



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Civil Engineering

Semester End Examination; Feb. - 2021

Water Supply and Treatment

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Apply knowledge of mathematics to forecast population of community to determine total quantity of water to meet demands of community.

CO2: Apply knowledge of basic science for testing and analyze the drinking water quality parameters from public health consideration as per standards.

CO3: Design various water treatment units to remove selected impurities in raw water.

CO4: Analyze the community pipe network of water distribution.

Note: I) PART - A is compulsory. **Two** marks for each question.

II) PART - B: Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.

III) Assume missing data if any.

Q. No.	Questions	Marks	BLs	COs	POs												
I : PART - A		10															
I a.	What do you mean by percapita demand of water? How it is calculated?	2	L2,L3	CO1	PO1												
b.	Write briefly health significance of fluoride in drinking water	2	L2	CO2	PO1,2												
c.	Briefly explain theory of gravity settling.	2	L2	CO3	PO3												
d.	Explain briefly theory or mechanism of filtration.	2	L2	CO3	PO3												
e.	Bring out briefly any two systems of water supply to community.	2	L2	CO4	PO2,5												
II : PART - B		90															
UNIT - I		18															
1 a.	Write briefly different water demands of a community.	9	L2	CO1	PO1												
b.	Forecast the population in the year 2021 by Arithmetic increase method and Incremental increase method from the data below.	9	L3	CO1	PO1												
<table border="1"> <thead> <tr> <th>Year</th> <th>1971</th> <th>1981</th> <th>1991</th> <th>2001</th> <th>2011</th> </tr> </thead> <tbody> <tr> <td>Population</td> <td>18000</td> <td>22000</td> <td>27000</td> <td>32500</td> <td>37400</td> </tr> </tbody> </table>		Year	1971	1981	1991	2001	2011	Population	18000	22000	27000	32500	37400				
Year	1971	1981	1991	2001	2011												
Population	18000	22000	27000	32500	37400												
c.	With a neat sketch, explain river intake structure.	9	L3,L2	CO1	PO1												
UNIT - II		18															
2 a.	Define wholesome water and potable water. State requirements of wholesome water.	9	L2	CO2	PO1,2												
b.	Sketch the flow diagram of conventional water treatment plant. Briefly explain impurities removed in each unit.	9	L3	CO3	PO3												
c.	State the objectives of aeration of water. Explain any two types of aerators with sketch.	9	L2	CO3	PO3												

UNIT - III**18**

- 3 a. Define detention time and surface overflow rate for sedimentation tank. Briefly explain different types of sedimentation tanks. 9 L2 CO3 PO3
- b. A water supply scheme requires daily peak demand of 15 MLD. Design a suitable rectangular sedimentation tank assuming the velocity of flow in the tank as 250 mm/min and the detention period of 4 hours. Assume depth of tank 4.0 m and free board of 0.5 m. 9 L6 CO3 PO3
- c. Explain briefly coagulation and flocculation. Describe jar test to find optimum dosage of coagulant. 9 L2,L3 CO3 PO3

UNIT - IV**18**

- 4 a. Bring out mechanism of filtration of water. With a neat sketch, explain working of rapid sand filter. 9 L2,L3 CO3 PO3
- b. Explain the action of chlorine in disinfection of water along with its chemistry to kill microorganisms. 9 L2,L4 CO3 PO3
- c. Design rapid sand filter for treating water supplied to a town having population of one lakh assuming peak percapita demand as 270 LPCD. The rate of filtration may be taken as 4500 liter/hour/square meters. Assume three set of filter units. 9 L6 CO3 PO3

UNIT - V**18**

- 5 a. With sketch, explain any two types of water distribution layout of pipe network. 9 L3 CO4 PO2
- b. Bring out Zeolite process of water softening. 9 L2 CO3 PO3
- c. Write a note on;
- i) Fire hydrant 9 L2 CO4 PO3
- ii) Fluoridation and de-fluoridation.

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