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10CV71

**Seventh Semester B.E. Degree Examination, June/July 2018**

**Environmental Engineering – II**

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.  
2. Assume any missing data suitably.**

**PART – A**

- 1 a. What is conservancy system (dry system) of sanitation? Give any two merits and demerits of this system. (06 Marks)
- b. Define sewerage and explain combined sewerage system with its merits and demerits. (08 Marks)
- c. Explain:  
i) time of entry  
ii) time of flow  
iii) time of concentration (06 Marks)

- 2 a. What is dry weather flow (DWF)? What are its sources and give any two factors affecting DWF? (06 Marks)
- b. Using rational method, determine the discharge for a storm water drain. Area of catchment 100 hectares. Intensity of rainfall 50 mm/hr. Details of catchment area is as follows.

Type of Area	Percentage Area	Impermeability Coefficient
Roofs	15	0.9
Pavements	20	0.8
Lawns and gardens	40	0.15
Unpaved	15	0.20
Wooded	10	0.05

- c. What are sewer appurtenances? List any four of them and explain with a neat sketch the catch basin. (06 Marks)
- 3 a. Explain the test for straightness and obstructions in sewers. (04 Marks)
- 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/sec. Take 'n' in Manning's Formula as 0.012. (08 Marks)
- c. Explain self cleansing and non scouring velocities in sewers. Give any two factors on which it depends. (08 Marks)
- 4 a. What is a sewer? What are the requirements of good sewer materials? List any four sewer materials commonly used. (08 Marks)
- b. Distinguish between BOD and COD and explain their role in wastewater treatment. (06 Marks)
- c. What is a trap? Give its classifications. (06 Marks)



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**PART - B**

- 5 a. Explain:
- i) Sludge drying beds (06 Marks)
  - ii) Disposal of screenings. (06 Marks)
- b. What is meant by modifications of ASP and list any four modifications. Explain any one briefly. (06 Marks)
- c. Calculate the dimensions of an oxidation pond for treating sewage from a residential colony with a population of 8000 persons. Assume the rate of sewage flow as 200 lpcd and 5 day BOD of sewage as 250 mg/L. Take organic loading as 300 kg/ha/day and  $L = 4B$  and depth of pond as 1.2 m. Apply check for detention time and comment on the design. (08 Marks)
- 6 a. List any six conditions favourable for land disposal of sewage. (06 Marks)
- b. Explain the different zones of purification in dilution method of sewage disposal and oxygen sag curve. (10 Marks)
- c. Give the significance of skimming tank and grit chamber in sewage treatment plant. (04 Marks)
- 7 a. Discuss with one example each for reuse and recycle of waste-water. (04 Marks)
- b. Explain the working principle of trickling filter and activated sludge process treatment of sewage. (06 Marks)
- c. Explain with a neat sketch the septic tank. (05 Marks)
- d. Give any three objectives of sludge digestion. (05 Marks)
- 8 a. A rectangular sedimentation tank is used to treat 2 MLD of sewage. For a design period of 2.5 hours, velocity of flow of 0.2 m/minute and effective depth of 3m, determine:
- i) The length of tank required
  - ii) Width of tank and
  - iii) Over flow rate of tank in  $m^3/m^2/day$  (08 Marks)
- b. Explain F/M ratio and sludge volume index (SVI) with significance in ASP. (06 Marks)
- c. Give the working principle and any two advantages and disadvantages of oxidation ponds. (06 Marks)

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