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**Question Paper Code : 21214**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Sixth Semester

Civil Engineering

CE 2354/CE 64/10111 CE 605 — ENVIRONMENTAL ENGINEERING — II

(Regulation 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name sewage characteristics with which organic matter concentration is expressed.

2. State the effluent standards for any four parameters recommended by the pollution control board.

3. Define "Sewerage system". List out the components of it.

4. What are the situations where the pumping of sewage becomes essential in sewage management?

5. What do you mean by on-site sanitation. Brief it.

6. State the objectives of grey water harvesting.

7. When will you opt/prefer the anaerobic treatment of sewage over an aerobic process?

8. Waste stabilisation ponds are applicable for sewage management in rural areas only. Comment on this statement and justify your comment.

9. What do you mean by sewage sickness?

10. Name the feed material sources for biogas recovery in a sewage treatment plant.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the estimation of storm run-off and the factors influencing it. (10)

(ii) List the effects of sewage on environment. (6)

Or

(b) (i) Explain the factors influencing sanitary sewage flow and its estimation. (10)

(ii) State the classification of solids present in sewage and the removal methods of each. (6)

12. (a) Design a server running 0.7 times full at maximum discharge condition for serving a town with a population of 90,000 and provided with a water supply at 200 litres/capita day. Take slope as 1 in 400, Manning's constant $N$ = 0.013, peak factor as band sewage flow rate as 85% of water supplied.

Or

(b) (i) Explain the laying of sewers in the field for the designed alignment and gradient. (10)

(ii) Describe the one pipe and two pipe plumbing systems. Compare them. (6)

13. (a) (i) What is Surface Overflow Rate (SOR). Derive the relationship between SOR and setting velocity of a particle for the removal of such particle? (10)

(ii) Explain the designing of a screen chamber. (6)

Or

(b) (i) Design a septic tank for a colony population of 100 persons. Assume suitable data wherever necessary.

(ii) State the design criteria for a grit chamber and brief its construction and functioning.

14. (a) (i) Discuss the loading refers criteria of aeration tank of an activated sludge process.

(ii) Briefly discuss the functioning and advantages of an UASB.

Or

(b) Determine the size of a high rate trickling filter for the following data :

| | | |
|---|---|---|
| Flow | – | 4.5 mld |
| Recirculation ratio | – | 1.4 |
| BOD of raw sewage | – | 250 mg/l |
| BOD removal in primary clarifier | – | 25% |
| Final effluent BOD designed | – | 30 mg/l |

15. (a) Explain the various actions involved in the self-purification process of a stream.

Or

(b) (i) Secondary sedimentation tank of a waste water treatment plant produces 1100 kg (dry basis) solids with moisture content of 95%. Solids are of 70% volatie with specific gravity of 1.05 and 30% being fixed with specific gravity of 2.6. Determine the sludge volume as it is produced and after the incineration.

(ii) Discuss the deep well injection.