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10CV61

**Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017**  
**Environmental Engineering - I**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.**

**PART - A**

- 1
  - a. Certain Human activities causes environmental degradation. Explain. (06 Marks)
  - b. Briefly explain factor affecting population growth. (06 Marks)
  - c. Briefly explain Fire demand. Calculate the fire demand for 2 lakh population by different formula. (08 Marks)
  
- 2
  - a. Why intake works are necessary in Water Supply Engineering Project? Explain with neat sketch of river intake works. (06 Marks)
  - b. Briefly mention the sources from which water derived from public water supply system. Differentiate between Palatable water and Potable water. (06 Marks)
  - c. Water has to be supplied to a town with one lakh population at the rate of 150 LPCD from a river 2000m away. The difference in elevation between lowest water level in the sump and reservoir is 36m. If the demand has to be supplied in 8hrs. Determine the size of the main and BHP of the pumps required. Assume maximum demand as 1.5 times the average demand. Assume  $f$  (frictional factor) = 0.0075, Velocity in the pipe 2.4m/sec and efficiency of pump 80%. (08 Marks)
  
- 3
  - a. What is Sampling? Briefly explain different types of sampling. (06 Marks)
  - b. Briefly explain health significance of presence of fluoride and Nitrate with permissible limits. (06 Marks)
  - c. What is E - coli? What are the measures to be taken while collecting water sample for bacteriological analysis. (08 Marks)
  
- 4
  - a. Draw typical flow diagram of the treatment of water to be supplied to a town from a river. Justify the different unit you provided in the diagram. (06 Marks)
  - b. Define briefly i) Sedimentation ii) Coagulation iii) Clarification. (06 Marks)
  - c. A sedimentation tank is to be designed for an overflow rate of 3500 L/m<sup>2</sup>/h. What % of particle of diameter i) 0.05mm and ii) 0.02mm will be removed in this tank at 10<sup>0</sup>C? Assume kinematic viscosity of water at 10<sup>0</sup>C as 1.31 centistokes. (08 Marks)

**PART - B**

- 5
  - a. With a help of neat sketch, explain the back washing of rapid sand filter. (06 Marks)
  - b. Explain the theory of Filtration. (06 Marks)
  - c. A filter unit is of size 4m × 6m. After filtering 6000m<sup>3</sup>/day in 24 hours period the filter is back washed at the rate of 10ℓ/m<sup>2</sup>/sec for 10 minutes. Compute i) Average filtration rate ii) Quantity and percentage of treated water used in washing iii) The rate of wash water flow in each trough. The unit has 4 troughs. Assume that filter is closed for 30 minutes every day for back washing and cleaning. (08 Marks)

- 6 a. Explain theory of chlorination of water with chemical equation. (06 Marks)  
b. Explain the Zeolite method of water softening. (06 Marks)  
c. Briefly explain treatment to swimming pool water and Reverse osmosis. (08 Marks)
- 7 a. What are the requirements of Ideal distribution system? (06 Marks)  
b. Differentiate between :  
i) Balancing reservoir and surface reservoir.  
ii) Continuous system and Intermittent system. (06 Marks)  
c. What is Defluoridation? Explain Nalagonda Technique of defluoridation of water. (08 Marks)
- 8 Write short notes on the following :  
a. Fire hydrant and types.  
b. Water meter.  
c. Reflex valve.  
d. Sluice valve. (20 Marks)

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