COURSE CODE: 14M31CE213　　　　　　　　　　　　　　　　MAX. MARKS: 15
COURSE NAME: Industrial Wastewater Treatment
COURSE CREDIT: 3　　　　　　　　　　　　　　　　　　　　MAX. TIME: 1 HR

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

1. Design an equalization tank for an industrial wastewater flow rate of 15000 m^3/d. The average and maximum BOD concentrations are 800 mg/l and 1200 mg/l respectively. The effluent from equalization basin should be less than 1000 mg/l. Statistically; it has been found that 84.1% probability of BOD occurs at 1250 mg/l and 15.9% probability of BOD concentration occurs at 550 mg/l. The 50% probability of BOD is 700 mg/l. Design at 95% probability conditions. Assume (Z = 1.65) **(4)**

2. Explain the concept of grab sampling and composite sampling. In this context, explain the suitability of using a grab sampling or composite sampling on when they should be conducted. Also describe the different steps that needs to be followed for conducting a composite sampling process **(1+1+2)**

3. Determine the effluent concentration from an equalization basin with a sampling interval of 1 hour with an average flow rate of 1600 gal/min. The initial concentration of the pollutant before the sampling process was started was found to be 170mg/l and the influent concentration entering the equalization basin over the sampling period was found to be 245mg/l. Assume the volume of equalization basin as 588000 gallons. Use Patterson –Menz equation **(2)**

4. Design an equalization tank from the following data. Also determine the time at which the equalization tank is empty. Use graphical method. **(5)**

Time Period (hrs)	Volume of wastewater (m^3)
08-11	72.3
11-14	93.2
14-17	66.8
17-20	91.1
20-23	89.6
23-2	61.1
2-5	61.1
5-8	58.1