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BICE-014

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00012

December, 2017

BICE-014 : ENVIRONMENTAL ENGINEERING – I

Time : 3 hours *Maximum Marks : 70*

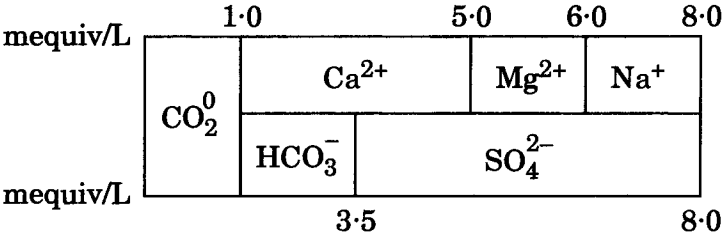
Note : *Answer any **five** questions. All questions carry equal marks. Assume suitable data, if missing. Use of scientific calculator is allowed.*

1. (a) Discuss the various factors affecting the process of disinfection.

(b) Explain the importance of Jar test in coagulation operation.

(c) Differentiate between Type-1 and Type-2 settling. *4+5+5=14*

2. Water with the ionic characteristics shown in the bar diagram below is to be softened to the minimum calcium hardness by the lime-soda ash process. Magnesium removal is not deemed necessary.



(a) Calculate the chemical requirements and solids produced in milliequivalents per litre.

(b) Draw a bar diagram for the finished water.

(c) For a flow of 25,000 m^3/d, calculate the daily chemical requirement and the mass of solids produced. Assume that the lime used is 90% pure and the soda ash is 85% pure. *4+5+5=14*

3. Write short notes on the following : *2+4+4+4=14*

(a) Water Softening

(b) Difference between Temporary and Permanent Hardness

(c) Drinking Water Standards

(d) Causes of Water-borne Diseases

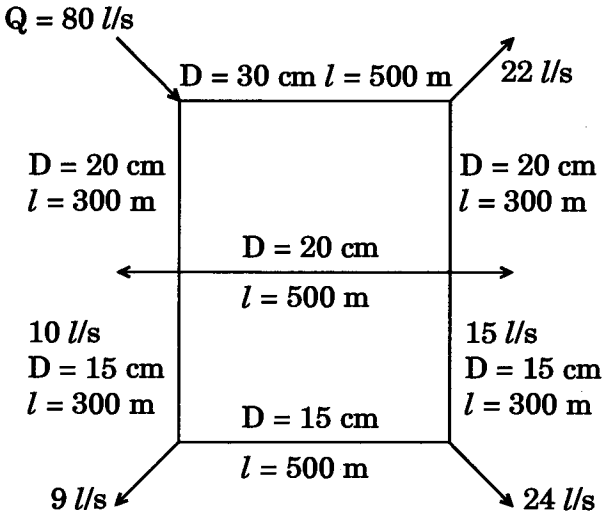
4. (a) Discuss different methods of population forecasting in detail.

(b) Discuss various factors affecting per capita demand of water.

(c) List different sources of water used for drinking purpose. *8+3+3=14*

5. (a) Design a rectangular sedimentation tank to treat 2·4 million litres of raw water per day. The detention period may be assumed to be 3 hours.

(b) Calculate the head losses and the corrected flows in the various pipes of a distribution network as shown in the figure below. The diameters and the lengths of the pipes used are given against each pipe. Compute the corrected flows after one correction. *4+10=14*



6. (a) Discuss various methods of analysis for a distribution system.

(b) Discuss various factors governing location of intake structure. *10+4=14*

7. Write short notes on the following : *5+4+5=14*

(a) Conveyance of Water

(b) Trouble-Shooting of Conveyance System

(c) Various Methods of Leak Detection