Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(Ev.S & E) (Sem.–1)

WATER POLLUTION & WASTE WATER TREATMENT

Subject Code : ES-504

Paper ID : [E1021]

Time : 3 Hrs. Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

1. a) Explain the significant components of municipal wastewater which need to be addressed for water pollution.

   b) Differentiate between (i) Effluent limited stream (ii) water quality limited stream.

2. a) Explain the different measures of oxygen demand in wastewater. Compare their suitability.

   b) "*No clear correlation exists between BOD and COD in general, but at specific plants it may be useful to establish a relationship between the two values.*" Explain.

3. The following BOD results were obtained on a sample of untreated wastewater at 20°C

t, day	0	1	2	3	4	5
y, mg/L	0	60	86	105	125	138

   Compute the reaction rate constant k and first stage ultimate BOD using both the least squares and fujimoto methods.

4. The 5 day BOD of a waste water is determined to be 150 mg/lit at 20°C. The k value is known to be 0.23 per day. What would be the BOD_8 if the test were run at 15°C.

5. Discuss the sources, importance and removal methods of the following constituents in wastewater :

   a) Nitrate b) Volatile organic compounds

6. a) Explain with help of a neat diagram, the changes in nitrogen forms in polluted water under aerobic conditions.

   b) A domestic waste has 40 mg/L of nitrogen in the form of organic nitrogen or ammonia. Assuming the very few new cells of bacteria are formed during nitrification of the waste, find (i) ultimate nitrogenous oxygen demand (ii) the ratio of ultimate NBOD to the concentration of nitrogen in the waste.

7. Explain the following terms in respect of ground water pollution :

   a) Dispersion

   b) Retardation

   c) Cone of depression

   d) Groundwater plume

8. Write short notes on :

   a) Saprobity

   b) Pathogenicity

   c) Toxicity

   d) Eutrophy