Reg. No. :

Question Paper Code : 52780

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Sixth Semester

Civil Engineering

CE 6605 — ENVIRONMENTAL ENGINEERING – II

(Regulation 2013)

(Common to PTCE 6605 — Environmental Engineering – II for B.E. Part-Time –
Fifth Semester – Civil Engineering – Regulation 2014)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by BOD?

2. State the discharge standards for any two parameters for treated sewage.

3. Under what circumstances manholes are provided in sewerage system?

4. What is meant by small bore system?

5. State the objectives of grey water harvesting.

6. What are the objectives of primary treatment of sewage?

7. What is meant by sludge volume index?

8. How do you determine organic loading rate of a trickling filter?

9. How do you remediate sewage sickness?

10. What is meant by sludge conditioning?

PART B — (5 × 13 = 65 marks)

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

Or

(b) Explain the various sources of wastewater and their effects on environment.

12. (a) Explain various systems of sanitary plumbing and write down their main characteristics of each system.

Or

(b) Briefly explain the various factors to be considered in the design of sewerage system.

13. (a) Assuming suitable criteria design a screen chamber with 20 mm spacing of bar for a proposed STP expected to treat 30 ML/d maximum flow. Draw a neat sketch of the unit.

Or

(b) Explain the function of septic tank with a neat sketch. Also discuss the design criteria.

14. (a) Design a high rate trickling filter from the following data:

Design flow   :   40 ML/d

Recirculation ratio   :   1.5

BOD of raw sewage   :   250 mg/L

Desirable effluent BOD   :   20 mg/L

Or

(b) Draw the typical process flow diagram for a UASB reactor and explain the working principle.

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 working principle.

PART C — (1 × 15 = 15 marks)

16.   (a)   A waste treatment plant is required to digest a sludge in such a way that the moisture content is reduced to 95% from the initial value of 96%. The inflow of sludge initially contains 70% volatile matter in the solid portion and during digestion only 60% of the volatile matter is destroyed. The specific gravity of volatile matter is 1.2 and that of fixed solid is 2.5. Calculate the volume of sludge before and after digestion if the inflow contains 2500 kg dry solids per day. Assuming 100 kg/m²/year solids loading rate, design the sludge drying bed required for dewatering operation.

Or

(b)   It is proposed to treat 18 ML/d of primary treated sewage with the help of a ASP system. The BOD of raw sewage is 280 mg/L. Design the various components of ASP system by assuming the following parameters.

MLVSS in the reactor	=	2500 mg/L
Return sludge Concentration (VSS)	=	8000 mg/L
MCRT	=	8 d
Yield coefficient	=	0.45
Decay coefficient	=	0.05 d⁻¹.