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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**Make Up Examination July-2024**

**Semester**: V

**Course Code**: CIV 2047

**Course Name**: Water Infrastructure Systems

**Program** : B.tech

**Date**: 01-07-2024

**Time**: 09:30AM to 12:30 PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and Non-programmable calculators are permitted.*

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**Part A**

**Answer any four Questions. Each question carries SIX marks. (4Qx 6M= 24M)**

1. What is the annual *Chlorine*requirement in quintals to treat 20MLD of water with *chlorine* dose of 0.5mg/ltr. (C.O.No.2) [Knowledge]
2. A rectangular sedimentation tank is designed for a surface overflow rate of 12,000 liters/hr/m2. What percentage of suspended particles of diameter 0.03 mm will be removed in the tank. Take kinematic viscosity (?) = 0.897 mm2/sec and specific gravity of particles 2.65.   (C.O.No.2) [Knowledge]
3. Duty of an engineer in designing a water supply scheme for a particular section of community is to evaluate the amount of water available and amount of water demanded by the public and to design a water supply. Write the objectives of the community water supply system. (C.O.No.1) [Knowledge]

1. Dialysis is most useful in recovering pure solutions for reuse in manufacturing process. Sketch the dialysis process. (C.O.No.3) [Knowledge]
2. What is the fire demand of a town of population 180000, assume 9 fire accident breakout per year with a water loss for 4 hours. Using National board of fire underwriter’s formula and express fire demand in lpcd? (C.O.No.2) [Knowledge]

**Part B**

**Answer any four Questions. Each question carries TEN marks. (4Qx10M=40M)**

1. **pH of water**can be defined as potential of hydrogen ion concentration in water. pH value denotes the concentration of hydrogen ions in the water and it is a measure of acidity or alkalinity of a substance. Two samples of water A and B have pH values of 4.4 and 6.4 respectively. Determine how many times sample A is more acidic than B? (C.O.No.1) [Comprehension]

1. It is the process of removal of settleable solids present in raw water by gravity. It takes place in a reactor or tank where suspended particles which are present in water are made to settle at bottom of the tank by reducing flow velocity of water. Discuss the advantages of this process.

(C.O.No.2) [Comprehension]

1. Chlorination serves not only for disinfection, but as an oxidant for other substances like iron, manganese, cyanide and for taste and odor control in water. Depict break point chlorination.

(C.O.No.2) [Comprehension]

1. Depending upon the level of source, topography of the area and other local conditions, the water may be forced into distribution system by lifting using mechanical means. Explain the given method of distribution system. (C.O.No.3) [Comprehension]
2. A town with population 50000 supplied water at a rate 200 Lpcd. A bleaching powder dose of 2 mg/l containing 35% of chlorine added to water to have a residual chlorine of 0.2 mg/l. Find the monthly bleaching powder requirement in kg. Also find chlorine demand in kg/day.

(C.O.No.2) [Comprehension]

**Part C**

**Answer any two Questions. Each question carries eighteen marks. (2Qx18M=36M)**

1. The layout of water distribution system tells us the network of pipes provided in the area and helps to determine the repair locations if any damages occurs. The distribution of water means delivering treated water to the user from the source. The distribution should take place in such a way that the users or consumers should meet their demand of water with sufficient quantity and quality. Demonstrate the various layouts of distribution. (C.O.No.3) [Application]

1. Two million litres of water per day is passing through a sedimentation tank which is 6m wide 15m long and having a water depth of 3m.

a) Find the detention time for the tank.

b) What is the average flow velocity through the tank?

c) If 60 ppm is the concentration of suspended solids present in turbid raw water how much dry solids will be deposited per day in the tank assuming 70% removal in the base and average specific gravity of the deposit as 2.

d) Compute the overflow rate (C.O.No.2) [Application]

1. A water supply scheme has to be designed for a city having a population of 100,000. Estimate the important kinds of draft which may be required to be recorded for an average water consumption of 250 Lpcd. Also record the required capacities of the major components of the proposed water works system for the city using a river as the source of supply. (C.O.No.1) [Application]