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**Question Paper Code : 21256**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fifth Semester

Civil Engineering

CE 2304/CE 53/10111 CE 504 — ENVIRONMENTAL ENGINEERING — I

(Regulations 2008/2010)

(Common to 10111 CE 504 — Environmental Engineering — I for B.E. (Part-Time)  
Fourth Semester — Civil Engineering — Regulations 2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Calculate the approximate alkalinity of a water containing 125 mg/L of bicarbonate ion and 15 mg/L of carbonate ion.
2. State the drinking water quality standards for any four chemical parameters as per BIS 10500-2012.
3. What are the advantages of DI pipe over CI pipe?
4. What do you mean by economic diameter of pumping main?
5. Differentiate between type-I and type-II settling.
6. Enumerate the mechanisms involved in disinfection process.
7. What is the significance of split treatment in RO process?
8. Distinguish between physical adsorption and chemical adsorption.
9. What are the components of house water supply service connection?
10. List the requirements of good distribution system.

PART B — (5 × 16 = 80 marks)

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

Year	1941	1951	1961	1971	1981	1991	2001	2011
Population	8400	13350	17000	19000	29000	32000	41500	60700

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)

Or

- (b) Briefly describe the various physico-chemical characteristics of surface and ground water and state their environmental significance.
12. (a) (i) Explain the difference between system head curve and pump head curve with the help of a graph. What does the merging of the two curves represent? (10)
- (ii) What factors are required to be considered in the selection of the type of a pump? (6)

Or

- (b) Mention the points which should be taken into consideration in deciding the location of an intake for the water supply of a large town, the source being a perennial river. Draw a neat sketch of a canal intake and explain the salient features.
13. (a) A water treatment plant treats 25 ML/d of water. Workout the following with respect to a flocculator: Dimension of the flocculation unit, Power input to paddle and area of paddles. Take viscosity  $0.89 \times 10^{-3}$  Ns/m<sup>2</sup>, velocity gradient  $60 \text{ s}^{-1}$ ,  $C_D = 1.8$  and relative velocity of paddle is  $0.5 \text{ m/s}$ . Assume any other suitable data.

Or

- (b) A new township is to have a population of 4,50,000 and 90 Lpcd of water supply. Design a rapid sand filter unit with details of under drainage and water washing including gutter arrangement. Assume suitable criteria as applicable.
14. (a) Enumerate and explain the various methods of removal of iron and manganese from groundwater.

Or

- (b) Draw a schematic diagram of a desalination plant and explain the working principle. Also briefly outline the design procedure.

15. (a) Find the flow in each pipe in the Loop shown in Fig.1. Use Hardy Cross method for analyzing the Loop. Consider  $C_H$  as 110 for all pipes

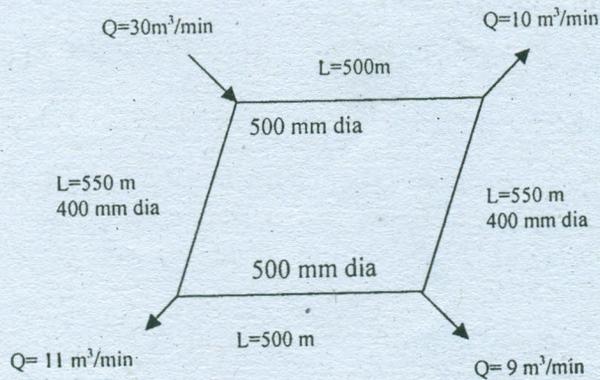


Fig.1.

Or

- (b) State briefly the basic principles governing the design of water-supply in buildings with particular reference to the quantity of flow, the determination of pipe-sizes and the lay-out of the pipe-system.