GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER II– EXAMINATION – WINTER - 2016 Subject Code: 2721802 Date: 17/11/2016 Subject Name: Treatment Process Design and Drawing			
Time: 2:30 pm to 5:00 pm Total Mark			ks: 70
	1. 2. 3.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks	
Q.1		Design a clariflocculator for a flow of 5 MLD.	14
Q.2	(a)	Design a bar screen to treat a wastewater flow of 0.5 m3/s and draw its neat Sketch.	07
	<b>(b</b> )	Differentiate between slow sand and rapid sand filter. OR	07
	<b>(b</b> )	Write a short note on cyclone separator along with a neat sketch.	07
Q.3	(a)	Design a Cyclone Separator for 22,000 m <sup>3</sup> /h gas stream at 100 °C. Consider the gas to be air having 100g/s of dust. The dust mean diameter is 12 µm and $p_p = 1500 \text{ kg/m}^3$ (a) Determine dimensions of components of cyclone. (b) Determine pressure drop through cyclone. Take $\mu_g = 2.1 \times 10^{-5} \text{ kg/m-s}$ .	14
		OR	
Q.3	(a)	Write a short note on Fabric filters.	14
Q.4	(a)	Explain the purpose of flow measuring devices. Enlist the different types	07
		of flow measuring devices and explain anyone with a neat sketch.	
	(b)	<ul> <li>Explain the terms:</li> <li>1. WOR 2. Detention time 3.SOR 4. Scour velocity</li> <li>5.Mean Cell Residence time. 6. F/M ratio 7. Effective size of sand.</li> </ul>	07
Q.4	(a)	Prepare a list of modifications of Activated Sludge Process and explain any two.	07
	<b>(b</b> )	What is equalization? Explain its purpose and types .	07
Q.5	(a)	Design a ASP process for a flow of 250 m3/d with inlet BOD of 300 mg/L. Assume following data: Y=0.45 MLSS=2000mg/L Kd= 0.15 Ks=20 MCRT =8 days	14

Q.5 (a) Air at 70°C passes through fabric filter for a period of 6h 25 minutes, 14 after which the total pressure drop is measured as 1.2 kPa. The filter cake density is 1280 kg/m<sup>3</sup>, and the residual pressure drop across the cleaned filter before the test is 137 Pa. The air velocity is 1.28 m/min, during the test and the initial dust loading is 32 g /m<sup>3</sup>. Estimate the permeability K<sub>p</sub> of the dust layer in units of square meter.

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