SEAT No. :

P4754

[5060] - 558

M.E. (Civil) (Water Resource & Environmental Engg.)
ADVANCED WATER & WASTE WATER TREATMENT
(2013 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 reverse osmosis and ion exchange for water and waste water 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 different methods of chlorination. **[10]**

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

Q5) Design an activated sludge process for municipal wastewater flow rate of 9000m^3/day, BOD of settled effluent = 2100 mg/l, expected BOD of treated effluent = 17 mg/l, yield coefficient = 0.5 kg/kg, K_d = 0.05/day, MLSS =3000 mg/l, return sludge solids concentration = 10,000 mg/l, and mean cell residence time is 10 days. **[10]**

Determine :

i)   Volume of reactor,

ii)   F/M ratio,

iii) VLR,

iv) Oxygen requirement,

v)   Recycle ratio &

vi) BOD removal efficiency.

Q6) Design a high rate trickling filter using NRC equations for   **[10]**

i)   Sewage flow = 10 MLD,

ii)   Recirculation ratio = 1.5,

iii) BOD of raw sewage = 1900 mg/l,

iv) BOB removal in PST = 35%,

v)   Final effluent BOD desired = 20 mg/L.

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

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

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