Unit - V

9. a) Discuss in brief the biological and chemical methods of removal of phosphorous from waste water.

   b) Write a detailed note on "Rural Sanitation".

OR

10. a) Discuss, with the help of a neat flow diagram, physico-chemical methods of waste water treatment.

    b) Enumerate various methods for disposal of solid waste. Explain any two in detail.

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Roll No .....

CE - 703

B.E. VII Semester

Examination, December 2013

Environmental Engineering - II

Time : Three Hours

Maximum Marks : 70

Note: 1. Solve one question from each unit.
2. All questions carry equal marks.

Unit - I

1. a) What do you understand by dry weather flow? Discuss in brief various factors affecting the dry weather flow.

   b) For a small town, having projected population of 30,000 residing over an area of 20 hectares. Find the design discharge for the combined sewer for the following data:

      i) Rate of water supply = 150 lit/capita/day.

      ii) Runoff coefficient = 0.4.

      iii) Time of concentration = 30 minutes

      iv) Constant a and b are 40 and 20 respectively.

OR

2. a) Describe in order the various stage followed in the construction of sewers network.

   b) What do you understand by "sewer appurtenance"? Enumerate various appurtenances commonly used. Explain any one in detail.

Unit - II

3. a) Define BOD, COD and TOC . Deduce expression for first stage BOD.

   b) The BOD_5 of a waste has been measured as 600 mg/l. If k = 0.23/day (base e), What is the ultimate BOD_4 of waste? What proportion of BOD_4 would remain unoxidised after 20 days?

OR

4. a) What is land treatment? Discuss the conditions under which it is suitable . Also explain "sewage sickness".

   b) Write short notes on following :

      i) Oxygen sag curve.

      ii) Zones of pollution in a stream.

Unit - III

5. a) A twin grit chamber is to be designed for handling a waste water with an average daily flow of 10 million lit. The longitudinal velocity should be limited to 0.3m/s. If settling velocity of particles of 0.2mm is 0.3m/s. Calculate the dimensions of grit chamber required also draw its sectional elevation.

   b) Explain role of micro-organism in biological treatment.

OR

6. a) Why coagulants are used in the sewage treatment? Enumerate common coagulants used. Also explain a method of application of any one of the coagulants.

   b) Explain the process of purification of sewage by Trickling filters, Also discuss the effect of recirculation on trickling filters.

Unit - IV

7. a) Explain the functional parameters to be controlled in an Activated sludge process to achieve a desired efficiency.

   b) Define sludge volume index and its significance.

   c) Design the dimension of a septic tank for a small colony of 300 persons provided with an assured water supply from water works at a rate of 135 lit/capita/day.

      Assume:

      i) 85% Water converted into sewage.

      ii) Rate of sludge deposition -30lit/capita/year.

      iii) The period of cleaning-2 years.

OR

8. a) Design an oxidation pond for treating domestic sewage of 1200 persons supplied with 200 lit/capita/day. The BOD and the suspended solids are each 300 mg/*l*. Permissible organic loading for the pond is not less than 500 Kg/ha/day. The detention period is not to exceed 6 days. Assume the width of the pond to its length as 1:2 and the operational depth as 1.2m. (Assume any other suitable data if needed).

   b) What do you understand by sludge thickening? Enumerate various methods and explain any one with help of sketch.