

(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 : $(4 \times 3 = 12)$

- (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 : $(3 \times 4 = 12)$

- (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.

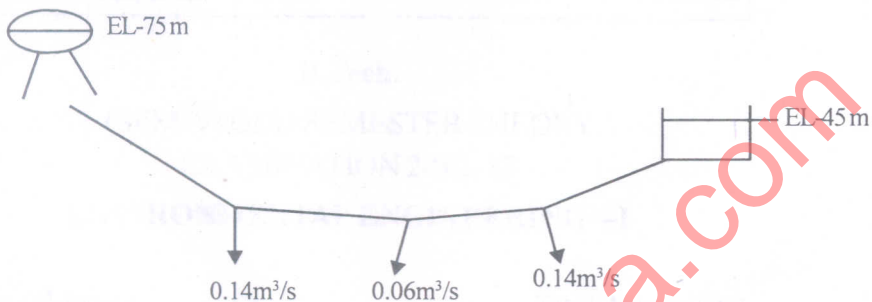


Figure 1 : Pseudo loop system

- (b) (i) What are the primary differences between Hardy Cross and Newton Raphson method for solving the ΔQ 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 : (4)

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)