

Civil

**COLLEGE OF ENGINEERING PUNE**

**Mid Semester Examination for First term 2011-12**

**Subject code: CE -407**

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

**Programme: Final Year B. Tech. (Civil)**

**Year: 2012-13**

**Duration: 03 hrs**

**Date: 23 / 11 / 2012**

**Max. Marks: 50**

**Instructions: 1 Attempt any five questions**

**2 Solve the whole question at a time and in a sequence**

<b>Q.1</b>	Enlist basic design considerations in waste water treatment. Explain any two in details	10
<b>Q 2 A</b>	Explain aerobic & anaerobic decomposition of Organic waste.	05
<b>B</b>	Explain the stages in self purification of stream. Explain with a graph oxygen sag analysis?	05
<b>Q 3 A</b>	Compare and contrast trickling filter and Activated Sludge process	05
<b>B</b>	Calculate the velocity and discharge of a circular sewer of diameter One meter, laid at a slope of 1 in 500, when it is running 0.8 of its full depth at peak discharge. Assume Manning's constant as 0.012.	05
<b>Q 4 A</b>	Differentiate between recirculation in Trickling filter and Activated sludge process	03
<b>B</b>	Work out the volume, F/M ratio , recirculation ratio, Suspended solids concentration in wasted sludge and efficiency for the activated sludge tank with the following data Discharge $Q = 25000 \text{ M}^3/\text{day}$ Influent B O D = 200mg /lit Effluent B O D = 20mg/lit Mean Cell Residence Time $\theta_c = 10$ days Growth Yield Coefficient $Y = 0.6$ Deoxygenating rate constant $K_d = 0.05/\text{day}$ MLSS in aeration tank = $X = 2000 \text{ mg/lit}$ SVI = 80 ml/gm	07
<b>Q 5 A</b>	What is sludge bulking in Activated Sludge Process ? What are the causes of sludge bulking? What are the remedial measures for sludge bulking?	05
<b>B</b>	Design a facultative stabilization pond with following data 1- Population to be served 15,000 2- Sewage flow 150 lpcd 3- Location $22^\circ$ North 4- Elevation 500 mt. above mean Sea Level 5- Mean Temperature during coldest month $30^\circ \text{ C}$ Max and $10^\circ \text{ C}$ min	05

	6- Influent B O D = 200 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	
<b>Q 6 A</b>	Explain necessity of sludge treatment. What are the stages in sludge treatment? Explain in brief anaerobic sludge digestion.	05
<b>B</b>	A septic tank is to be designed for a colony of 100 population. The peak discharge may be assumed as 300 lpm and rate of water supply as 100 lit/cap/day. Work out Dimensions of septic tank Draw plan and section Work out area required for dispersion trenches if percolation rate is 15 min /cm	05
<b>Q 7 A</b>	Differentiate clearly between centralized and decentralized waste water treatment.	05
<b>B</b>	Draw a sketch and explain principle of UASB	05