

**B.E. / B.Tech (Arrear) DEGREE END SEMESTER EXAMINATIONS APRIL/MAY 2011  
CIVIL ENGINEERING BRANCH  
FIFTH SEMESTER (REGULATIONS 2004)**

23

**CE 374 – ENVIRONMENTAL ENGINEERING-I**

Time: 3 hours

Total Marks: 100

Instructions

- (i) Part A carries a maximum of 20 marks and Part B carries a maximum of 80 marks
- (ii) All questions in Part A carries 2 marks each and all questions in Part B carries 16 marks each
- (iii) Make suitable assumptions wherever necessary and state them clearly.

**PART A (10X2 = 20 Marks)**

1. What are the impacts of nitrogen and phosphorous in water bodies?
2. What do you mean by sustainable development?
3. State the drinking water quality standards for any four chemical parameters as per BIS.
4. What do you understand by Coliform index?
5. Give the difference between lamp hole and manhole.
6. State the significance of self cleansing velocity in sewer design.
7. When does it become necessary to provide for the lift of sewage in a sewerage project?
8. What is the function of stand-pipe in distribution system?
9. How do you calculate storage capacity of a service reservoir?
10. Give the difference between soil pipe and waste pipe.

**PART B (5X16 = 80 Marks)**

- 11.i) The population of a town obtained from the census department is given below:

| Year       | 1941 | 1951  | 1961  | 1971  | 1981  | 1991  | 2001  | 2011  |
|------------|------|-------|-------|-------|-------|-------|-------|-------|
| Population | 8500 | 13350 | 17000 | 19000 | 29000 | 32000 | 41500 | 60500 |

Estimate the expected population during the years 2031 and 2041 by adopting incremental increase method. Also estimate the water demand in terms of ML/d at the rate of 90 Lpcd for the year 2031 and 2041. (10)

- ii) Mention and discuss the factors that influence per capita water demand. (6)
- 12.a) i) What are the important considerations which govern the selection of site of an intake structure? (8)
- ii) Explain the salient features of river intake with the aid of a neat sketch. (8)
- (OR)
- b)i) Describe the problem called crown corrosion of sewers. (6)
  - ii) A combined circular sewer is to be laid to serve a catchment of 65 hectare. Calculate the size of the sewer from the following data:  
Population to be served = 90,000  
Per capita water supply rate = 110 Lpcd  
Critical intensity of rainfall = 35 mm/h  
Coefficient of runoff = 0.41

(10)

- 13.a) A centrifugal pump with the following characteristics is installed in a system to raise water from one reservoir to another. The water surface elevation in the first reservoir is 150 m and that in the second reservoir is 200m. The pipeline connecting the reservoir is 3 km of 300 mm diameter. Determine the operating point in the system. Take  $C_H = 110$ . Also compute WHP and BHP of the pump assuming overall pump efficiency as 70%.

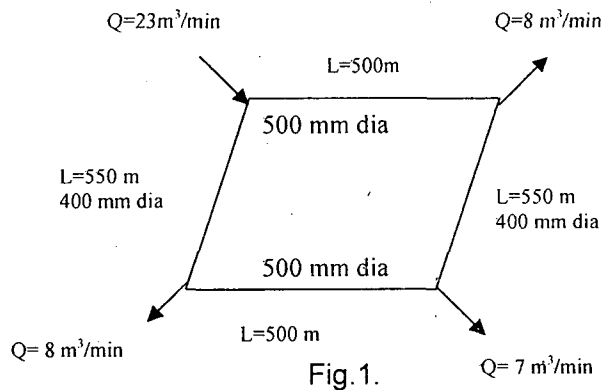
|                       |      |      |      |      |      |      |
|-----------------------|------|------|------|------|------|------|
| Pump discharge. Lpm   | 0    | 740  | 1600 | 2340 | 3160 | 3950 |
| Total dynamic head, m | 62.5 | 60.5 | 57.3 | 48.7 | 37.6 | 20.2 |

(OR)

- b)i) What are the factors to be considered in the selection of pipe material for water transmission? (8)
- ii) Describe with the help of sketches various types of joints used in C.I. Pipes. (8)
- 14.a) Describe the various layouts of distribution network in a water supply system and state their advantages and disadvantages.

(OR)

- b) Find the flows in each pipe in the Loop shown in Fig.1. Use Hardy Cross method for analyzing the Loop. Consider  $C_H$  as 100 for all pipes



- 15.a)i) Draw a sketch of a water supply service connection from the street main to a residential building and state the functions of each fitting. (10)
- ii) State briefly the basic principles governing the design of water supply in building with reference to quantity of flow and layout of the pipe system. (6)
- (OR)
- b) i) State the principles you would observe while preparing drainage plan of a building. Give reasons for your answer. (12)
- ii) What are the requirements of a good trap? (4)