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Question Paper Code : 57189

B.E. / B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

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. Define: (a) Sullage , (b) MINAS

2. What is meant by Population equivalent ?

3. Sewers are designed for partial flow always. Is it true ? Justify your answer.

4. Write any two computer applications of Design of Sewer.

5. Mention the methods of onsite sanitation.

6. Differentiate between COD and BOD.

7. Differentiate between oxidation ditch and oxidation pond.

8. What is UASB ? Write its uses.

9. Define Sludge density index.

10. Name the methods of disposal of sewage by land treatment.

PART – B (5 × 16 = 80 Marks)

11. (a) (i) Explain briefly different characteristics and composition of sewage. **(8)**

(ii) *Explain various factors influencing Dry weather flow.* **(8)**

OR

(b) (i) The BOD of Sewage incubated for one day at 30 °C has been found to be 400 mg/L. Estimate the 5 day 20°C BOD. Assume K_{10} =0.12/ day at 20 °C. **(8)**

(ii) A city with a population of 100,000 has an area of 100 hectares. Find the D.W.F and storm water flow for the sewer line for the following data:
Rate of Water supply = 200 LPCD
Average runoff coefficient for the entire area = 0.5
Time of Concentration = 50 min
Assume 75% of water supplied reaches the sewer. **(8)**

12. (a) (i) How are sewer lines tested ? What precautions are taken during the backfilling of Trenches ? **(8)**

(ii) The main combined sewer is to be designed to serve an area of 12 km^2 with a population density of 250 person per hectare. The average rate of flow is 250 LPCD. The maximum flow is 100% in excess of average together with the rainfall equivalent of 15 min in 24 hours, all of which are runoff. Determine the capacity of the sewer. Taking maximum velocity of flow as 3 m/s , also determine the size of the sewer. **(8)**

OR

(b) (i) Explain the one pipe and two pipe systems of plumbing . **(8)**

(ii) Explain with neat sketch Manholes and inverted siphon. **(8)**

13. (a) (i) Design a Grit chamber for an average Sewage flow of 14 Mld. Diameter of Incoming Sewer is 500 mm. Assume suitable data if required. **(8)**

(ii) What is the role of Screen Chamber in Sewage treatment plant and write its design procedure. **(8)**

OR

(b) Describe the step involved in the design of septic tank. And also explain the working of a septic tank with neat sketch. **(16)**

14. (a) Determine the size of a high rate TF for the following data : **(16)**

Sewage flow = 6 Mld

Recirculation ratio = 1.5

BOD of Raw Sewage = 230 mg/l

BOD removal in PST = 30%

Final BOD effluent = 20 mg/L

OR

(b) (i) Explain the Reclamation & Reuse of Sewage . **(8)**

(ii) Discuss in detail about waste stabilization pond. **(8)**

15. (a) (i) What do you understand by oxygen sag curve ? Derive the classical streeter- Phelps oxygen sag curve. **(10)**

(ii) Discuss the principle of self purification process of river **(6)**

OR

(b) A waste water effluent of 600 l/s with a BOD = 60 mg/l. DO = 2.5 mg/l and temperature of 25 °C enters a river where the flow is 30 m^3/sec and BOD= 3 mg/l, DO = 8.5 mg/l and temperature of 16 °C deoxygenation constant for the waste is 0.10 per day at 20 °C. The velocity of water in the river downstream is 0.15 m and depth of flow is 1.5 m/s. Determine the following after mixing of waste water with the river water :

(i) Combined discharge

(ii) BOD

(iii) DO

(iv) Temperature **(16)**

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