

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

First Semester

Environmental Engineering

PEVT2403 - Physical and Chemical Treatment Systems for Water and Wastewater

Regulations - 2024

Duration : 3 Hrs

Maximum : 100 Marks

PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	List out the major pollutants present in the water and waste water.	RE	1	2
2.	Specify the standards of performance of waste water treatment with reference to four key physic-chemical parameters.	RE	1	2
3.	Summarize the principle of reverse osmosis.	UN	2	2
4.	How is flocculation carried out in treatment plants?	RE	2	2
5.	Illustrate the purpose of increasing the number of media type in a filter.	UN	3	2
6.	How are residue managed after water treatment?	RE	3	2
7.	Distinguish between hydraulic profile and PID.	UN	4	2
8.	List out the major industries and their pollutants.	RE	4	2
9.	What are the functions of grit chamber in waste water treatment plants?	RE	5	2
10.	Outline about sludge thickening.	UN	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Explain the significance of physico-chemical treatment in wastewater treatment plants.	UN	1	13
	Or			
	b i Explain the criteria for reactor selection for a given application.	UN	1	7
	ii Compare the batch and continuous reactors in terms of reactor kinetics.	UN	1	6
12.	a Explain the functions of nanofiltration, ultrafiltration and electrodialysis in treatment systems.	UN	2	13
	Or			
	b Summarize the different types of chemical treatment methods used in wastewater treatment plants.	UN	2	13
13.	a Distinguish between rapid sand filter, slow sand filter & pressure filters.	AN	3	13
	Or			
	b i The maximum daily demand at a water purification plant has been estimated as 15 million litres per day. Design the dimensions of a suitable sedimentation tank (fitted with mechanical sludge removal arrangements) for the raw supplies, assuming a detention period of 6 hours and the velocity of flow as 25 cm per minute.	AN	3	7

	ii	A filter unit is 4.5 m by 9.0 m. After filtering 10,000 cubic meter per day in 24-hour period, the filter is back washed at a rate of 10 l/sq.m/sec for 15 min. Compute the average filtration rate, quantity, and percentage of treated water used in washing, and the rate of wash water flow in each trough. Assume 4 troughs.	AN	3	6
14.	a	Design an industrial wastewater treatment plant for a paper & sugar industry with a case study.	AN	4	13
		Or			
	b	Examine the construction, operation and maintenance of an industrial water treatment plants.	AN	4	13
15.	a	Identify the functions of grit chamber, sludge drying beds and oil skimmer in wastewater plants.	AP	5	13
		Or			
	b	Construct the layouts and hydraulic profile of an industrial wastewater plants.	AP	5	13

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	Examine the importance and usefulness different physical and chemical treatments used in municipal water treatment plants.	AN	4	15
		Or			
	b	Design a wastewater treatment plant for a population of 4000. Daily water supply 3,00,000 liters. Daily sewage generation is about 80% of daily water supply.	AN	5	15