

**B.Tech. Civil (Water Resources
Engineering)****Term-End Examination
December, 2012****ET-507(B) : WASTE WATER TREATMENT***Time : 3 hours**Maximum Marks : 70*

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

1. (a) Describe about the solids present in the waste water. How will you determine the amount of suspended solids present in a given sample of waste water ? **6**
- (b) A stream with a flow of $4 \text{ m}^3/\text{s}$, BOD - 1 mg/lit and saturated with DO (9.1 mg/lit) receives a sewage effluent at the rate of $2 \text{ m}^3/\text{s}$, BOD- 20 mg/l and DO- 4 mg/l . If the BOD constant (KD) is $0.1/\text{d}$ and the reaeration constant (KR) is $0.35/\text{d}$, calculate the DO at a point which is 1-day time of flow downstream of the discharge point. Also calculate the BOD remaining at that point. **8**

2. (a) With the help of neat sketch describe the working of grease and oil trap. 7
- (b) A population of 40,000 is residing in a town having an area of 100 hectares. If the coefficient of run-off for this area is 0.70 and time of concentration is 30 minutes, calculate the discharge for which the sewers of a proposed combined system will be designed. 7
3. (a) Discuss the properties of three most commonly used coagulants in the sewage treatment. Why chemical aided sedimentation is not so common in sewage treatment ? 7
- (b) Differentiate between aerobic and anaerobic forms of biological stabilisation reactions. 7
4. (a) Name three wastewater treatment units operating on the principle of "aerobic fixed film systems". With the help of neat sketch describe the working of any one of these units. 8
- (b) Define Bacteria-algae symbiosis. How this concept has been used in the treatment of waste water ? 6

5. (a) With the help of flow diagram, describe the process of composting for the final disposal of sludge. What are the advantages and disadvantages of window system of composting ? 9
- (b) "Sludge can serve as a soil conditioner". Discuss. 5
6. Discuss in detail the system approach to the problem of re-use of waste water. 14
7. Write short notes on *any four* of the following :
- (a) Physical characteristics of waste water.
 - (b) Testing of House sewer 4x3½=14
 - (c) Activated carbon
 - (d) Depth-duration curve
 - (e) Catch Basins
 - (f) Deep Bed Filters
 - (g) Gravity thickeners
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