Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V(NEW) EXAMINATION – SUMMER 2022

Subject Code:3151303 Date:04/06/2022

Subject Name:Physico-chemical Treatment Technology

Time:02:30 PM TO 05:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

Q.1	**(a)**	Give the classification of Screens.	**03**
	(b)	Enlist characteristics of wastewater and explain physical characteristics in detail.	**04**
	(c)	Discuss aerated grit chamber with neat sketch. Also explain advantages and disadvantages of it.	**07**
Q.2	**(a)**	Differentiate between electrophoresis and electro osmosis.	**03**
	(b)	Classify the properties of colloidal dispersion.	**04**
	(c)	Describe electric double layer theory with neat sketch.	**07**
		OR	
	(c)	Describe DLVO theory with neat sketch.	**07**
Q.3	**(a)**	Distinguish between discrete and Flocculant settling.	**03**
	(b)	Define effective size and uniformity co-efficient.	**04**
	(c)	Write a short note on tube settler with neat sketch.	**07**
		OR	
Q.3	**(a)**	Define following terms: 1. SOR 2. WOR 3. Scour velocity	**03**
	(b)	Give the detail classification of filtration.	**04**
	(c)	Enlist functional zones of sedimentation tank and explain sludge and outlet zone in detail.	**07**
Q.4	**(a)**	Give the detail classification of treatment.	**03**
	(b)	Find terminal settling velocity of spherical particle with diameter of 0.05mm of specific gravity 2.65 settling through water having kinematic viscosity 1.004×10^{-4} m^2/sec.	**04**
	(c)	A 50 MLD treatment uses an alum dose of 125 mg/L for raw water which contains about 15 mg/L suspended solids. Estimate maximum kg/day of dry sludge solids which must be removed from plant and volume of wet sludge which has 2 % by weight. Take specific gravity of sludge as 1.02. Assume $Al_2(SO_4)_3.14\ H_2O$ as alum.	**07**
		OR	
Q.4	**(a)**	Differentiate between flocculation and coagulation.	**03**
	(b)	Determine the head loss through bar screen when 50% of flow area is clogged due to accumulation of coarse particles. Assume Vapp = 0.6 m/sec, Vscreen = 0.9 m/sec , open area for flow through clear bar screen = 0.9 m^2, head loss coefficient C(clean) = 07 and C(Clogged) = 0.6	**04**

	(c)	Discuss settling column test of discrete particles.	**07**
Q.5	**(a)**	How to estimate the SVI?	**03**
	(b)	Enlist methods of dewatering and explain any one in detail.	**04**
	(c)	Write a short note on breakpoint chlorination with neat sketch.	**07**

OR

Q.5	**(a)**	Enlist sources of sludge.	**03**
	(b)	Differentiate between aerobic and anaerobic digestion.	**04**
	(c)	What do you understand by the term disinfection of water? Why it is necessary to disinfect the water for public water supply schemes?	**07**

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