

**B.Tech. Civil (Water Resources Engineering)****Term-End Examination****December, 2015****ET-507(B) : WASTE WATER TREATMENT***Time : 3 hours**Maximum Marks : 70*

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**Note :** Answer any *five* questions. All questions carry equal marks. Use of scientific calculator is allowed. Assume any missing data suitably.

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1. (a) Differentiate between aerobic and anaerobic processes of decomposition of organic matter. 4
- (b) Draw neat sketches of the following : 10
  - (i) Floor Trap
  - (ii) Intercepting Trap
2. (a) Differentiate between 'Storm sewage', 'Sanitary sewage', 'Domestic sewage' and 'Industrial sewage'. 7
- (b) Determine the size of a circular sewer for a discharge of 600 l/s running half full. Assume  $i = 0.0001$  and  $n = 0.015$ . For half full sewer,  $q/Q = 0.5$ . 7

3. (a) Draw a neat sketch of a drop manhole and indicate where is it used. 7
- (b) Describe in order various stages followed in the construction of sewers. 7
4. (a) If the 2-day 25°C B.O.D. of a sample of sewage is 200 mg/l, what will be its 5-day 30°C B.O.D. ?
- $$K_{25} = 0.1256, K_{30} = 0.1578,$$
- $$L_{a, T} = L_{a, 20}(0.02 T + 0.6).$$
- T is the temperature. 7
- (b) The average sewage flow from a city is  $80 \times 10^6$  l/d. If the average 5-day B.O.D. is 285 mg/l, compute the total daily 5-day oxygen demand in kg and the population equivalent of the sewage. Assume per capita B.O.D. of sewage per day = 75 g. 7
5. (a) Explain the self-purification of streams. 7
- (b) Explain and sketch a grit chamber. 7
6. (a) Explain the theory of activated sludge process and illustrate the sequence of operations by drawing a flow diagram. 7
- (b) What do you mean by 'digestion of sludge' ? How is it carried out at municipal sewage treatment plants ? 7

7. Write short notes on any *four* of the following :

$$4 \times 3 \frac{1}{2} = 14$$

- (a) Oxygen sag curve
  - (b) Waste water reuse
  - (c) Catch basins
  - (d) Oxidation pond
  - (e) Screens
  - (f) Composting
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