

R 8148

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

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. On what factors the dose of coagulants depend?
2. What is meant by break point chlorination?
3. What are the design considerations for a grit chamber?
4. Give Stoke's equation for discrete particle settling.
5. Why does "ponding" occur in trickling filter?
6. Define 'Sludge Volume Index'.
7. Under what circumstances land treatment of sewage is suitable?
8. Define 'Elutriation'.
9. What is meant by high rate sludge digestion?
10. State the purpose of sludge dewatering.

PART B — (5 × 16 = 80 marks)

11. (a) What are the various processes required to remove the different types of impurities? Give a neat sketch showing the various processes required in treating a river water, starting from the source of water.

Or

- (b) What should be the requirements of a good disinfectant? Explain theory of disinfection of water by chlorine.

12. (a) Design a grit chamber with a proportional flow weir at its outlet for a population of 50000. The quantity of water supply is 135 lit/capita/day. Assume relevant data.

Or

- (b) Design a circular sedimentation for treating waste from a population of 50000 persons. Average water demand is 135 lpcd. Maximum demand is 2.7 times average demand. Check for surface loading. Assume necessary data. Draw the cross section of the sedimentation tank.

13. (a) Design an activated sludge process unit for a flow of 5000 m³/day. BOD of raw sewage is 250 mg/l. Return sludge = 50%. Sketch the cross section of the aeration tank.

Or

- (b) Design an oxidation pond for a flow rate of 20000 m³/day. The 5 day BOD of the waste water is 150 mg/l. Organic loading in the pond is 300 kg/hectare/day. Assume suitable data not given.

14. (a) Describe the various stages involved in self-purification of streams and the factors influencing the process of self-purification.

Or

- (b) Sketch and explain Deep well injection method of sewage disposal.

15. (a) Explain the various process involved in sludge treatment with a flow chart.

Or

- (b) Write short notes on :

(i) Iron and manganese removal. (6)

(ii) Sewage Farming. (5)

(iii) Biogas Recovery. (5)