

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 2711808**Date: 09-01-2015****Subject Name: Water and Wastewater Technologies****Time: 02:30 pm - 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.

- Q.1 (a)** The hourly variation in wastewater flow for a given town along with corresponding average concentrations of BOD and SS are given in Table. Compute the average and weighted average concentrations of BOD and SS, average hourly flow rate and mass loading data. **14**

Time (Hours)	Flow (m ³ /hr)	BOD (mg/L)	SS (mg/L)	Time (Hours)	Flow (m ³ /hr)	BOD (mg/L)	SS (mg/L)
0	16.50	171	193	12	19.20	223	281
1	15.20	142	163	13	19.50	218	269
2	13.70	103	125	14	18.60	210	246
3	13.40	74	97	15	18.20	205	245
4	12.60	51	67	16	17.60	192	181
5	12.40	55	60	17	17.50	166	167
6	12.30	69	62	18	17.60	160	165
7	13.50	118	105	19	18.20	189	189
8	16.60	149	216	20	18.90	240	218
9	18.40	190	271	21	19.20	315	226
10	19.20	212	283	22	18.80	272	221
11	19.60	221	294	23	17.80	213	200

- Q.2 (a)** Prepare a list of conventional coagulants in water treatment and with the help of equations explain the chemistry of each. **07**
- (b)** How much alkalinity (as CaCO₃) is consumed by a dose of 40 mg/L each of the following coagulants-Al₂(SO₄)₃.18H₂O, FeSO₄.7H₂O, Fe Cl₃, and Fe(SO₄)₃? **07**

OR

- (b)** Enlist and explain the mechanisms of coagulation. **07**

- Q.3 (a)** Differentiate between Slow Sand Filter and Rapid Sand Filter giving at least 7 points of difference. **07**
- (b)** Enlist and explain the different types of settling phenomena giving examples of each. **07**

OR

- Q.3 (a)** Explain the terms **07**
- | | |
|------------------------------|--|
| (i) Mean cell residence time | (iv) Food to microbe ratio |
| (ii) Yield | (v) Recycle ratio |
| (iii) Specific growth rate | (vi) Specific substrate utilization rate |
| | (vii) Oxygen uptake rate |
- (b)** Differentiate between aerobic and anaerobic process. **07**

- Q.4 (a)** Differentiate between **07**
 (i) Suspended growth process and attached growth process
 (ii) Extended aeration and tapered aeration
- (b)** Describe the experimental procedure to determine the biokinetic constants in laboratory **07**
- OR**
- Q.4 (a)** With a neat diagram, describe the removal mechanism of a trickling filter. **07**
(b) Enlist the modification of Activated Sludge Process and explain any two with neat sketches. **07**
- Q.5 (a)** With the help of a neat sketch, explain the components & working of UASB. **07**
(b) Enlist & Explain the environmental factors affecting anaerobic treatment process. **07**
- OR**
- Q.5 (a)** Differentiate between: **07**
 (i) Standard rate & high rate digesters
 (ii) Single stage & two stage anaerobic digester
- (b)** Explain the terms: **07**
 (i) SOR (ii) WOR (iii) Scour Velocity (iv) Organic Loading rate
 (v) Flow through velocity (vi) settling velocity (vii) detention time
