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BANGALORE - 560 037

10CV61

Sixth Semester B.E. Degree Examination, June/July 2018
Environmental Engineering – I

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.
2. Assume any missing data suitably.

PART – A

- 1 a. Explain the importance and necessity for protected water supply. (05 Marks)
b. Discuss the various types of water demand. (05 Marks)
c. List various methods of population forecasting. Estimate the population expected at the end of 3 decades using the following population statistics by:
(i) Arithmetical increase method.
(ii) Geometrical increase method. (10 Marks)

Year	1970	1980	1990	2000	2010
Populations	1,25,000	1,80,000	2,50,000	3,10,000	3,77,000

- 2 a. Briefly discuss different types of sources of water with respect to quality and quantity. (06 Marks)
b. What are intake works and their types and factors affecting the selection and location of a suitable site for intake works construction? (06 Marks)
c. A town with a prospective population of 1 lakh is to be supplied with water from a river, 3 km away and 25 m below the level of the water works. Design the economical section of the rising main and pumping unit when electricity is available. Rate of water supply is 140 lit/head/day, friction coefficient 0.01, efficiency of the pumping unit = 0.75. Pumping is done for 18 hrs/day. (08 Marks)
- 3 a. Write a note on:
(i) Water quality management.
(ii) Water borne diseases.
(iii) Sampling of water for examination.
(iv) Physical, chemical and microbiological quality parameters. (16 Marks)
b. Indicate the maximum permissible limits of the following in drinking water:
(i) Turbidity
(ii) Fluorides.
(iii) Chlorides.
(iv) Nitrates. (04 Marks)

- 4 a. Draw a typical layout of a water treatment plant and mention the function of each unit of the plant. (08 Marks)
b. What is aeration and its objectives in the water treatment? (04 Marks)
c. What is coagulation? Design a circular settling tanks for a city of population of 2 lakhs and supplying water at the rate of 150 lpcd. The detention period is 3 hours. If the alum is used as coagulant at the rate of 1.5 mg/l, calculate the monthly requirement of alum. (08 Marks)

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PART - B

- 5 a. Explain the theory of filtrations. (04 Marks)
b. Compare slow sand filters with rapid sand filters. (08 Marks)
c. Design a set of eight slow sand filter beds for a town of 1.0 lakhs; per capita water demand = 135 lpcd. Rate of filtration is 200 lit/hour/m². Assume maximum demand as 1.5 times the average demand. Out of eight units one unit is standby. Sketch your design. (08 Marks)
- 6 a. What is disinfection of water? Briefly explain different methods of disinfecting water. (08 Marks)
b. For disinfecting 10 million litres of water per day, bleaching powder containing 25% available chlorine is used. Chlorine demand of water is 1.2 mg/l and a residual chlorine of 0.2 mg/l should be maintained. Calculate the monthly requirement of bleaching powder. (04 Marks)
c. Give a comparison of lime soda process and zeolite process of softening of water. (08 Marks)
- 7 a. Briefly explain Fluoridation and DeFluoridation of water with any one method of Defluoridation. (08 Marks)
b. Discuss the various methods of distribution systems of water? With their merits and demerits. (12 Marks)
- 8 Write a note on any four of the following:
a. Fire Hydrants.
b. Types of valves used in water supply.
c. Layout of water supply in buildings.
d. Break point and chlorination.
e. Operation troubles in filters. (20 Marks)