Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–II(New course)• EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 2721802 **Date: 09/12/2015**

Subject Name: Treatment Process Design and Drawing

Time:2:30 pm to 5:00 pm **Total Marks: 70**

Instructions:

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

Q.1 (a) Design a bar screen to treat a wastewater flow of 0.4 m^3/s and draw a neat sketch. **07**

(b) Prepare a list of flow measuring devices and with the help of neat sketches explain any two flow measuring devices **07**

Q.2 (a) Explain the purposes of providing equalization tank. Explain inline and offline equalization. What are its benefits? **06**

(b) An Activated sludge plant is designed to reduce 90 % of influent BOD of 250 mg/L. Compute (a)Net sludge produced per day (b) mean cell residence time, (c) hydraulic retention time and (d) F/M ratio for the assumed design data given below. **08**

Wastewater Flow: 2 MLD
Volume of aeration tank : 500 m3
MLSS in the aeration tank : 2500 mg/L
Kinetic coefficients, Y: 0.5 and Kd : 0.08 day-1

OR

(b) With the help of neat sketch explain any two along with their advantages and limitations: **08**

(i) Extended aeration
(ii) Step aeration process
(iii) Contact stabilization process
(iv) Oxidation ditch

Q.3 (a) Design an equalization basin for the following: **08**

Time h	00	01	02	03	04	05	06	07	08	09	10	11
Flow m3/s	0.048	0.036	0.023	0.019	0.019	0.020	0.023	0.036	0.0509	0.0631	0.0670	0.0682
Time h	12	13	14	15	16	17	18	19	20	21	22	23
Flow m3/s	0.072	0.0744	0.0750	0.078	0.0806	0.0843	0.085	0.0806	0.078	0.667	0.058	0.0526

(b) Differentiate between coagulation and flocculation giving at least 6 points of difference. **06**

OR

Q.3 (a) Write a note on mixing devices. **08**

(b) Give the classification of different types of filtration systems. **06**

Q.4 (a) Design a two stage Trickling Filter system for a flow of 7 MLD to produce an effluent of BOD 30 mg/L. **10**

(b) Define the terms :

(i) SOR (ii) WOR (iii) Scour velocity (iv) F/M ratio **04**

OR

Q.4 (a) Design a clariflocculator for a flow of 8 MLD. **08**

Q.4 (b) Differentiate between Rapid sand filter and slow sand filter. **06**

Q.5 With the help of a neat sketch explain the construction and working of a cyclone separator for removal of particulate matter from flue gases. Also enlist the advantages and limitations of a cyclone separator. **14**

OR

Q.5 A test is carried out to determine the values of R_f & R_p. for design of a Bag Filter .The following data were obtained. **14**

a. ΔP (after cleaning) = 4.5 mbars
b. Mass collected = 45 kg
c. ΔP (after test run) = 22 mbars
d. Filter area, A = 37 m^2
e. flow rate, Q = 0.51 m^3/s

Determine (a) R_f and (b) Rp

****