Q 2124

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007

Sixth Semester

Civil Engineering

CE 339 — ENVIRONMENTAL ENGINEERING — II

(Including Drawing)

Time : Three hours   Maximum : 100 marks

Assume any data necessary.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Give stoke's equation for discrete particle settling.

2.   What is the purpose of demineralization of water?

3.   What is the difference between oxidation pond and oxidation ditch?

4.   What is the significance of BOD/COD ratio?

5.   The 5 day BOD of sewage is 240 mg/lit. What is the BOD load in Kg/d for 100 cu.m/day of sewage?

6.   Draw a flow diagram of secondary treatment of sewage.

7.   What is meant by 'self purification of polluted river'?

8.   How does the leaching cess pool function?

9.   What are the objectives of sludge treatment?

10.   Write the NRC equation for design of single stage trickling filter.

PART B — (5 × 16 = 80 marks)

11. (a) Design a sedimentation tank for a water treatment plant to a town with population of 1,00,000. The per capita water supply is 160 1/day. Assume any other data.

Or

(b) What are the types of filters used in municipal water supplies? And Explain theory of filtration.

12. (a) A grit chamber with a proportional flow weir at its outlet to be designed to handle a sewage flow from a population of 40,000 with 135 lpcd. Design and draw a 'grit chamber' for the above data.

Or

(b) Design a screen channel to handle sewage from a township having population of 40,000 and 150 lpcd. Draw a neat sketch of their units.

13. (a) Design an oxidation ditch for the following data : Population = 60,000 and sewage flow = 125 lpcd. Assume any other suitable data.

Or

(b) Design a trickling filter for a population of 1,00,000, recirculation ratio is 3.0, efficiency = 90%. Assume primary treatment is available.

14. (a) A city discharges 15×10^6 Lit/day of waste water into a river, which is fully saturated with Oxygen and flowing at the rate of 3000 m^3 with velocity of 0.2 m/s. The 5 day BOD of sewage at the given temperature is 300 mg/L. Find when and where the critical dissolved oxygen (DO) deficit will occur in the downstream portion of the river and what is its amount. Assume coefficient of purification of streams as 4.0 and Coefficient of deoxygenation K_d as 0.1.

Or

(b) (i) What are the advantages and disadvantages of land disposal of sewage? (8)

(ii) Compare dilution and broad irrigation methods of sewage disposal.

(8)

15. (a) With a neat sketch explain the principle and working of sludge digester. State the factors influencing sludge digestion.

Or

(b) Design a sludge digestion tank with the following data :

   (i)   Average flow of sewage = 50×10^6 liters/day

   (ii) Total suspended solids in the raw sewage = 350 mg/litre

   (iii) Volatile suspended solids = 200 mg/litre

   (iv) Moisture content of digested sludge = 85%

         Assume data suitably.