Register Number:……..

KUMARAGURU
college of technology
character is life

B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Fifth Semester

CIVIL ENGINEERING

U18CEI5201**:** Environmental Engineering

COURSE OUTCOMES

CO1: Plan and estimate public water supply system
CO2: Design the various components of water treatment plants
CO3: Design water distribution networks and service supply to buildings
CO4: Estimate and design of sewage flow and plumbing system
CO5: Design of septic tanks and the various components of sewage treatment plants

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	How to determine the storage need of an Impounding reservoir?		CO1	[K_2]
2.	What will be the fire demand for a city having population of 4,00,000 by Kuichling's formula?		CO1	[K_2]
3.	Define: i. Detention time; ii. Surface overflow rate.		CO2	[K_1]
4.	What is meant by breakpoint Chlorination?Give its significance in water treatment and distribution		CO2	[K_3]
5.	State the assumptions made in pipe network analysis resolved by Hardy Cross method.		CO3	[K_1]
6.	Name the methods involved in detecting the leakage of water in distribution pipeline.		CO3	[K_1]
7.	With neat sketch represent the various components of a Catch basin.		CO4	[K_2]
8.	Calculate the diameter of a circular sewer having a average discharge equal to 40 lit/sec and sewage velocity as 1.5 m/sec.		CO4	[K_3]
9.	How is biological wastewater treatment classified? Give two examples for each.		CO5	[K_2]
10.	What do you mean by Sludge Volume Index (SVI)?		CO5	[K_1]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain the various factors that influence the water demand of a community.	6	CO1	[K_2]

b) The population of a town panchayat as per past census records are furnished below. Calculate the population in the year 2041 using the following methods. 10 CO1 [K_3]

Arithmetical increase method (4)

Geometrical increase method (3)

Incremental increase method (3)

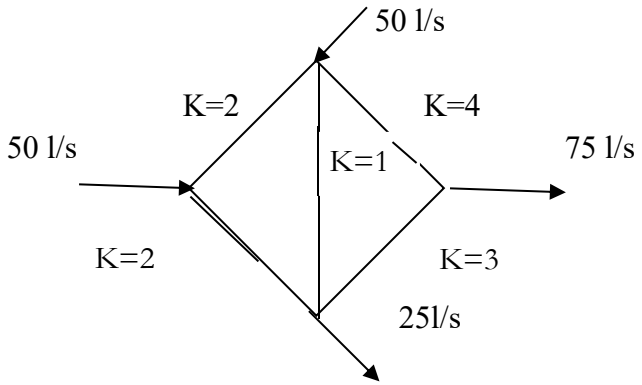
Census Year	1961	1971	1981	1991	2001	2011
population	8,58,545	10,15,672	12,01,553	16,91,538	20,77,820	25,85,862

12. a) Estimate the settling velocity of a particle of 0.06 mm diameter having specific gravity of 2.65 at of 20oC. Take kinematic viscosity as 1.007 x 10-6 m2/s. 4 CO2 [K_3]

b) Design a rectangular primary sedimentation tank to treat water with average flow rate of 20MLD for a detention period of 4hrs. Assume a suitable velocity and check for the Surface overflow rate. 12 CO2 [K_3]

13. a) Explain the advantages and disadvantages of the Water Distribution networks with neat sketches. 6 CO3 [K_2]

b) Analyse the pipe network and determine the distribution of flow after two corrections shown in figure below. The head loss H_L may be assumed as KQ^n. The flow is turbulent and pipes are rough. The value of K for each pipe is indicated in the figure. Use Hardy Cross Method for atleast one iteration. 10 CO3 [K_3]



14. a) A combined sewer of a circular section is to be laid to serve a particular area. Calculate the size of this sewer from the following data: 12 CO4 [K_3]

Area to be served : 140 hectares

		Population : 2,00,000 Mximum Permissible flow velocity : 3 m/sec Time of entry of storm water : 12 minutes Time of flow in channel : 20 minutes Per capita water supply : 25 lpcd Coefficientof run-off for the area : 0.45 Hourly, maximum rainfall for the area At the design frequency : 5 cm Assume any other data not given and if needed.			
	b)	Differentiate self-cleansing and non-scouring velocity.	4	CO4	[K_2]
15.	a)	Design a Septic tank for a hostel with the following data: • Number of Users = 150 • Peak discharge = 200 Lit/min • Desludging period = 1 year.	6	CO5	[K_3]
	b)	Design standard rate Trickling filter for the following data: Sewage flow = 3.0 MLD Recirculation ratio = 1.5 BOD of raw sewage = 250 mg/L BOD removed in primary tank = 25% Final effluent BOD desired = 30 mg/L	10	CO5	[K_3]
16.	a)	Describe the salient features of river intake with neat sketch.	8	CO1	[K_2]
	b)	Differentiate slow sand and rapid sand gravity filters based on their working principles and functional operations.	8	CO2	[K_2]