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**Question Paper Code : 71591**

22/05/17 FN

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Sixth Semester

Civil Engineering

CE 6605 — ENVIRONMENTAL ENGINEERING — II

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the sources of wastewater.

2. What is meant by time of concentration?

3. What are the advantages of using a circular section for sewers?

4. Mention the various pumps used to pump sewage?

5. Define the biological concept taking place in a septic tank.

6. Why a constant velocity have to be maintained in a Grit channel?

7. Differentiate between activated sludge process and trickling filler process of sewage treatment.

8. What is the significance of solids retention time in ASP design?

9. What is meant by sludge conditioning? What are the methods of sludge conditioning?

10. What is meant by dewatering?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the estimation of storm runoff and the factors influencing it.

Or

(b) (i) Define the terms BOD and COD. Explain first stage BOD and second stage BOD with a graph. (8)

(ii) The BOD of a sewage incubated for one day at 30°C has been found to 120 mg/L. What will be the 5-day BOD at 20°C? Assume $K = 0.21\ d^{-1}$ (base l) at 20°C and $\theta = 1.056$. (8)

12. (a) Design a sewer running 0.7 times full at maximum discharge for a town provided with the separate system serving a population of 1 lakh. Water is supplied from the water works at a rate of 200 litres per capita per day. Take a constant value of n = 0.013 at all depths of flow. The permissible slope is 1 in 600. Take peak factor of 2.25. Assume 80% of water turns as sewage.

Or

(b) Explain the step by step procedure for laying and testing of a sewer line.

13. (a) (i) Why the septic tank method of treating sewage is considered ineffective? Under what circumstances a septic tank method of treating sewage is preferred? (4)

(ii) Design a septic tank for a hostel of 150 persons. Let the desludging period be taken as one year and Length to breadth ratio as 2.5 : 1. Adopt peak discharge of 205 $L_{pm}$ surface area @ 0.92 $m^2$ for every 10 $L_{pm}$ of peak flow rate. Also design a soil absorption system dispersion trench for the disposal of the septic tank effluent, assuming the percolation rate as $100\,L/m^2/d$. Assume data wherever necessary. (12)

Or

(b) (i) Explain the velocity control devices in Grit channel. (8)

(ii) Discuss in brief various types of settling in sedimentation tanks. (8)

14. (a) Explain the basic operation of an activated sludge process with a flow diagram. Also mention its operating troubles with remedial suggestions. (12 + 4 = 16)

Or



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

(i) Sewage flow = 5 MLD

(ii) Recirculation ratio = 1.5

(iii) BOD of raw sewage = 250 mg/L

(iv) BOD removal in primary tank = 30%

(v) Final efficient BOD desired = 30 mg/L.

15. (a) Explain the self purification of streams with the help of an Oxygen sag curve. Explain the factors affecting the same. (10 + 6 = 16)

Or

(b) With the help of a diagram, explain the working of a standard rate sludge digester?

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