Even Semester Examination - 2017

BTECH (IV SEMESTER)

ENVIRONMENTAL ENGG.-I

Time: 02:00 Hours **Max Marks : 50**

Note: Attempt **all** questions, each question carry **equal** marks.

1. Attempt any FIVE questions [2 x 5]

   (i) Compute the "Fire Demand" for a city having population of 180,000 using various formulae.

   (ii) Describe working of river intake, with the help of sketch.

   (iii) Discuss various factors affecting the rate of demand.

   (iv) Discuss the various points to be considered in the planning of a water supply scheme for a city.

   (v) Discuss briefly the various types of water demands for a city.

(vi) Compute the 'fire demand' for a city having population of 1,40,000 using

a) Kuichling's formula b) Buston's formula

2. Attempt any TWO questions [5 x 2]

(i) Estimate the hydraulic gradient in a 2 m diameter smooth concrete pipe carrying a discharge of 3 cumecs by using (a) Manning's formula (b) Hazen-William's formula. Assume n = 0.013 and CH =130.

(ii) Illustrate with sketches the different types of layouts of pipe systems in distributing water.

(iii) Describe working of Lake intake, with the help of sketch.

3. Attempt any TWO questions [5 x 2]

(i) The population of the past three successive census of a city is as given below.

Year	1970	1985	2000
Population	45,000	56,000	63,000

Estimate the population of the city for the year 2030 by Logistic Curve Method.

(ii) What are Intakes? What are the important considerations which govern the selection of site of an intake?

(ii) The following is the population data of a city, available from past census records. Determine the population of the city in 2011 by (a) arithmetic increase method (b) geometrical increase method (c) incremental increase method.

Year	1931	1941	1951	1961	1971	1981	199
Population	12000	16500	26800	41500	57500	68000	741

4. Attempt any TWO questions [5 x 2]

(i) Water is pumped into a distribution reservoir from wells at a uniform rate of 1.3 cumecs. The estimated hourly water requirements for the worst day are given in Table below. Determine mathematically, the capacity of the distribution reservoir in cubic meters required to fulfill these demands.

Time in hours	1	2	3	4	5	6	7	8	9	10	11	12
Demand in million litres per	2.5	2.3	2.2	2.1	2.3	2.5	3.0	4.5	5.9	6.3	6.4	6.3

hour												
Time in hours	13	14	15	16	17	18	19	20	21	22	23	24
Demand in million litres per hour	6.3	6.3	6.2	6.3	6.4	6.7	7.0	7.0	6.7	5.8	4.2	3.5

(ii) Explain Hardy cross method and Gravity and Pressure conduits.

(iii) Define self-cleaning velocity and non-scouring velocity.

5. Attempt any TWO questions [5 x 2]

(i) Discuss storage capacity of distribution reservoir? Explain the mass curve method of calculating reservoir storage capacity.

(ii) A 0.5 m diameter and 100 m long pipeline carrying 0.5 m3/sec discharge is fitted with a valve at downstream end. Calculate the rise of pressure caused within the pipe due to the valve closure in (i) 1 second, (ii) instantaneously. Take the sonic velocity as 1430 m/s.

(iii) A 300mm dia sewer is to flow at 0.03 depth on a grade ensuring a degree of self-cleansing equivalent to that obtained at full depth at a velocity of 0.90m/s. find the required grade and associated velocity and rate of discharge at this depth. Use Manning's rugosity coefficient as 0.013. Also assume that the rugosity coefficient variation is neglected with depth.

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