

Total No. of Questions : 8]

SEAT No. :

P4582

[Total No. of Pages : 2

[4860]-1053

M.E. (CIVIL) (Water Resource & Environmental Engg.)

ADVANCED WATER & WASTEWATER TREATMENT

(2013 Credit Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Answer any five questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of logarithmic tables, slide rule, mollier charts, electronic pocket calculator and steam tables is allowed.*
- 5) *Assume suitable data, if necessary.*

Q1) Explain in detail the principle and working of electro dialysis and ion exchange for water and wastewater treatment. **[10]**

Q2) Discuss the principle, concept and necessity of aeration. Explain various methods of aeration with neat sketches. **[10]**

Q3) What is the theory of disinfection? State the factors affecting disinfection. Explain break point chlorination. **[10]**

Q4) Design an aerated grit chamber for the treatment of municipal wastewater. The average flow rate is $0.5 \text{ m}^3/\text{s}$. Take peak factor as 2.75. **[10]**

Q5) Design an activated sludge process for municipal wastewater flow rate of $8000 \text{ m}^3/\text{day}$, BOD of settled effluent = 180 mg/l , expected BOD of treated effluent = 10 mg/l , yield coefficient = 0.5 kg/kg , $K_d = 0.05/\text{day}$, MLSS = 3000 mg/l , return sludge solids concentration = $10,000 \text{ mg/l}$ and mean cell residence time is 10 days.

Determine

- a) Volume of reactor
- b) F/M ratio
- c) VLR
- d) Oxygen requirement
- e) Recycle ratio &
- f) BOD removal efficiency.

[10]

P.T.O.

Q6) Design a high rate trickling filter using NRC equations for

- a) sewage flow = 5MLD,
- b) recirculation ratio = 1.5,
- c) BOD of raw sewage = 300 mg/l,
- d) BOB removal in PST= 35%,
- e) final effluent BOD desired =30 MG/L.

[10]

Q7) State the design parameters, principle, advantages and disadvantages of UASBR. Draw a neat sketch of the reactor. **[10]**

Q8) State the sources of wastewater from manufacturing process, characteristics of effluent for dairy and automobile industry. Draw the treatment flow charts. **[10]**

