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B. TECH.
FIFTH SEMESTER EXAMINATION, 2016-2017
ENVIRONMENTAL ENGINEERING-I

[Time: 2 Hours] [Total Marks: 50]

Note: Attempt all questions. Assume any data, not given, suitably.

1. Attempt any **Four** parts of the following: **[2.5x4=10]**

   (a) Explain variation in water demand of a city.
   (b) The population of a city for 5 decades from 1971 to 2011 is given below. Find out the population of city in 2051 by geometric increase method.

Year	1971	1981	1991	2001	2011
Population	26,000	29,000	34,000	42,000	52,000

   (c) List all surface and ground water sources that can be used for public water supplies.
   (d) What do you mean by design period and write factors governing selection of design period.
   (e) Explain the factors governing selection of a water source for public water supply.
   (f) Draw figure of a river intake structure and explain its functioning.

2. Attempt any **Two** parts of the following: **[5x2=10]**

   (a) A water supply pipe 1 m in diameter, buried in a trench 1.4 m wide, is backfilled with dry sand. The top of the pipe is 2.5 m below the surface of the fill. The pipe passes at right angles under a one lane road which carries a vehicle whose loading (including impact) consists of two concentrated 8 KN loads located at 1.8 m apart transverse to the roadway. Find the maximum vertical force exerted on a unit length of the pipe, if the pipe is made of steel. The thickness of the pipe may be neglected for calculating the external diameter of the pipe. Assume γ for dry sand = 16 KN/m^3; coefficient C for dry sand = 0.84, 1.45 and 1.90 at H/B = 1.0, 2.0 and 3.0 respectively.
   (b) Explain functioning of 'Pressure Relief Valve' and 'Air Valve' with the help of neat sketches. How economical diameter of rising main is calculated?
   (c) (i) Explain functioning of 'expansion joint' used in water supply pipes with the help of neat sketch.
   (ii) Explain method of testing of pipe line before use.

3. Attempt any **Two** parts of the following: **[5x2=10]**

   (a) (i) Compare 'dead end system' with 'radial system' used in distribution system.
   (ii) How you will collect and estimate storm water flow.

(b) A city with a population of 5 lakhs has to be supplied water as per following table:

Period of day (Hrs)	Water demand in liter person per day
0-1	30
1-2	30
2-3	30
3-4	40
4-5	50
5-6	80
6-7	160
7-8	240
8-9	360
9-10	440
10-11	440
11-12	300
12-13	200
13-14	160
14-15	120
15-16	220
16-17	300
17-18	360
18-19	360
19-20	320
20-21	280
21-22	160
22-23	90
23-24	30

Determine the capacity of balancing reservoir to be provided to meet out difference between constant rate supply and variable demand if the pumping is to be done for 24 hours.

(c) (i) Write assumptions made in Hardy Cross Method of solving pipe networks.
(ii) Explain equivalent pipe method in solving pipe network.

4. Attempt any **Two** parts of the following: **[5x2=10]**

(a) What do you mean by 'self cleansing velocity'. Derive Shield's expression for calculating it.
(b) Explain functioning of 'Manhole' and 'Oil and Grease Trap' with the help of neat sketches.
(c) Write down national ambient air quality standards (NAAQS) prescribed by MoEF/CPCB.