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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2021

B.Tech V Semester

COURSE CODE: 10B11CE613

MAX. MARKS: 35

COURSE NAME: Sewage Treatment and Disposal

COURSE CREDITS: 3

MAX. TIME: 2 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. What do you mean by variation in flow of sewage? Explain average flow, dry weather flow and maximum flow? [CO-2] [4]
2. 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-5] [5]
3. The population of five decades from 1940 to 1980 is given below. Find out the population in decades 1990, 2000 and 2010 by using: Arithmetical increase method; Geometrical increase method; Incremental increase method and decrease rate of growth method? [CO-3&4] [5]

Year	Population
1940	250000
1950	480500
1960	550300
1970	638600
1980	695200

4. A treated waste water is discharged at a rate of $1.5 \text{ m}^3/\text{sec}$ into a river of minimum flow of $5 \text{ m}^3/\text{sec}$. The temperature of river flow and waste water flow may be assumed as 25°C . The BOD removal rate constant K_1 is $0.12/\text{d}$ (base 10). The BOD₅ at 25°C of the wastewater is 200 mg/l , and that of the river water upstream of the wastewater outfall is 1 mg/l . The efficiency of waste water treatment is 80% . Evaluate the BOD₅ AT 25°C if river water receives untreated waste water and treated waste water respectively. [CO-6] [3.5 + 3.5]
5. Write short note on the following: [3]
 - (a) Merits and demerits of coagulation process in sewage treatment.
 - (b) Skimming Tanks [CO-5&6]
6. A population of 40,000 resides in a town covering an area of 75 hectares. Calculate the discharge for a combined system of sewers. Given:-

(1) Coefficient of run off=0.70

(2) Rain concentration=40 minutes

(3) Water consumption=120 l/d/ person

(4) 70% of wastewater reaches the sewers. [CO-1]

[3]

7. Assuming that the surface on which the rain falls in a district is as follows: 20% of the area consists of roofs with runoff ratio as 0.9, 25% of the area consists of pavements for which the runoff ratio is 0.85, 50% of the area consists of lawns and gardens for which runoff ratio is 0.10, and the remaining 5% of the area is wooded for which the runoff ratio is 0.05. Determine the runoff coefficient, if the total area of the district is 1.5 square km and the maximum rain intensity is taken as 60.5 mm/hour, what is the total runoff for the district using rational formula? [CO-2]

[3]

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

(a) Mass of evaporating dish = 53.5433 g

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

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

(d) Mass of filter after drying at 105°C = 1.5433 g

(e) Mass of filter and residue after drying at 105°C = 1.5554 g

(f) Mass of filter and residue after ignition at 550°C = 1.5476 g

Determine the concentration of different types of solids. [CO-4]

[5]