

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

**PAPER ID : 2132**

Roll No.

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**B.Tech.**

(SEM. V) ODD SEMESTER THEORY

EXAMINATION 2012–13

**ENVIRONMENTAL ENGINEERING—I**

*Time : 2 Hours*

*Total Marks : 50*

**Note** :— Attempt **all** questions. Assume any data suitably if required.

1. Attempt any **four** of the following : (4×3=12)
  - (a) What is meant by the term "per capita demand" ? How it is estimated ?
  - (b) Why is the population forecast necessary in the design of public water supply schemes ?
  - (c) Explain— Specific yield of an aquifer, Specific retention of a soil, Storage coefficient of an aquifer, Specific Capacity of a well.
  - (d) What are infiltration galleries and infiltration wells ? Explain both with neat sketch.
  - (e) What are intake towers ? Differentiate between dry and wet intake towers.
  - (f) What are the factors which govern the location of an intake structure in a river ? Explain.

2. Attempt any **four** of the following : (4×3=12)
- (a) What are pressure pipes and why it is used for water conveyance in a water supply project ?
  - (b) State the comparative merits and demerits of the following materials used in conveyance of water (i) Cast Iron (ii) Concrete.
  - (c) Explain the working of following with neat sketch (i) Gate Valve (ii) Reflux Valve.
  - (d) What is water hammer ? What precautions should be taken to minimize its effect ?
  - (e) Explain the following with neat sketch – Expansion joint and flanged joint.
  - (f) Explain the following appurtenances – Ferrule, Goose Neck and Stop Cock.
3. Attempt any **three** of the following : (3×4=12)
- (a) What do you understand by the terms self-cleansing velocity and limiting velocity in sewer ?
  - (b) A stone-ware sewer, 30 cm in diameter 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 salient features of egg shaped sewer. Also explain hydraulically equivalent section.
  - (d) What do you understand by ventilation of sewer ? Why and how it is provided in sewer line ?
  - (e) Draw a cross section of man-hole and discuss the purpose of man holes.

4. Attempt any two of the following : (2×7=14)

- (a) Consider the pseudo-loop system shown in Figure 1. Find the flows in each pipe and head at each node by Hardy Cross Method.

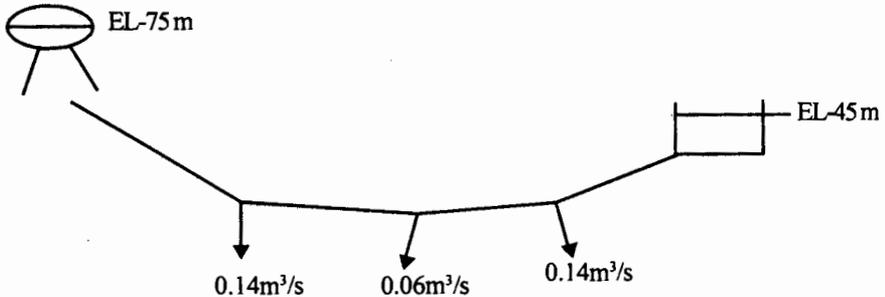


Figure 1 : Pseudo loop system

- (b) (i) What are the primary differences between Hardy Cross and Newton Raphson method for solving the  $\Delta Q$  equations ? (4)
- (ii) Given two pipes that are connected in parallel, what is the relationship between flows and head in the two pipes ? (3)
- (c) (i) Calculate the storage required to supply the demand shown in the following tables if the inflow of water to the reservoir is maintained at a uniform rate throughout 24 hours :

Time	00-04	04-08	08-12	12-16	16-20	20-24
Demand in million litres	0.48	0.87	1.33	1.00	0.82	0.54

- (ii) Compare the advantages and disadvantages of continuous and intermittent systems of water supply scheme. (3)