

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST II EXAMINATION (April- 2016)
B. Tech. (VI- SEM.)

COURSE CODE: 10B11CE613

MAX. MARKS: 25

COURSE NAME: Sewage Treatment and Disposal

COURSE CREDIT: 3

MAX. TIME: 1.5 HRS

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

1. A 500 mm diameter concrete pipe has a slope of 0.75% and a flowrate of $2 \text{ m}^3/\text{s}$. The BOD_5 at the influent is 250 mg/l and the wastewater temperature is 25°C . Determine the potential for sulphide generation (2.5)
2. a) With a neat graphical representation, explain the variation of DO during the BOD test and derive an expression for 5 day BOD from the same. (3)
2. b) The BOD of a sewage incubated for one day has been found to be 100 mg/l at 30°C . What is the 5-day BOD at 20°C . Assume k (base 10) at 20°C to be 0.1 per day. (2)
3. With neat sketches where appropriate, write short notes on (a) Obstruction test in sewers (b) Laying out of sewers (c) Flushing Tank and (d) Inverted Syphons (2.5x4 = 10)
4. Discuss the advantages and disadvantages of PFR and CFSTR (min. 4 points each) (3)
5. Examine the correctness of following statements and justify your answer (a) The ultimate BOD of the sewage decreases with the increase in temperature and (b) The sewers are laid from tail end towards the head end. (2)
6. A lateral is to be designed for a city of 50km^2 . It will cover 50% residential, 30% commercial and 20% industrial. The residential area is designed for 40% large lots, 50% small single family lots, 5% small two family lots and 5% for multistoried apartments. The average domestic wastewater flow rate is $9.26 \times 10^{-6} \text{ m}^3/\text{sec}/\text{person}$, commercial flow rate $2.89 \times 10^{-4} \text{ m}^3/\text{sec}/\text{ha}$ and the industrial flow rate is $4.63 \times 10^{-4} \text{ m}^3/\text{sec}/\text{ha}$. Infiltration and Inflow occurs for the entire area and has a flow rate of 1000 l/d/ha. Calculate the maximum and the minimum flows required to be maintained in the sewer. (2.5)
 The saturation densities for the residential areas are given in the following table

| Type of area | Density (persons/ha) |
|---------------------------|----------------------|
| Large lots | 9 |
| Small lots, single family | 80 |
| Small lots, two family | 130 |
| Multistoried apartments | 2700 |