

04-11-2022

Reg. No.

Question Paper Code

11553

**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022**

Sixth Semester

**Civil Engineering**

**EN8592 - WASTEWATER ENGINEERING**

(Regulations 2017)

Duration: 3 Hours

Max. Marks: 100

Answer ALL Questions

**PART - A (10 × 2 = 20 Marks)**

*Marks,  
K-Level, CO*

1. What do you mean by population equivalent? *2,K1,CO1*
2. What is crown corrosion in sewers? *2,K2,CO1*
3. Why grit chamber is provided in sewage treatment plant? *2,K2,CO2*
4. What is the significance of weir loading rate in sedimentation tank design? *2,K2,CO2*
5. What is algal bacteria symbiosis in waste stabilization pond? *2,K2,CO3*
6. Write short note on UASB. *2,K1,CO3*
7. Enlist the methods of treated sewage disposal. *2,K1,CO4*
8. Give the Streeter Phelps model equation. *2,K1,CO4*
9. Write short note on biogas recovery. *2,K2,CO5*
10. What do you mean by sludge conditioning and state its methods? *2,K1,CO5*

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) i) Design a sewer running 0.7 times full at maximum discharge for a town provided with the separate system serving a population of 2 lakhs. Water is supplied from the water works at a rate of 200 litres per capita per day. Take a constant value  $n = 0.014$  at all depths of flow. The permissible slope is 1 in 600. Take peak factor of 3. Assume 75 % of water turns as sewage. *7,K2,CO1*  
ii) List the various sewer appurtenances used in sewerage system. Explain any two with neat sketches. *6,K1,CO1*
- OR
- b) i) Explain with sketches the different plumbing systems for drainage in building. *7,K2,CO1*  
ii) What is storm runoff and explain the factors influencing it? *6,K2,CO1*

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

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12. a) Design a screen and grit chamber unit for the proposed STP for 80 MLD. Assume suitable data wherever required. *13,K2,CO2*

**OR**

- b) Explain in detail about theory, construction, design aspects and disposal of effluent of septic tank with neat sketches. *13,K2,CO2*

13. a) Explain in detail about the principle, functions, design criteria and drawings with reference to activated sludge process. *13,K2,CO3*

**OR**

- b) Write short notes on  
(i) MBR *6,K2,CO3*  
(ii) SBR with neat sketches. *7,K2,CO3*

14. a) (i) Explain the factors affecting the self-purification of natural streams. *5,K2,CO4*  
(ii) Draw a typical oxygen sag curve explain its meaning and state its importance. *8,K2,CO4*

**OR**

- b) State how UASB is related with treatment of waste water? Write in detail about the UASB reactor with neat sketch, advantages and disadvantages. Explain its function and operation. *13,K2,CO4*

15. a) With the help of neat sketches explain the process, types and gas collection system in anaerobic sludge digester. *13,K3,CO5*

**OR**

- b) Explain in detail about sludge thickening and its types with neat sketches. *13,K2,CO5*

**PART - C (1 × 15 = 15 Marks)**

16. a) Explain in detail about sludge conditioning and dewatering with a neat sketch. *15,K2,CO6*

**OR**

- b) Elaborate with neat sketch about the working of a high rate two stage anaerobic sludge digester and explain its salient features. *15,K2,CO6*