PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

MAKE UP EXAMINATION- JAN 2023

Course Code: CIV 222

Course Name: Water Infrastructure Systems

Program   : B.tech

Date: 23-JAN-2023
Time: 01:00 PM to 4:00 PM
Max Marks: 100
Weightage: 50%

Instructions:
(i) Read the all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer all the Questions. Each question carries 6 marks.   (4Qx 6M= 24M)

1. Define wholesome water and list the requirements of wholesome water (C.O.No.1) [Knowledge]

2. Sedimentation is the process of removal of suspended impurities like silt, clay and sand. With the help of neat sketch, explain the working principle of sedimentation tank.

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

3. Distribution system is used to describe collectively the facilities used to supply water from its source to the point of usage. List any four requirements of good distribution system.(C.O.No.3) [Knowledge]

4. Filtration is a process of passing water through beds of sand or other granular media. Differentiate slow sand filter and rapid sand filter.   (C.O.No.2) [Knowledge]

Part B

Answer all the Questions. Each question carries 10 marks.   (4Qx10M=40M)

5. Slow sand filter (SSF) effectively removes turbidity and pathogenic organisms through various biological, physical and chemical process. With the help of neat sketch, show the components of slow sand filter.   (C.O.No.2) [Comprehension]

6. Water treatment includes many operations like Aeration, Flocculation, Sedimentation, Filtration, Softening, Chlorination and demineralization. Draw the flow chart of surface water treatment and mention the function of each treatment unit.   (C.O.No.2) [Comprehension]

7. The purpose of distribution system is to deliver water to consumer with appropriate quality, quantity and pressure. With the help of neat sketch explain grid iron system of water distribution and mention its advantages.   (C.O.No.3) [Comprehension]

8. Disinfection is a process of killing disease causing pathogens present in water. List any four requirements of ideal disinfectant and explain any two methods of disinfection of water.

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

Part C

Answer all the Questions. Each question carries 12 marks. **(3Qx12M=36M)**

9. Design six slow sand filter beds from the following data.

    Population = 50000 persons

    Water demand = 150 liters/person/day

    Rate of filtration = 200 liters/hr/m^2

    L=2B. Assume maximum demand as 2 times average daily demand. Also assume that one unit out of six will be kept as standby. (C.O.No.2) [Application]

10. A town with population 100000 supplied water at a rate 180 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) [Application]

11. Find out the diameter of the conveying main required to handle a flow of 4 MLD from a source to town separated by a distance of 3 km. The elevation difference between source and supply is 8 m. Take Hezen William's coefficient C_H = 100. (C.O.No.3) [Application]