Anirban Dhuley

Roll No: _____

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- Dec 2017

M.Tech 1st Semester

COURSE CODE: 14M31CE116 MAX. MARKS:35

COURSE NAME: Wastewater Treatment

COURSE CREDITS: 3 MAX. TIME: 2 Hrs

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.* ***Assume any other necessary data suitably.***

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1. A staged RBC system is to be designed using following data:
   a. Inflow = 50000 m^3/d
   b. Influent BOD = 500 mg/L
   c. Influent soluble BOD = 300 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
   f. Disk surface area of standard unit: 9000 m^2 **(7)**
2. Write short notes on the following: (a) Advantages and disadvantages of stabilization pond (b) Aerobic and anaerobic oxidation pond (c) Advantages and disadvantages of anaerobic treatment (d) UASB (e) Sludge drying beds. **(10)**
3. Design a facultative stabilization pond to treat 5000 m^3/d wastewater, BOD_5 230 mg/l, from a town located in central India, latitude 22° N, elevation 100 m above sea level. The average temperature in January is 18° C. The effluent from the pond is to be used for irrigation. **(6)**
4. Design an upflow sludge blanket reactor for an average flow of 5 MLD of wastewater with the following data:
   COD of wastewater = 400 mg/l
   HRT = 6 hrs
   Design COD loading = 1-2 kg COD/ m^3d
   Velocity of rise of wastewater in the reactor through sludge bed = 0.75 hr
   Velocity of wastewater in settling chamber = <1.5 m/hr
   Flow area covered by each inlet = 1-2 m^2 **(4)**
5. Design sludge drying beds for digested sludge obtained from low rate anaerobic digesters for digesting a mixture of primary and excess activated sludge. The capacity of activated sludge plant is 50000 m^3/d. Assume any other necessary data suitably. **(4)**
6. Design a bio-tower system to treat a wastewater flow of 50 MLD having settled BOD_5 equal to 3000 mg/l and to be operated at 25° C. The depth of media to be used is 6 m and the recirculation ratio is 2.5:1. The treatability constant at 20° C is 0.06 min^{-1}.and desirable concentration of effluent BOD_5 is 20 mg/l. **(4)**