

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 100612

Roll No.

**B.TECH.**

**Theory Examination (Semester-VI) 2015-16**

**Environmental Engineering-II**

*Time : 3 Hours*

*Max. Marks : 100*

**Section-A**

**Q.1 Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)**

- Enumerate the amount of total solids present in waste water.
- Calculate one day 37°C BOD of sewage sample whose 5-days 20°C BOD is 100mg/l.
- Give the flow diagram for the activated sludge process.
- Write about the functions of sedimentation tank.

(1)

P.T.O.

- Define 'flowing through period' and 'detection period' in a sedimentation basin.
- What is meant by 'disinfection' in treating public water supply?
- Describe a method of application of any one of the coagulants.
- Discuss how a slow sand filter differs from a rapid sand filter.
- How will you determine the optimum coagulant quantity by jar test?
- State the basic concepts of anaerobic contact process.

**Section-B**

**Q2. Attempt any 5 questions from this section. (10×5=50)**

- Explain the importance of determination of solids in sewage. How do you determine the suspended solids in a given sample of waste water?
- Write notes on:
  - Cycles of decay of waste organic substances;

(2)

- (ii) Concentration of solids in sewage;
- (iii) C.O.D and B.O.D;
- (iv) Composition of municipal sewage;
- (v) BOD/COD ratio.
- (c) Explain the term sludge volume index.
- (d) Why coagulants are used in the sewage treatment? Mention few common coagulants.
- (e) Classify the following under aerobic or anaerobic processes:
- (i) Sludge digestion tanks;
- (ii) Intermittent sand filters;
- (iii) Trickling filters;
- (iv) Activated sludge treatment;
- (v) Lower compartment of imhoff tank.
- (f) Discuss the use of chlorine as disinfecting agent with reference to:
- (i) Its disinfecting action;

- (ii) Its doses;
- (iii) Its forms; and
- (iv) Testing its residuals.
- (g) Describe briefly the various constituents of a coagulation-sedimentation plant.
- (h) Explain in details about anaerobic fixed film reactor.

### Section-C

**Note: Attempt any 2 questions from this section. (15×2=30)**

- Q3. (a) A town has an average domestic sewage flow of 41,650 m<sup>3</sup>/day with a BOD concentration of 250ppm. A neighboring industrial estate adds about 12,325 m<sup>3</sup>/day of sewage having 9080kg of BOD to it. Find out:
- (i) The concentrations of BOD in industrial and the combined sewage;
- (ii) The probable population and per capita flow of sewage.
- (b) Discuss briefly about the laboratory tests conducted on sewage and their importance in the treatment and disposal of sewage.

- Q4.** (a) Distinguish between low rate trickling filters and high rate filters.
- (b) Calculate the volume and number of aeration tanks and the rate of air supply for the following data of the activated sludge unit;

Population = 35,000

Average sewage flow = 180lpcd

BOD of raw sewage = 220mg/l

BOD removed in primary treatment = 30%

Overall BOD reduction desired = 85%

- Q5.** (a) The population of a city is 50,000 and the per day capita consumption is 130lit/day. Calculate the following in respect of the rapid sand filter for the above data.

- (i) Total area of filters;
- (ii) Number and dimension of each filter bed;
- (iii) Quantity of air for air wash per filter bed;
- (iv) Back wash water per filter bed after air wash.

- (b)** Design the septic tank for the following data:

No. of people = 100

Sewage/capita/day = 120lit

Desludging period = 1 year

Length: width = 4:1