CE-503 **Roll No.** | | | | | | | | | | |

B. Tech.
(SEM V) ODD SEMESTER EXAMINATION 2015-16
Environmental Engineering-I

Time: 2 Hours **Maximum Marks: 50**

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

1. Attempt any **Four** parts of the following: [3.5x4=14]

   (a) Write down factors affecting 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 arithmetic increase method.

Year	1971	1981	1991	2001	2011
Population	25,000	28,000	34,000	42,000	47,000

   (c) Compare the quality of surface and ground water in terms of 'hardness' and 'total solids'.
   (d) Give the minimum domestic water consumption (annual average) for Indian towns and cities with full flushing systems as per IS 1172-1993.
   (e) Explain the factors governing location of intake structure.
   (f) Write any two formulae used for determining fire demand.

2. Attempt any **Two** parts of the following: [6x2=12]

   (a) Explain in detail the process of calculating external forces acting on a pipe being laid (under all possible conditions) for supplying water in a city.
   (b) List the various pipe materials used in water supply and discuss the merits and demerits of any one pipe material. Draw the neat sketches of following:
      (i) Gate valve
      (ii) Pressure relief valve
   (c) Discuss pressure and gravity distribution system. Write the use of balancing reservoir in distribution system. Explain method of testing of water supply pipeline.

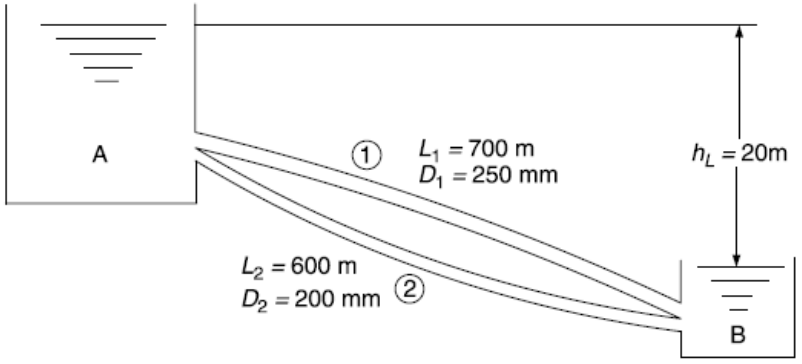
3. Attempt any **Two** parts of the following: [6x2=12]

   (a) Write short notes on following:
      (i) House water connection
      (ii) Different cocks and pipe fittings
   (b) Differentiate between conservancy and water carried systems.
      Assuming that the surface on which the rain falls in a district is classified as below:
      20% of the area consists of roof for which the runoff ratio is 0.9, 20% of the area consists of pavements for which the runoff ratio is 0.85, 5% of the area consists of paved yards of houses for which the runoff ratio is 0.80, 15% of the area consists of macadam roads for which the runoff ratio is 0.40, 35% of the area consists of lawns,

gardens and plants for which the runoff ratio is 0.10 and the remaining area is forest for which the runoff ratio is 0.05.

Determine the coefficient of runoff for the entire district. If the total area of district is 45 hectares and the maximum rain intensity is taken as 50 mm/hr, estimate the total run off for the district.

(c) What do you mean by equivalent pipe? For a given parallel pipe arrangement from reservoir A to B in Fig. below, calculate equivalent pipe diameter and corresponding flow. Assume Darcy–Weisbach's friction factor f = 0.02 and neglect entry and exit (minor) losses. Length of equivalent pipe can be assumed as 500 m.



4. Attempt any **Two** parts of the following: [6x2=12]

(a) "Sewers flowing with depths between 50% and 80% full, need not be placed on steeper gradients to be as self cleansing as sewers running full". Justify.

(b) Giving the background composition of atmosphere, define air pollution. The concentration of SO_2 in a stack was found to be 4 ppm. What will be the concentration of SO_2 in $\mu g/m^3$.

(c) Show that the adiabatic lapse rate is 0.98°C/100m. Explain the plume behavior under different environmental lapse rate conditions.