

(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 2010-11

ENVIRONMENTAL ENGG.—I

Time : 2 Hours

Total Marks : 50

- Note :—**
- (1) Attempt **all** questions.
 - (2) Assume any data suitably, if required.

1. Attempt any **four** of the following questions :— (3×4=12)

- (a) What are various methods to forecast the population growth in an area ? Explain suitability of any four methods.
- (b) Explain the variation in the rate of demand of water. Also explain, how you take into account these variations in the design of various units.
- (c) A city has following recorded population :

1971	50000
1991	110000
2001	160000

Estimate :

- (i) Saturation population
- (ii) Expected population in the year 2011.
- (d) What is turbidity ? What are principles involved in the measurement of turbidity by Jackson's turbidimeter and Nepheloturbidity meter ?

- (e) What do you understand by demand curve ? Explain the method of calculating reservoir capacity for a specific yield, from a mass inflow curve.
- (f) Explain the working of a submerged intake well for a river. Also draw its sketch.

2. Attempt any **four** parts of the following :— (3×4=12)

- (a) Discuss advantages and disadvantages of Cast Iron, Wrought Iron, Steel and Galvanised Iron pipes.
- (b) Draw neat sketches of following :
 - (i) Spigot and Socket joint for CI pipe.
 - (ii) Expansion joint for CI pipe.
- (c) Discuss various classifications of Cement concrete pipes as per IS-458-1961. Also give suitability of each class of pipes.
- (d) Draw sketches of Air release valve and pressure relief valve. Also explain the working of each.
- (e) What is water hammer ? Explain the mathematical equation to estimate the pressure from water hammer.
- (f) Discuss the modified Hazen William's formula to compute velocity of flow and head loss due to friction in a pipe.

3. Attempt any **two** questions :— (6½×2=13)

- (a) Find the diameter of a 900-m long equivalent pipe ($C_{hw} = 100$) to replace the series-parallel system shown in Fig. 1. The length and diameter and C_{hw} coefficients are as follows :

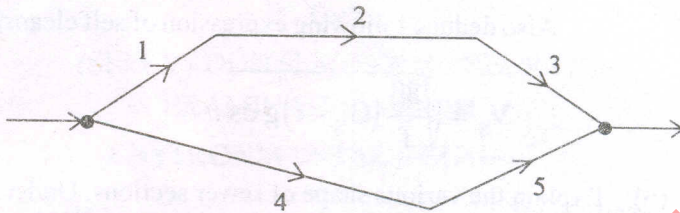
pipe 1 — 300 m, 250 mm, 120

pipe 2 — 400 m, 300 mm, 130

pipe 3 — 200 m, 200 mm, 100

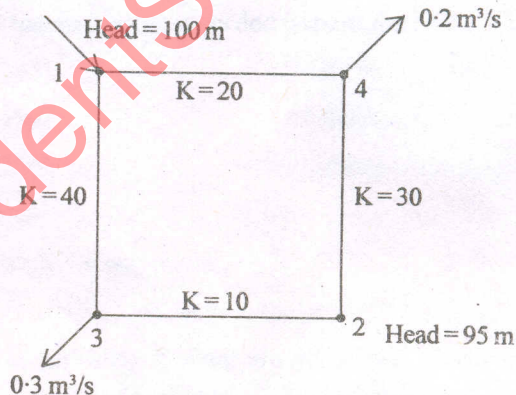
pipe 4 — 500 m, 400 mm, 130

pipe 5 — 300 m, 250 mm, 80.



(Fig. 1)

- (b) Discuss the methods of balancing heads and balancing flows in Hardy cross methods of analysis of pipe network. Explain each method with example.
- (c) Solve the following water distribution network by Newton Raphson method to calculate head at node 3 & 4 of Fig. 2.



(Fig. 2)

- (a) What do you understand by the terms 'Self cleansing velocity' and 'limiting velocity' in sewers ?

Also deduce following expression of self cleansing

$$V_s = \sqrt{\frac{8\beta}{f} (G_s - 1) g ds}.$$

- (b) Explain the various shape of sewer sections. Under what circumstances do you prefer egg-shaped sewer ?

What are advantages of circular sewer ?

- (c) (i) What is Manholes ? Draw a neat section of deep manhole.

Also discuss usability of drop manholes.

- (ii) Explain following Sewer appurtenances :

— Grease & Oil Trap.

— Inverted Siphons.

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