

**B.TECH. CIVIL (WATER RESOURCES
ENGINEERING)**

Term-End Examination, 2019

ET-507(B) : WASTE WATER TREATMENT

Time : 3 Hours]

[Maximum Marks : 70

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

1. (a) What is difference between Bio-chemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) ? Why BOD/COD ratio is always less than one ? [4]
- (b) A population of 20000 is residing in a town having an area of 80 hectares. If the average coefficient of run off for this area is 0.60 and the time of concentration is 30 minutes, calculate the discharge for which the sewers of a proposed combined system will be designed. Make suitable assumptions wherever needed. [8]

- (c) Define self cleaning velocity used in sewers. [2]
2. (a) With the help of neat sketch explain the working of Grease and Oil trap. [7]
- (b) Discuss the various tests normally conducted for testing of house sewer. [7]
3. (a) Discuss the properties of three most commonly used coagulants in sewage treatment. Why chemical aided sedimentation is not preferred in waste water treatment. [7]
- (b) List the various factors responsible for the successful operation of anaerobic digestion process. Why temperature is considered most important ? [7]
4. (a) Differentiate between activated sludge process and trickling filter process. Also discuss the factors that must be studied before deciding for any of the two processes. [9]

- (b) An activated sludge plant treating flow of 25 lit/s has an aeration basin volume of 450m³ and operates with MLVSS concentration of 3250 mg/l sludge with a VSS content of 15000 mg/lit is wasted at a rate of 35 m³/d. Calculate the sludge age and hydraulic retention time. [5]
5. (a) List any four sludge dewatering methods and discuss the relative merits and demerits of any one. [6]
- (b) Discuss the properties of solids and sludge produced from various waste water treatment units. [8]
6. Discuss in detail the necessity of monitoring and evaluation of waste water re-use projects. [14]
7. Write short notes on any four of the following : [4×3½=14]
- (a) Pneumatic Ejector
- (b) Nomenclature of sewers
- (c) Screens
- (d) Facultative ponds

- (e) Sludge thickening
- (f) Drop Manhole
- (g) Health implications of waste water re-use

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