COLLEGE OF ENGINEERING PUNE

Mid Semester Examination for First term 2013-14
Subject code: CE -407

Name of subject: **Environmental Engineering -II**

Programme: Final Year B. Tech. (Civil)
Year: 2013-14 **Date: / 11 / 2013**
Duration: 03 hrs **Max. Marks: 50**
Instructions: 1 Attempt any five questions
2 Solve the whole question at a time and in a sequence

Q No.1 A	Draw flow diagrams of wastewater treatment plant 1 Activated sludge process 2 Trickling filter 3 Oxidation pond	**05**
B	Explain aerobic and anaerobic Biological treatment of wastewater	**05**
Q No 2 A	A COD test is performed as per standard methods with potassium di chromate as an oxidising agent and following results are obtained. Calculate C O D and write interpretation of test results **Standardisation** 25 ml ferrous ammonium sulphate is required for 10 ml of potassium di chromate of 0.25 N **Sample digestion** Volumes of ferrous ammonium sulphate required for 20 ml Blank and 20 ml sample (dilution ratio1: 50) are 25 ml and 24 ml respectively	**05**
B	Enlist various physical, Chemical and Biological characteristics of waste water. Explain the significance of B O D and COD tests.	**05**
Q No 3 A	Calculate the velocity and discharge in a circular sewer having diameter 1 mt , laid at a gradient 1in 500. The sewer runs partially full at (d /D) = 0.5. Use Manning's formula with n = 0.01	**05**
B	Enlist various appurtenances used in the sewerage system. Draw a sketch of a drop manhole and explain its purpose	**05**
Q No 4 A	What is the necessity of velocity control device in grit chamber? Draw a neat labeled sketch of one such device and explain its concept.	**05**
B	An average operating data for conventional ASP design is as below Wastewater flow = 35000 m3 per day Volume of aeration tank = 12800 m3 Influent B O D = So= 180 mg /lit Effluent B O D = Se = 20 mg/lit Max. Growth Yield Coefficient Y = 0.6	**05**
	Endogenous respiration rate constant Kd = 0.05/day MLSS = X = 3000 mg/lit Effluent suspended solids = 30 mg /lit Waste sludge suspended solids 12000 mg/lit Work out the hydraulic retention time, F/M ratio, efficiency for the activated sludge tank, Mean cell residence time and recirculation ratio. Compare results with standard characteristics of conventional ASP	

Q No 5 A	Enlist low cost wastewater treatment techniques and explain principle of oxidation pond	**05**
B	Design a facultative stabilization pond with following data 1- Population to be served 5,000 2- Sewage flow 140 lpcd 3- Location 22 ° North 4- Elevation 800 mt. above mean Sea Level 5- Mean Temperature during coldest month 30 ° C Max and 10 ° C min 6- Influent B O D = 120 mg/l 7- Desired B O D reduction = 90 % 8- B O D removal rate constant K = 0.1 per day (I S 5611) Photosynthetic Oxygen rate at 22 ° North = 237.5 kg /day/ha	**05**
Q No 6 A	Draw a neat plan, section of a septic tank. State circumstances under which it is used.	**05**
B	Explain merits and demerits of centralized and decentralized waste water treatment	**05**
Q No 7 A	Enlist stages in sludge treatment and Explain in details anaerobic sludge digestion	**05**
B	Draw a sketch and explain principle of UASB	**05**