

May-25-0366

CE-505 (Environmental Engineering-I)

B.Tech. 5th (CBCS)

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from section A, B, C, D and section E is compulsory. Assume missing data, if any.

**SECTION - A**

1. (a) Enumerate and explain the characteristics of surface and ground water and state their environmental significance. (5)
- (b) With neat sketch, explain how water is drawn from infiltration galleries. (5)
2. (a) A 30 cm gravity well is being pumped at a rate of 1,200 lpm. Measurements made in nearby test wells 5 m and 25 m away yielded drawdown 4.5 m and 1.0 m, respectively. The distance of the water table above the bottom of the well is 80 m. Determine (i) the drawdown in the well during pumping (ii) the specific yield of the well. (5)

- (b) What are the different factors to be considered in the selection of source for a water supply scheme? How does the quality of ground water differ from surface water? (5)

**SECTION - B**

3. The population data for a town is given below. Find out the population in the year 2021, 2031 and 2041 by (a) arithmetical

(b) geometric (c) incremental increase methods.

Year	1971	1981	1991	2001	2011
Population	84,000	1,15,000	1,60,000	2,05,000	2,50,000

(10)

4. (a) Define per capita water demand. List any four major factors affecting the rate of demand of water and explain the concept of fluctuations in water demand. (7)
- (b) Write the maximum acceptable limit of the following for the public drinking water.  
i. Color ii. pH iii. Chlorides iv. Sulphates v. Nitrates vi. Fluorides (3)

**SECTION - C**

5. (a) Name any four commonly used coagulant in water treatment. What are the factors which affect coagulant dosage? (5)
- (b) Differentiate between water quality criteria and standards. Discuss use of MPN as bacteriological water quality standard. (5)
6. Explain the construction, working and backwashing of a rapid sand filter with the help of neat sketch. (10)

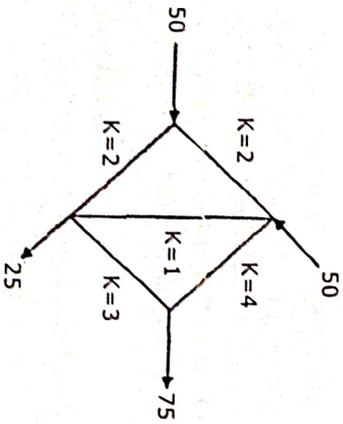
**SECTION - D**

7. (a) Calculate the head loss in a C.I transmission main 300mm in diameter and 2km in length with  $C=100$ , when it carries a flow of  $10\text{m}^3/\text{min}$ . (2)
- (b) What are the basic requirements of a pipe joint? Describe various pipe joints with neat sketches. (4)

[P.T.O.]

(c) Discuss about the various methods of leak detection in pipes. Also explain how to maintain the drinking water pipe line system. (4)

8. Determine the distribution of flow in the pipe network shown in figure. The head loss  $h_L$  may be assumed as  $KQ^2$ . The flow is turbulent and pipes are rough. The value of  $K$  for each pipe is indicated in the figure. Use Hardy-Cross method. (10)



### SECTION - E (Compulsory)

9. Answer the following:

- Define: storage coefficient and storage yield.
- Define per capita demand. How is it useful in water supply scheme planning?
- What is the basic principle in the base-exchange process of water softening?
- Define disinfection. Enlist various methods of disinfection.
- Define: Detention time and surface over flow rate for a sedimentation tank.
- What are the functions of aerators?

(g) Explain the factors influencing settling of discrete particles, (h) What are the objectives of Screen chamber and Grit chamber?

(i) What are the requirements of water distribution system?  
 (j) State the advantages of steel pipes in water supply project. (10×2=20)