COURSE CODE: 10B11CE613

COURSE NAME: Sewage Treatment and Disposal

COURSE CREDIT: 3

MAX. MARKS: 35

MAX. TIME: 2 HRS

Note: Attempt all questions. Assume suitable data if required. Carrying of mobile phone during examinations will be treated as case of unfair means

1. In the context of population forecasting, 'The logistic curve method utilizes other population forecasting methods for predicting the population'. Justify the statement with a neat sketch. [CO 2]   (5)

2. A town with a population of 30,000 has to design a sewage treatment plant to handle industrial as well as domestic wastewaters of the town. A sanitary survey revealed the following: Dairy waste of 3 million liters per day with BOD of 1100 mg/l and a sugar mill waste of 2.4 million litres per day with BOD of 1500 mg/l are produced. In addition, domestic sewage is produced at the rate of 240 litres per capita per day. The per capita BOD of domestic sewage being 72 gm/day. An overall expansion factor of 10 per cent to be provided. The sewage effluents are to be discharged to a river stream with a minimum dry weather flow of 4500 litre per second and dissolved oxygen content of 9mg/l. It is necessary to maintain dissolved oxygen content of 4 mg/l in the stream. Determine the degree of treatment required to be given to the sewage. Assume the suitable values of coefficients of de-oxygenation and re-oxygenation. [CO 3 & 4]   (10)

3. Estimate the screen requirement for a plant treating a peal flow of 60 million litres per day of sewage? [CO 5]   (5)

4. The following results were obtained from 50 ml sample of wastewater:

(a) Mass of evaporating dish= 53.5433g

(b) Mass of evaporating dish and residue after evaporation at 105°C=53.5794g

(c) Mass of evaporating dish and residue after ignition at 550 °C= 53.5625g

(d) Mass of filter after drying at 1050C = 1.5433 g

(e) Mass of filter and residue after drying at 1050C = 1.5554 g

(f) Mass of filter and residue after ignition at 5500C = 1.5476 g

Determine the concentration of different types of solids.

(5)

5. A treated waste water is discharged at a rate of 1.5 m³/sec into a river of minimum flow of 5m³/sec. The temperature of river flow and waste water flow may be assumed as 25 °C. The BOD removal rate constant K_1 is 0.12/d (base 10). The BOD_5 at 25 °C of the wastewater is 200 mg/l, and that of the river water upstream of the wastewater outfall is 1mg/l. The efficiency of waste water treatment is 80%. Evaluate the BOD_5 AT 25 °c if river water receives untreated waste water and treated waste water respectively.

(3.5 + 3.5)

(3)

6. Write short note on the following:

(a) Merits and demerits of coagulation process in sewage treatment.

(b) Skimming Tanks