Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II (Old course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 1721802 Date:13/05/2015

Subject Name: Treatment Process Design and Drawing

Time: 02:30 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 clariflocculator for average flow of 12 MLD. **14**

Q.2 (a) Define the following highlighting its significance in the design and operation of Clariflocculator: **07**

(i) Velocity gradient

(ii) RPM of paddles

(b) With the help of a neat sketch explain any one flow measuring device. **07**

OR

(b) Describe the procedure to find out the effective size and uniformity coefficients of sand to be used in RSF. Also write the method to determine $P_{toofine}$, $Pt_{oocoarse}$ and $P_{useable}$ from sand. **07**

Q.3 (a) Calculate the overall efficiency of a venture scrubber given following conditions: **14**

Liquid to gas ration :1.14 lit/m3 Throat velocity = 69.19 m/s

Particle density of fly ash=700 kg/m3 Gas viscosity=2.21 x10^{-5} kg/m-s

The particle size distribution data are given in table .Use k=1.125 and neglect the Cunningham factor effect.

dp microns	< 0.1	0.1-0.5	0.5-1.0	1.0-5.0	5.0-10.0	10.0-15.0	15.0-20.0	>20.0
Weight %	0.01	0.21	0.78	13	16	12	8	50

OR

Q.3 (a) Determine the overall dust removal efficiency of the cyclone separator from the following data: **14**

(i) Composition of dust

dp, µm	50	20	10	05	01
Mass fraction	0.3	0.25	0.2	0.15	0.1

(ii) Diameter of cyclone=1.5m
(iii) Temperature=20^0C
(iv) Flow rate=5.5m^3/sec
(v) Configuration Factor=551.3
(vi) Density of particle=1725kg/m^3
(vii) Dynamic viscosity=2.1 x 10^{-5} kg/m-s.

Q.4 (a) Design a screen with screen chamber for average flow of 90 MLD. Assume suitable data if required. **14**

OR

Q.4 (a) Design a grit chamber (parabolic channel type) for a flow of 0.5m^3/sec. **14**

Q.5 (a) The cumulative flow of wastewater reaching at the end of time period to a treatment plant in a day varies as shown in table. Determine the capacity of an equalization tank for the given flow variation. The given flow fluctuations are as under : **14**

Time H	0	2	4	6	8	10	12	14	16	18	20	22	24
Cum Flow m^3	0	30	50	80	110	120	130	150	162	180	198	200	220

OR

Q.5 (a) For ASP with recycle find the volume of aeration tank, sludge wasting rate, Recycle ratio and oxygen requirement to treat waste water with following characteristics: **14**

Flow: 5000 m^3/d
BOD:3350 mg/L
Y: 0.45
Kd: 0.1
Ks : 20
SRT : 8 days
MLSS :2500 mg/L
Check for F/M ratio.

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