(Pages : 3) 1878

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, May 2013
(2008 Scheme)
08.803 : ENVIRONMENTAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions **fully**.*
*2) Assume suitable data if **necessary**.*

PART – A

1. Explain sewage sickness. What are the preventive measures you can take to avoid it ?
2. Write down Streeter-Phelps equation and explain.
3. Explain population equivalent. Calculate its value for a sewerage system of 1200 people having 72 gm per capita per day of BOD. The per capita contribution of suspended solids and BOD are 91 gm and 60 gm respectively.
4. Discuss the operation troubles of a trickling filter.
5. List out different methods of disposal of effluent from a septic tank and explain any one.
6. What do you mean by Algal-Symbiosis ?
7. Write a short note about Aerated lagoon.
8. What are the important principles of house drainage ? **(8×5=40 Marks)**

P.T.O.

PART – B

Module – I

9. a) The drainage area of a district is 48 ha. with maximum rain intensity 6 cm/hr. Of this, 20% of the total surface area, i.e. roof of buildings has a coefficient of run off 0.9. Another 20% comes from paved area, 15% from Macadom roads, 5% from paved yard of houses, 35% from lawns, gardens etc and 5% from wooded area. The coefficient of run off are 0.85, 0.8, 0.5, 0.1 and 0.05 respectively. If population density is 300 per hectare and 200 Lpcd of water is supplied, determine the capacity of sewer for a separate system as well as partially separate one. **10**

b) Explain the components of a sewerage system. **5**

c) Discuss the concept of time of concentration in peak drainage discharge calculation. **5**

OR

10. A town discharges 0.06 m^3/s of sewage with a 5 day BOD of 180 mg/L into a river having a flow and BOD_5 as 0.6 m^3/s and 6 mg/L respectively. The temperature of river water and effluent is 20° C. The rate constants K_R and K_D are found to be 0.3/day and 0.1 per day respectively. The DO content of the effluent and river water are 2.1 mg/L and 8.2 mg/L respectively prior to mixing. The saturation DO of water at 20° C is 9.17 mg/L. If the velocity of flow is 0.1 m/s; find when and where critical oxygen deficit occurs in the stream. Also find the amount of critical oxygen deficit. **20**

Module – II

11. Design a standard rate trickling filter with its rotary distributor arm and under drainage system for treating sewage with a BOD 140 mg/L from a small town with a population of 30,000 with a sewage rate 150 Lphd. **20**

OR

12. a) Draw the flow chart of a conventional waste water treatment unit and explain function of each unit.

b) A completely mixed activated sludge process is used to treat a sewage flow of 1 MLd having BOD_5 as 200 mg/L. The biomass concentration in the aeration tank is 2000 mg/L and the concentration of net biomass leaving the system is 50 mg/L. The aeration tank has a volume of 200 m^3. Determine the hydraulic retention time and the average time for which the biomass stays in the system.

c) What are the main limitation of ASP ? **(8+10+2)**

Module – III

13. a) Define sludge digestion. Bring out the stages and factors affecting it and sketch a sludge digestion tank.

b) Discuss various types of sewers. **(12+8)**

OR

14. a) Derive Shield's expression for self cleansing velocity in sewers.

b) Calculate the diameter and discharge of a circular sewer laid at a slope of 1 in 400 when it is running half full and with a velocity of 1.9 m/s. Assume Manning's coefficient n = 0.012.

c) List out materials used for sewers. **(10+7+3)**
