

**Question Paper Code : 71262**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Sixth Semester

Civil Engineering

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

(Regulation 2008/2010)

(Common to 10111 CE 605 – Environmental Engineering – II for  
B.E. (Part-Time) Sixth Semester – Civil Engineering – Regulation 2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the impacts of nutrients on water bodies?
2. How do you estimate storm water runoff?
3. When does it become necessary to provide manhole in sewerage system?
4. Give the difference between sanitary and storm sewer.
5. What are the objectives of grit removal?
6. What is the significance of weir loading rate in sedimentation tank design?
7. Distinguish between HRT and SRT.
8. An aeration tank has an MLSS concentration of 2500 mg/L. After settling for 30 minutes in a 1-L graduated cylinder, the sludge volume is measured to be 200 mL. Compute the SVI of the sludge.
9. What is the significance of pH in anaerobic digestion?
10. Enumerate various methods of sludge disposal.

11. (a) Explain the various physico-chemical characteristics of sewage and state their environmental significance.

Or

- (b) Discuss the environmental legislation requirements while planning sewerage system.
12. (a) Explain various systems of sanitary plumbing for buildings. Write down the main characteristics of each system.

Or

- (b) (i) Describe any four appurtenances of sewerage system. (8)
- (ii) Design a sewer to carry 17.5 Lps of ultimate peak sewage flow at half full depth. Take the slope of the sewer as 1 in 400 and  $n = 0.013$ . Check for self-cleansing velocity also. (8)
13. (a) Design a screen and grit chamber unit for a proposed STP of 60 ML/d capacity.

Or

- (b) (i) Briefly discuss the operations and maintenance issues pertaining to primary treatment of sewage. (6)
- (ii) Explain the various components and working of a septic tank with a neat sketch. (10)
14. (a) Draw the typical process flow diagram of an oxidation ditch and explain the working principle.

Or

- (b) (i) Explain how the algal-bacterial symbiosis helps in waste stabilization pond. (6)
- (ii) Design a high rate trickling filter for treating sewage of 22 ML/d with a raw sewage  $BOD_5$  of 320 mg/L. Assume a recirculation ratio of 1.5 and efficiencies of the PST as 30% the filter as 75%. Use NRC equation. (10)

Or

- (b) (i) Briefly outline the characteristics of sludge. (4)
- (ii) The thickened sludge of  $70 \text{ m}^3/\text{d}$  is processed in a standard rate anaerobic digester. The moisture content of thickened sludge is 95%. The digestion period is 25 days and the sludge must be stored for 3 months between final disposal events. Organic content of the sludge is 75 percent and 65 percent of the organics are converted into gaseous and liquid end products. The solid content of the digested sludge is 4.5%. Determine the required reactor volume. (12)
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