Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII(NEW) • EXAMINATION – WINTER 2016

Subject Code:2171306 **Date:25/11/2016**

Subject Name:Wastewater Engineering

Time:10.30 AM to 1.30 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4.

Q.1 (a) Design a Parabolic grit chamber with rectangular weir has 9 MLD flow and particle size 150 µm with specific gravity 2.65. Assume horizontal velocity 0.216 m/sec. **07**

(b) Design an aerated grit chamber for the treatment of Municipal waste water. The average flow rate is 0.55 m^3/s and the peaking factor is 2. **07**

Q.2 (a) Differentiate between domestic wastewater and industrial wastewater. **07**

(b) Enlist and Explain the operational problems of Physical Unit operations. **07**

OR

(b) Write a Short note on Rotating Biological Contactors with neat sketch. **07**

Q.3 (a) Find the Volume of ASP aeration tank to treat a waste of flow 0.15 m^3/s & influent BOD of 85 mg/l. The effluent standard is 30 mg/l of BOD_5 & 30 mg/l of SS. Assume that BOD_5 of SS is 63% of SS concentration. Take Ks = 100, k =5, K_d =0.05, y = 0.5 & X = 2000 mg/l. **07**

(b) Write a short note on Belt filter press with a neat diagram. **07**

OR

Q.3 (a) For the flow rate data given in the table below, find out the volume of equalization tank **07**

Time	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
Q, m^3/sec	0.11	0.15	0.2	0.26	0.30	0.34	0.36	0.37	0.37	0.35	0.31	0.26	0.25
Time	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	
Q, m^3/sec	0.26	0.29	0.34	0.4	0.46	0.49	0.49	0.46	0.3	0.26	0.2	0.11	

(b) Enlist and Explain the operational problems of Chemical Unit operations. **07**

Q.4 (a) With neat sketch, explain the phases of SBR operational cycle. **07**

(b) Enlist the drawbacks and benefits of SBR. **07**

OR

Q.4 (a) Design a circular sedimentation tank for design flow of 21,000 m^3/day. Assume detention time 2 hrs. Determine tank depth and diameter to produce an overflow rate of 35 m^3/m^2.day. Check for WOR and Horizontal velocity. Draw line sketch of it. **14**

Q.5 (a) Explain the UASB process with its design criteria. **07**

(b) Design an oil and grease trap to remove 150mg/L of oil and grease from a flow of 45000 m^3/day of wastewater. **07**

OR

Q.5 (a) Design a bar rack (mechanically cleaned) for a peak flow 70MLD flow condition in incoming sewer is given by: **14**

1) Diameter of sewer = 1.50 m
2) Depth of flow at peak flow =1 m,
3) Velocity at peak design flow = 0.8m/s
4) Drop to screen chamber flow with respect to sewer invert is 0.08 m

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