Dr Rajw

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
T2 EXAMINATION (April- 2018)
B.Tech (VIII –SEM)/M. Tech. (II- SEM.)

COURSE CODE: 14M31CE214 MAX. MARKS: 25
COURSE NAME: Process Design in Environmental Engineering
COURSE CREDIT: 3 MAX. TIME: 1.5 HRS

Note: Attempt all Questions. Carrying of mobile phones during exams will be treated as case of unfair means. Assume suitable data if required.

1. With a neat flow sketches, explain the following combined treatment systems (a) Activated Biofilter, (b) Roughing Filter/ASP system, (c) Trickling Filter/Solids Contact Process and (d) Trickling Filter/ASP systems **(12) [CO-1, 2, 4]**

2. Design an oxidation ditch for a population of 45,000 having an organic loading rate (5day at 20^0C) of 50gm/capita/day. The sewage flow rate is 150lpcd and desired effluent BOD_5 at 20^0C is 20mg/l. The organic loading rate in the ditch is 0.5 and depth of ditch is 1.5 m. Assume 4 ditches in parallel setup. The oxygen requirement is 2.5kg of O_2/kg of BOD_5. The applied oxygenation capacity of 1 m length of rotor at 16 cm depth of immersion and 75 RPM with a rotor speed of 3kg of O_2/hr **(6) [CO-1, 2, 4]**

3. Design an RBC for a wastewater flow of 4200 m^3/d having SBOD$_5$ of 150mg/l and total BOD_5 of 300mg/l. The effluent BOD_5 should be less than 25mg/l. The temperature of incoming wastewater is 28^0C and peaking factor for both peak hourly flow rates is 3.5. The loading factor is 8 kgSBOD/1000 m^2/d. The overflow rate on average flow is 24 m/d and for peak flow conditions is 48 m/d. **(3) [CO-1, 2, 4]**

4. Design a biotower to treat a flow of 25000 m^3/d with an influent BOD concentration of 200 mg/l. Assume the treatability constant to 0.075 per minute at a temperature of 20^0C and the filter media constant can be assumed as 0.6. The depth of the medium is 7 m and the recirculation ratio is 2.5 during average flow concentrations. The treated effluent should have a BOD concentration of 10 mg/l and the temperature of wastewater is 30^0C. Assume 3 treatment units to be provided. **(4) [CO-1, 2, 4]**