Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 19 / 12/ 2025 **Time: 01:00pm – 04:00pm**

School: SOE	**Program: B.Tech-CIV**	
Course Code : CIV2047	**Course Name: Water Infrastructure Systems**	
Semester: V	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**16**	**16**	**22**	**24**	**22**

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	Define design discharge.	**2 Marks**	**L1**	**CO1**
2.	Why total draft is not taken as sum of maximum hourly demand & fire demand?	**2 Marks**	**L1**	**CO1**
3.	What is design period?	**2 Marks**	**L1**	**CO1**
4.	What are palatable and wholesome water?	**2 Marks**	**L1**	**CO2**
5.	Define mineral acidity and carbonic acidity.	**2 Marks**	**L1**	**CO2**
6.	What is plain sedimentation?	**2 Marks**	**L1**	**CO2**
7.	What are flocculent particles?	**2 Marks**	**L1**	**CO3**
8.	Define creeping flow or stokes flow.	**2 Marks**	**L1**	**CO4**
9.	What is electrokatadyn process?	**2 Marks**	**L1**	**CO4**
10.	What are Zeolites?	**2 Marks**	**L1**	**CO5**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	Demonstrate minimum domestic water consumption (Annual Average) for Indian town and cities with full flushing system and LIG colonies in small Indian town and cities as per IS: 1172-1993.	**10 Marks**	**L3**	**CO1**
		Or			
12.	**a.**	Calculate the fire demand for a town of population 2 lakh, assuming one fire accident breakout per month and which loss for 6 hrs using national board of fire underwriters formula and express fire demand in lpcd.	**10 Marks**	**L3**	**CO1**
13.	**a.**	Intake structures collect surface water sources like rivers and lakes and convey it to water treatment plants. Identify the factors affecting selection of suitable site for Intake Structure.	**10 Marks**	**L3**	**CO2**
		Or			
14.	**a.**	The population of 5 decades from 1950 to 1990 are given below. Find out the population after 1,2, and 3 decades beyond the last known decade by incremental, arithmetic and geometric methods.	**10 Marks**	**L3**	**CO2**

YEAR	PPOPULATION
1950	25000
1960	28000
1970	34000
1980	42000
1990	47000

15.	**a.**	Surface water often requires more extensive treatment due to higher levels of suspended particles and contaminants while groundwater may need specific treatments for issues like high hardness or iron. Sketch the flow charts for surface water and ground water treatment.	**10 Marks**	**L3**	**CO3**
		Or			
16.	**a.**	Sedimentation tank are designed to reduce flow velocity which makes particles to settle at bottom of the tank. Demonstrate the design Criteria for sedimentation tank.	**10 Marks**	**L3**	**CO3**
17.	**a.**	The jar test is a common laboratory procedure used to determine the optimum operating conditions for water or wastewater treatment. Demonstrate jar test apparatus and procedure to determine optimum dosage of coagulant.	**10 Marks**	**L3**	**CO3**
		Or			

18.	**a.**	If 10 mg/l of alum dose is added to 10 MLD of water. Calculate the amount of hardness imparted to the water in terms of kg/day? Use the following chemical equation $Al_2(SO_4)_3\ 18H_2O + 3Ca(HCO_3)_2 \Longrightarrow CaSO_4 + 2\ Al(OH)_3 + 6\ CO_2 + 18\ H_2O$ Note: Alum is very effective at a pH 0f 6.5 to 8.5	**10 Marks**	**L3**	**CO3**

19.	**a.**	Rapid sand fitters are single media gravity type filters. Identify the components of rapid sand fitter with dimensions.	**10 Marks**	**L4**	**CO4**
	b	A city has to treat 24MLD of turbid water using rapid sand filter with a filtration rate of $5m^3/hr/m^2$ a) Calculate the size of the filter bed if L:B::2:1 only one unit of filter is provided. b) Calculate the percentage of filtrated water required for back washing the filter, if the rate of back wash is 6 times the rate of filtration and duration of back wash is 10min. Back washing is done once in a day.	**10 Marks**	**L4**	**CO4**
		Or			
20.	**a.**	Disinfection is the process of using a chemical or physical method to inactivate or kill microorganisms. Infer the appropriate physical and chemical disinfection methods.	**10 Marks**	**L4**	**CO4**
	b	Chlorine usage in the treatment of 20,000 cubic meters of water per day is 8 kg. The residual chlorine after 10 minutes of contact is 0.15 mg/L. Calculate the chlorine dosage and chlorine demand of the water in mg/L, respectively.	**10 Marks**	**L4**	**CO4**

21.	**a.**	Reverse osmosis (RO) is a crucial part of dialysis by purifying the water used to create the dialysate. Contrast the working principles of dialysis and Reverse osmosis with neat sketch.	**20 Marks**	**L4**	**CO5**
		Or			
22.	**a.**	Water distribution network is used to describe collective usage of the facilities to supply water from its source to the point of usage. Compare the various classes of water distribution networks with their advantages and disadvantages.	**20 Marks**	**L4**	**CO5**