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ET-507(B)

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B.Tech. Civil (Water Resources Engineering)

Term-End Examination

June, 2013

ET-507(B) : WASTE WATER TREATMENT

Time : 3 hours *Maximum Marks : 70*

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

1. (a) What is Bio- chemical Oxygen Demand (BOD) ? Derive an expression for BOD with time. 7

   (b) The 5 day 30°C BOD of a sewage sample is 110 mg/l. Calculate its 5 day 20°C BOD. Assume the deoxygenation constant at 20°C (K_2O) as 0.1 per day. 7

2. (a) With the help of neat sketch describe the working of Drop Manhole. 7

   (b) A bar screen is installed in a wastewater treatment plant receiving a daily peak flow of crude sewage of 50,000 m^3. Estimate the head loss through the screen and also the gross area of the screen. 7

3. (a) What do you understand by the term 'Floatation' ? With the help of line diagram discuss the working of Dissolved Air Floatation unit. 7

(b) The average daily waste flow from a factory is 0.65m^3 of stearic acid ($C_{17}H_{35}COOH$) of concentration 140 mg/lit. Find out the theoretical oxygen demand and 5 day BOD. (Atomic Weights H=1, C=12 and O=16) 7

4. (a) With the help of a line diagram describe the working of conventional activated sludge process. What is the importance of sludge volume Index in sewage treatment using activated sludge process ? 9

(b) An activated sludge plant treating flow of 30 lit/sec has an aeration basin volume of 420m^3 and operates with MLUSS concentration of 3600mg/lit. sludge with VSS content of 15,000mg/lit. is wasted at a rate of 40m^3/d. Calculate the sludge age and hydraulic retention time. 5

5. (a) What is Septage ? Using flow diagram indicate the various methods for treatment and disposal of septage. 9

(b) List the criteria to be considered in selecting a sludge treatment /disposal option and elaborate only one of these criteria. 5

6. (a) What are the benefits of indirect wastewater re-use and how does it affect the public health ? 8

(b) "Spreading basins are better then direct injection well systems". Discuss. 6

7. Write short notes on ***any four*** of the following : **4x3½=14**

(a) Man Conservative Pollutants.

(b) Depth - Duration Curve.

(c) Leaching Requirement.

(d) Gully Trap

(e) Catch Basin

(f) Sludge conditioning

(g) Anaerobic Sludge Digester