[4960]-1053

M. E. (Civil) (Water Resource & Environmental Engg.)
ADVANCED WATER & WASTE WATER TREATMENT
(2013 Pattern)

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 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 theory of filtration? Explain in detail components, under drainage system, cleaning and operational troubles in RSGF.   **[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 8000m^3/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/day, MLSS = 3000 mg/l, return sludge solids concentration = 10,000 mg/l, and mean cell residence time is 10 days.   **[10]**

P.T.O.

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 = 5MLD

    ii)   Recirculation ratio = 1.5

    iii)   BOD of raw sewage = 300 mg/l

    iv)   BOB removal in PST = 35%

    v)   Final effluent BOD desired = 30 mg/l

Q7) Explain the methods of sludge treatment and disposal with their advantages and disadvantages.   **[10]**

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

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