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10CV71

Seventh Semester B.E. Degree Examination, June/July 2016

Environmental Engineering – II

Time: 3 hrs. Max. Marks:100

Note: *Answer FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1 a. Write the differences between water supply pipes and sewers. **(06 Marks)**

b. Mention the factors affecting quantity of storm water. **(06 Marks)**

c. The catchment area is of 300 hectares. The surface covers in the catchment classify as given below.

Type	Co-efficient	% Area
Roof	0.90	15
Pavement and Yards	0.80	15
Lawn and garden	0.15	25
Roads	0.40	20
Open ground	0.10	15
Single family dwelling	0.50	10

Calculate the Runoff coefficient and quantity of storm water run-off. If intensity of rainfall is 30mm/h for rain with duration equal to time of concentration. If population density in the area is 350 person per hectare and rate of water supply is 200ℓpcd. Calculate design discharge for combined system. Take $Q_{peak} = 2$. **(08 Marks)**

2 a. State the hydraulic formulas which are commonly adopted in design of sewers. Explain any one in brief. **(06 Marks)**

b. Explain the phenomenon of crown corrosion with the help of neat sketch. How can this be avoided? **(06 Marks)**

c. Calculate the velocity of flow and corresponding discharge in a sewer of circular section having diameter equal to 1m laid at a gradient of 1 in 500. The sever runs at 0.6 depth. Use mannings formula taking N = 0.012. **(08 Marks)**

3 a. Mention the classification of trap according to use and location of these traps in house drainage connections. **(06 Marks)**

b. Explain various principles that should be kept in mind while designing a house drainage system. **(06 Marks)**

c. Briefly explain sewer appurtenances with neat sketch (i) Drop manhole (ii) removes low density material which affect the growth of aerobic bacteria during treatment process. **(08 Marks)**

4 a. Briefly explain the laboratory procedure for determining the BOD of waste water. **(08 Marks)**

b. The BOD of a sewage incubated for one day at 30°C has been found to be 100mg/ℓ. What will be the 5 day 20°C BOD? Assume K = 0.12 (Base 10) at 20°C. **(06 Marks)**

c. With the help of neat sketch explain carbon and Nitrogen cycle. **(06 Marks)**

PART – B

5 a. Discuss fully the action involved in self purification of Natural water. **(06 Marks)**

b. What is sewage sickness? How sewage sickness can be prevented? **(06 Marks)**

c. Using the following data find out Do at the end of 1st and 2nd day.

	River	Wastewater
Flow (m^3/s)	25	2
DO (mg/ℓ)	9.1	0
5day BOD (mg/ℓ)	2	200

Take deoxygenation constant as 0.1 per day and reoxygenation constant as 0.3 per day. Take saturation DO as 9.1 mg/ℓ **(08 Marks)**

6 a. Explain the flow diagram employed for a conventional waste water treatment plant. Indicate the importance of each unit indicated in the flow diagram. **(06 Marks)**

b. Explain the functioning of screens and grit chamber in the treatment of municipal waste water. **(06 Marks)**

c. Design a rectangular sedimentation tank for population of 90000 with rate of water supply 140ℓpcd 80% of which reaches treatment plant. Assume peak factor 1.2 and velocity of flow 0.3 m/min. **(08 Marks)**

7 a. Draw a neat sketch of trickling filter and label the part. Mention the merits of trickling filters. **(06 Marks)**

b. Mention modifications of Activated sludge process and explain any two. **(06 Marks)**

c. Define the following :

i) Hydraulic retention time (HRT)

ii) Volumetric BOD_5 loading

iii) F/M Ratio

iv) Sludge age **(08 Marks)**

8 Write explanatory notes on :

a. Methods of sludge disposal

b. Septic tank

c. Recycling of waste water

d. Oxidation pond.

(20 Marks)

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