Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91251

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

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 is the effect of oxygen demanding waste on water bodies?

2. Enumerate the sources of wastewater.

3. What do you mean by small bore system?

4. Under what circumstances pumping is required for sewerage system?

5. Distinguish between unit operations and unit processes.

6. What is meant by grey water harvesting?

7. Distinguish between aerobic pond and anaerobic pond.

8. What is the significance of sludge volume index?

9. A town discharges 50 m^3/s of secondary treated sewage into a stream having a rate of flow 1000 m^3/s. The DO content of sewage is 0.5 mg/L and DO in upstream side of river is 8.5 mg/L. Find the DO of mix.

10. Enumerate various methods of sludge dewatering.

PART B — (5 × 16 = 80 marks)

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

Or

(b) Give a detailed procedure to quantify sanitary sewage flow and storm water runoff with reference to an urban area.

12. (a) Explain various systems of sanitary plumbing for building and write down the main characteristics.

Or

(b) Briefly explain the various factors to be considered in the design of sewerage system. Design a sanitary sewer to a population of 6000 receiving water at a rate of 90 'Lpcd. Minimum self cleansing velocity at design flow is 0.8 m/s, maximum depth of flow is 0.5 D. Assume other design criteria as applicable.

13. (a) Assuming suitable criteria design a grit chamber and primary settling tank for a proposed STP expected to treat 28 ML/d maximum flow.

Or

(b) Design a septic tank for a population of 120 people in a housing colony. Desludging period is one year. What would be the size of the dispersion trench, if the effluent from the septic tank is to be discharged in it?

14. (a) Explain the working principle of an Activated sludge process with a neat sketch.

Or

(b) (i) Explain the algal- bacterial symbiosis with respect to aerobic pond. (6)

(ii) Design a high rate trickling filter for treating sewage of 5.5 ML/d with a raw sewage BOD_3 @ 27°C of 280 mg/L. Assume a recirculation ratio of 1.6 and efficiency of the filter as 84%. Use NRC equation. (10)

15. (a) What do you mean by "Self purification" of stream? Draw a neat sketch of an oxygen sag curve and explain the salient features.

Or

(b) Draw a neat sketch of a high rate two-stage anaerobic sludge digester and explain its salient features.
