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TEN – 403

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0070

Roll No.

B. Tech.

(SEM. IV) EXAMINATION, 2006-07

WATER ENGINEERING

Time : 3 Hours]

[Total Marks : 100

- Note :**
- (i) Attempt *all* questions.
 - (ii) All questions carry *equal* marks.
 - (iii) In case of numerical problems assume data wherever not provided.

- 1** Attempt any **two** parts of the following : **10×2=20**
- a) Enumerate the common pollutants affecting the quality of water supply. Describe their effects on human body.
 - b) A rectangular settling tank without mechanical equipment is to treat 2 million litres per day of raw water. The sedimentation period is to be 4 hours. The velocity of flow 8cm/minute and the depth of the water and sediment 4.2m. If an allowance of 1.2 m for sediment is made, what should be
 - i) The length of basin
 - ii) The width of the basin
 - c) Describe the various constituents of a coagulation – sedimentation plant with sketches.

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2 Attempt any **four** parts of the following : **5×4=20**

- a) Discuss the construction and working of a rapid gravity filter.
- b) Differentiate between temporary and permanent hardness of water.
- c) Design six slow sand filter beds from the following data:
Population to be served = 60,000 persons
Per capita demand = 135 l/hr.
Rate of infiltration = 175 l/hr/sq.m
Length of each bed = Twice the breadth.

Assume max^m demand as 1.75 times of the average daily demand.

Also assume that one unit out of six will be kept as standby.

- d) Write the process of removal excess of fluorides from drinking water.
- e) Differentiate between the following pairs.
 - i) Loss of head and negative head in rapid sand filter
 - ii) Aeration and screening
- f) What is meant by “disinfection” in treating public water supply? What are the chemicals which are used as disinfectants?

3 Attempt any **two** parts of the following : **10×2=20**

- a) Describe briefly bringing out salient points on base exchange process and lime soda process in water softening.
- b) Discuss the common methods of their treatment of water coming from oil refineries and dairies.

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- c) Discuss in details stream pollution by industrial waste and its control. Also draw the flow sheet showing the different treatment units of water purification plants.

4 Attempt any **two** parts of the following : **10×2=20**

- a) What are the different sources of water supply? Explain with the help of a sketch the utility of a mass curve and demand curve for water supply.
- b) Population of a town as obtained from the census report is as follows :

<i>Census Year</i>	<i>Population</i>
1961	45520
1971	55460
1981	63710
1991	71320
2001	79540

Apply an approximate method, give reasons and predict population for the year 2011.

- c) What do you mean per capita demand of water? How it can be calculated? Point out its importance for design of various units in water supply scheme.

5 Attempt any **four** parts of the following : **5×4=20**

- a) What is a “Booster pump”? Where it is used?
- b) Draw schematic diagram of Ring system and radial system of lay out of distribution system.

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- c) Calculate the diameter of cast iron pipe required for the distribution system of a part of the town with a population of 1000 persons. Make reasonable assumptions regarding the rate of supply, terminal pressure, etc.
 - d) Why is corrosion of great significance in connection with water supply mains? What means are employed to minimize it?
 - e) What factors will you keep in mind while designing plumbing system for water supply to a house?
 - f) A town is receiving its water supply from an impounding reservoir through 90 cm diameter gravity main with a fall of 79.2 m for distance of 80.5 km. Due to growth of population it is proposed to increase the supply by 50% laying a part length of additional 150 cm diameter pipe and new line being joined cross-connections. Find out the length of the new pipe line required. ($4f = 0.04$)
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