CE - 703
WE. VII Semester
Examination, December 2014
Environmental Engineering - II
Time : Three Hours
Maximum Marks : 70

Note: 1. Attempt all questions.
2. All questions carry equal marks.
3. Assume suitable data if necessary- and state them clearly.

1. a) Discuss the comparative merits and demerits of the separate system and combined system of sewerage.
b) A population of 30.000 is residing in a town having an area of 60 hectares. If the average coefficient of run off for this area is 0.60, and the time of concentration of the design rain is 30 minutes calculate the discharge for which the sewers of a proposed combined system will be designed for the town in question. Make suitable assumptions where needed.

OR

2. a) Mention the various sewer appurtenances used in a sewerage scheme, and state the location and utility of each.
b) Design the section of a combined circular sewer from the following data:
Area to be served = 150 hect; population = 50.000
Maxi permissible velocity = 3.2 m/s; Time of entry = 5 minutes
Time of flow = 20 minutes; Rate of water supply = 270
1pcd Impermeability factor = 0.45,

3. a) What is the difference between BOD and COD? A 2% solution of a sewage sample is incubated for 5 days at 20°C. The depletion of oxygen was found to be 4 mg. Determine the BOD of the sewage.

b) What is sewage farming? What are its advantages over the method of disposal of sewage by dilution? What precautions must be taken in its operation to prevent health hazards using the produce?

OR

4. a) Write a detailed explanatory note on the self-purification of streams.
b) Given a waste water containing 300 mg/l of ketone of chemical formula $CH_3C0C_2H_5$,

i) Calculate the COD
ii) Assume a K value (base 10) of 0.1 per day
Calculate the ultimate BOD and the 5 day BOD of the waste.

5. a) Write short notes on the following;
i) Grit chamber
ii) Detritus tank
b) Determine the size of a high rate trickling rater for the following data:
Flow = 4.5 MLD, Recirculation ratio = 1.4
BOD of raw sewage = 250 mg/l. BOD removed in primary clarifier = 25%, final effluent BOD desired = 50 mg/l
Calculate also the size of the standard rate trickling filter to accomplish the above requirement.

OR

a) What do you understand by recirculation? What are the advantages of recirculation?
b) Explain the process of purification of sewage by trickling, filters.

7. Design a conventional activated sludge plant to treat sewage with diffused air aeration system, given the following data: Population = 35,000, average sewage flow = 180 1pcd BOD of sewage = 220 mg//, BOD removed in primary treatment = 30%, overall BOD reduction desired — 85%.

OR

8.a) Give the flow diagram for the activated sludge process , and describe the working of the activated sludge plant.
b) Mention merits and demerits of Imhoff tank.

9. What are the different methods of disposal of solid refuse? Which one is most popular in India? Explain the process in detail.

OR

10. Write short notes on any two
a) Adsorption by activated carbon
b) Phosphorus removal
c) Physico chemical waste water treatment.