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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MAKE UP EXAMINATION- November 2016

B.Tech(8^{th})/ M.tech (2^{nd}) Semester

COURSE CODE: 14M31CE214 MAX. MARKS: 25

COURSE NAME: Process Design in Environmental Engg.

COURSE CREDITS: 3 MAX. TIME: 1Hr 30 Min

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

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1. Design a two stage trickling filter to treat settled domestic sewage with a BOD_5 of 200 mg/L for an average flow of 10 MLD. Assume a peak factor of 2. The desired effluent BOD is 10 mg/L. Provide following information: (a) Volume and size of filter (b) Details of distributor for first stage filter. **(6)**
2. A staged RBC system is to be designed using following data:
   a. Inflow = 10000 m^3/d
   b. Influent BOD = 200 mg/L
   c. Influent soluble BOD = 90 mg/L
   d. Desired effluent BOD = 20 mg/L
   e. Desired effluent soluble BOD = 10 mg/L
   f. Permissible organic loading : 4 – 10 g sBOD/m^2.d
      8 – 20 g BOD/m^2.d
   g. Maximum 1st stage organic loading: 12 -15 g sBOD/m^2.d
      24 – 30 g BOD/m^2.d

   Disk surface area of standard unit: 9300 m^2 **(6)**
3. Explain following:
   (a) Difference between SRT and HRT (b) Types of trickling filter (c) Enumerate advantages and disadvantages of aerobic treatment of wastewater (d) Explain difference between conventional and extended aeration system. **(8)**
4. Design an oxidation ditch for a population of 100000. Assume per capita wastewater flow rate of 150 lpcd. BOD_5 generation is 35 g/ capita/ day and TKN generation is 15 gm/capita/day. Effluent BOD_5 concentration should not be greater than 30 mg/l. Food by mass ratio 0.2. Return sludge concentration (MLSS) is 9000 mg/l. MLVSS/ MLSS =0.5. Sludge yield coefficient, Y_d= 0.6, Sludge decay coefficient is 0.12 d^{-1}. MLVSS = 1800 mg/l. (*Assume any other necessary data suitably).* **(5)**