



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

**PAPER ID : 100503**

Roll No.

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**B. Tech.**

(SEM. V) (ODD SEM.)

THEORY EXAMINATION, 2014-15

**ENVIRONMENTAL ENGINEERING - I**

Time : 2 Hours]

[Total Marks : 50

- Note :**
- (1) Attempt all questions.
  - (2) Marks and number of questions to be attempted from the section is mentioned before each section.
  - (3) Assume missing data suitably. Illustrate the answers with suitable sketches.

1 Attempt any **four** of the following : **4×3**

- (a) Discuss various factors which affect the losses waste in water supply.
- (b) Mention and discuss the factor that influences per capita demand.
- (c) What is coincident draft ? Also discuss the provision for fire demand in water supply.

- (d) Predict the population for the years 2012, 2021, 2031 and 2041 from the following census figures of a town by incremental increase method.

Year	1951	1961	1971	1981	1991	2001	2011
Population : (thousands)	93	111	132	161	191	212	223

- (e) Draw a schematic diagram of dry intake towers and its working.
- (f) Discuss recuperating test for an open well. Also deduce the equation used.

2 Attempt any **four** of the followings : 4×3

- (a) Explain aquifers and aquiclude. Also discuss cavity formation in a tube well.
- (b) Write down various formulae used in pipe/sewer network hydraulic calculations. Also explain various terms used.
- (c) What are various external and internal pressures that a pipe bears during its laying and operation?
- (d) Explain the working of following with neat sketch (i) Gate valve (ii) Air valve.
- (e) What is water hammer in a pipe network? What provisions are made to safeguard a network from hammer?
- (f) Explain with neat sketch - Flexible of CI pipe and Expansion joint of steel pipes.

3 Attempt any **two** of the followings :  $6 \times 2 = 12$

- (a) A town with a population of 1 million has a continuous water supply. Average supply in 270 lpcd, the water being supplied by direct pumping. The total supply of 270 lpcd is phased as follows :

Time	lpc
5 AM to 11 AM	90
11 AM to 3 PM	54
3 PM to 9 PM	81
9 PM to 1 AM	27
1 AM to 5 AM	18

Water is supplied from the treatment plant at a uniform rate of 11.25 million litres per hour, for all 25 hours. Find the capacity of the reservoir required for distribution of water.

- (b) A stone-ware sewer, 30 cm in diameters is laid at a gradient of 1 in 100. Using  $N=0.013$  in Manning's formula, calculate the velocity and discharge when sewer is running full.
- (c) Discuss the role of minimum and maximum velocities in sewer line design. Also discuss effects of flow variation on velocity in a sewer.

4 Attempt any **two** of the followings :  $2 \times 7$

- (a) (i) Explain the Newton Raphson method used for pipe network analysis in water distribution system. **4**
- (ii) Explain following terms with reference to water connection to a house. Ferrule, Goose Neck and Stop Cock. **3**

(b) (i) Compare merits and demerits of the continuous and intermittent systems of water supply. 4

(ii) Discuss following methods of water distribution : 3  
Gravitational system  
Pumping system  
Combined system.

(c) A pipe network with two loops is shown in figure below. Determine the flow in each pipe for an inflow of 5 units at the junction A and outflows of 2.0 units and 3.0 units at junctions D and C respectively. The resistances R for different pipes are shown in the figure. 7

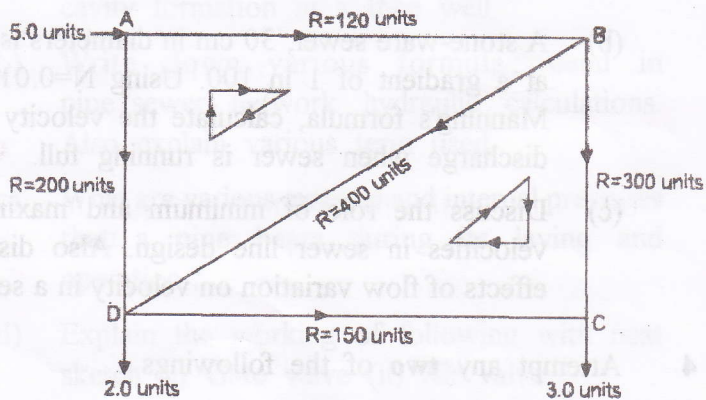


Fig.