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10CV61

**Sixth Semester B.E. Degree Examination, Jan./Feb. 2021**  
**Environmental Engineering - I**

Time: 3 hrs.

Max. Marks:100

**Note:1. Answer any FIVE full questions, selecting atleast TWO questions from each part.**  
**2. Assume suitable missing data if any.**

**PART – A**

- 1 a. Mention the points to be considered while selection of a water supply scheme for a city. (08 Marks)
- b. The following data have been noted from the census department :
- | Year       | 1970 | 1980  | 1990  | 2000  |
|------------|------|-------|-------|-------|
| Population | 8000 | 12000 | 17000 | 22500 |
- Calculate the probable population in the year 2010 and 2020 by :
- i) Geometric Increase method      ii) Incremental Increase method. (08 Marks)
- c. Explain design period. (04 Marks)
- 2 a. What are the requirements of an intake structure? Explain reservoir intake structure. (08 Marks)
- b. From a clear water reservoir 3.0m deep and maximum water level at 30.00m. Water is pumped to an elevated reservoir at 75.00m at a constant rate of 9,00,000 litres/hour. The distance is 1500m. Give the economical diameter of raising main and the water horse power of the pump. Neglect minor losses and take  $f = 0.01$ . (08 Marks)
- c. Briefly explain Economical diameter of raising main. (04 Marks)
- 3 a. Write the Desirable limits and effects of following water quality parameters :  
 i) Nitrate    ii) Calcium    iii) Iron    iv) Cadmium. (08 Marks)
- b. Explain : i) MPN    ii) BOD. (08 Marks)
- c. What are the requirements of wholesome water? (04 Marks)
- 4 a. Draw the neat flow chart of water treatment plant. Which treatment process, the following parameters are removed : i) Inorganic particle    ii) Odour    iii) Colloidal particle  
 iv) Micro – organisms. (08 Marks)
- b. Design a sedimentation for a water works which supplies  $1.4 \times 10^6$  litre/day water to the town. The sedimentation period is 5 hours. The velocity of flow is 12cm/min. Depth of tank water in tank is 4.0m. Assume an allowance for sludge is to be made as 80cm. (08 Marks)
- c. What are Coagulants? Mention any four types of coagulants. (04 Marks)

**PART – B**

- 5 a. Explain Mechanism of filtration. (08 Marks)
- b. Design five slow sand filter beds from the following data for the water works of a town of population 75,000 : Per capita demand 135  $\ell$ /d/c. Rate of filtration = 210 litres/h/m<sup>2</sup>. Assume maximum demand as 1.5 times the average demand Out of five units, one is to kept as stand by and used while repairing other units. (08 Marks)
- c. Briefly explain Operational problems in filtration. (04 Marks)



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- 6 a. Briefly explain : i) Break point chlorination with a neat sketch  
ii) Pre and Post Chlorination – Explain. (10 Marks)  
b. Explain Lime soda process with the help of chemical equation. (10 Marks)
- 7 a. Describe Nalgonda technique of deflouridation of water, with a neat sketch. (08 Marks)  
b. List the various layouts used in water distribution network. Discuss in detail at least two of them. (08 Marks)  
c. What are the functions of Service Reservoir? (04 Marks)
- 8 Write short notes on any Four :  
a. Fire hydrant.  
b. Reflux valve.  
c. Gate valve.  
d. Water meter.  
e. Water borne disease. (20 Marks)

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