

B.Tech. Civil (Water Resources Engineering)
Term-End Examination

00615

June, 2017

ET-507(B) : WASTE WATER TREATMENT

Time : 3 hours

Maximum Marks : 70

Note : Answer any **five** questions. All questions carry equal marks. Assume any data suitably, if necessary. Use of scientific calculator is permitted.

1. (a) Discuss the factors governing choice of separate sewerage systems. 6
- (b) Find the minimum velocity and gradient required to transport coarse sand through a sewer of 60 cm diameter with sand particles of 1 mm diameter and specific gravity 2.66. Assume $\beta = 0.06$ and $f = 0.02$. Assume the sewer to run half full. Take $n = 0.012$. 8
2. (a) Explain the equipments used for sewer cleaning work. 7
- (b) Explain in brief the necessity of providing a manhole in a sewer line. Draw a neat sketch, showing the components of a manhole. 7

3. (a) The BOD of a sewage incubated for one day at 30°C has been found to be 100 mg/l . What will be the BOD for 5 days at 20°C ? Assume $K = 0.12$ (Base 10) at 20°C . 7
- (b) Discuss the different zones of effluent discharged into a stream. 7
4. (a) Explain the biological unit processes, employed in wastewater treatment in brief. 6
- (b) Write short notes on the following : 8
- (i) Racks and Screens
- (ii) Skimming Tanks
5. (a) What do you understand by a trickling filter? Explain the biological process involved in the working of a trickling filter with the help of a neat sketch. 8
- (b) Explain in brief the principles of working of aerobic, anaerobic and facultative type of stabilization ponds. 6
6. (a) What do you understand by 'digestion' of sludge? Explain the mechanism of anaerobic digestion. 6
- (b) Explain the following types of trap in brief : 8
- (i) Nahani Trap (Floor Trap)
- (ii) Grease Trap

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

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

- (a) Pollution characteristics of Dairy Industry Waste
 - (b) Sludge Density Index (SDI)
 - (c) Use of Chemical Clarification
 - (d) Waterborne Diseases
 - (e) Ventilation of Sewers
 - (f) Dissolved Oxygen (DO)
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