Estimate the domestic water requirement of the town in the year 2040 by Incremental increase method with the following data.	10	(2 : 1 : 1.4.1)												
	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Year</th> <th style="padding: 5px;">1980</th> <th style="padding: 5px;">1990</th> <th style="padding: 5px;">2000</th> <th style="padding: 5px;">2010</th> <th style="padding: 5px;">2020</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Population</td> <td style="padding: 5px; text-align: center;">250000</td> <td style="padding: 5px; text-align: center;">480500</td> <td style="padding: 5px; text-align: center;">550300</td> <td style="padding: 5px; text-align: center;">638600</td> <td style="padding: 5px; text-align: center;">695200</td> </tr> </tbody> </table>	Year	1980	1990	2000	2010	2020	Population	250000	480500	550300	638600	695200		
Year	1980	1990	2000	2010	2020										
Population	250000	480500	550300	638600	695200										
	b. What is design period? Explain factors affecting governing design period.	10	(2 : 1 : 1.3.1)												
<u>MODULE – 2</u>															
3.	a. List the types of filters and explain the mechanism/process of Rapid sand filter.	10	(2 : 2 : 1.2.1)												
	b. With the help of unit flow diagram, explain in brief each unit of water treatment plant.	10	(2 : 2 : 1.2.1)												
OR															
4.	a. Find the dimensions of a rectangular sedimentation tank with the following data Volume of water to be treated per day = 3 ML, Detention period = 4 Hours, Velocity of flow = 0.1m /min	10	(2 : 2 : 1.3.1)												
	b. Explain in brief any one methods of softening of water.	10	(2 : 2 : 1.3.1)												
<u>MODULE – 3</u>															
5.	a. Compare the different types of sewerage system for the disposal of waste water.	10	(2 : 3 : 1.3.1)												
	b. Define sampling. Explain the importance and types of sampling.	10	(2 : 3 : 1.3.1)												
OR															
6.	a. The 5-day BOD at 30°C of a sewage sample is 120 mg/L. Calculate 5 days BOD at 20°C. Assume de-oxygenation constant at 20°C, $k_D = 0.1/\text{day}$.	10	(2 : 3 : 1.4.1)												
	b. Define BOD and explain in brief method/calculation of BOD of a given sample.	10	(2 : 3 : 1.3.1)												
<u>MODULE – 4</u>															
7.	a. Explain the classification and functions of screens in the sewage treatment process.	10	(2 : 4 : 1.3.1)												

- b. Explain the construction and working principle of grit chamber with neat sketch. **10** (2 :4 : 1.3.1)

OR

8. a. With help of the flow diagram explain the importance of each unit employed for a municipal wastewater treatment plant. **10** (2 :4 : 1.3.1)
b. Explain the working of conventional activated sludge process (ASP) with flow diagram. **10** (2 :4 : 1.3.1)

MODULE – 5

9. a. Explain the working principle of trickling filter with neat sketch. **10** (2 :5 : 1.3.1)
b. Determine the size of the High-rate trickling Filters for the following data: **10** (2 :5 : 1.3.1)
(i) Sewage flow = 4.5 MLD (ii) Recirculation ratio = 1.5 (iii) BOD of Raw sewage = 250 mg/L (iv) BOD removal in primary tank = 30% (v) Final effluent BOD desired = 30 mg/L.

OR

10. a. Explain the terms (i) stabilization pond (ii) Oxidation ditch (iii) Equalization tank **10** (2 :5 : 1.3.1)
b. Discuss the comparison between activated sludge process and trickling filters. **10** (2 :5 : 1.3.1)

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