(Please write your Exam Roll No.) Exam Roll No. 05125603414

END TERM EXAMINATION

FOURTH SEMESTER [B.TECH] MAY-JUNE 2016

Paper Code: ETCE-202	Subject: Water Engineering
Time: 3 Hours	Maximum Marks: 75

Note: Attempt any five questions including Q.no.1 which is compulsory. Explain the answer with figure wherever necessary.

Q1 Attempt **any five** of the following: **(5x5=25)**

(a) What is fire demand? Give suitable allowance in water supply scheme?

(b) Discuss the variations in water demand of a town?

(c) What points should be kept in mind while selecting a site for a intake work?

(d) What do you understand by the term Detention Period and give reasonable values of it with respect to sedimentation basin?

(e) Enumerate the chemicals used in coagulation. Discuss their merits and demerits?

(f) Explain in brief the different methods of distribution of water used in Municipal Water Supply schemes?

(g) What are the factors to be considered in selecting a site for location of distribution reservoir?

Q2 (a) Mention different methods of forecasting population? Describe in detail any one of the methods (except Arithmetic, Incremental Increase Method). **(7.5)**

(b) Estimate the population in the year 2011 from the following census data for a town by using *Incremental Increase Method*? **(5)**

Year	1941	1951	1961	1971
Population	30,000	42,000	53,000	58,000

Q3 Municipal wastewater-treatment plant discharge secondary effluent to a surface stream. The worst conditions are known to occur in the summer months when stream flow is low and water temperature is high. Under these conditions, measurements are made in the laboratory and in the field to determine the characteristics of the wastewater and stream flows. The wastewater is found to have a maximum flow rate of 15,000 m^3/day, a BOD of 40 mg/L, a dissolved oxygen concentration of 2 mg/L, and a temperature of 25°C. The stream (upstream from the point of wastewater discharge) is found to have a minimum flow rate of 0.5 m^3/s, a BOD of 3 mg/L, a dissolved concentration of 8 mg/L, and a temperature of 22°C. Complete mixing of the wastewater and stream is almost instantaneous, and the velocity of the mixture is 0.2 m/s. From the flow regime, the reaction constant is estimated to be 0.4 day^{-1} for 20°C conditions.

Sketch the dissolved oxygen profile for a 100 km reach of the stream below the effluent discharge. **(12.5)**

Q4 (a) Explain in brief the aerobic nitrogen, carbon and sulphur cycle in metabolic process? **(7.5)**

(b) Explain any two physical process involved in natural purification of water system? **(5)**

P.T.O.

Q5 (a) Draw a neat sketch of a Rapid Gravity Filter and describe how it works. What are its advantages over the slow sand filter? **(7.5)**

(b) Explain in brief about: **(5)**

(i) Break point chlorination

(ii) Super chlorination

Q6 (a) The population of a city is 50,000 and the per day capita consumption is 130 l/day. Calculate the following in respect of the rapid sand filter for the above data: **(7.5)**

(i) Total area of filters;

(ii) Number and dimension of each filter bed;

(iii) Back wash water per filter bed after air wash.

(b) Explain the kinetics of disinfections. **(5)**

Q7 (a) Explain the Hardy Cross method used for pipe network analysis in water distribution system. **(7.5)**

(b) Explain various layout of distribution networks in distribution system? **(5)**

Q8 Write short notes on the following:

(a) Hourly variation in water demand. **(4)**

(b) Advantages and disadvantages of metering policy of water supply. **(4)**

(c) Head loss estimation in a pipe network. **(4.5)**

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