U.S.N

P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)
Sixth Semester, B.E. - Civil Engineering
Semester End Examination; June - 2017
Wastewater Treatment

Time: 3 hrs   *Max. Marks: 100*

Note: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.
   ii) Make suitable assumptions, wherever necessary.

UNIT - I

1 a.	Summarize the difference between separate and combined system of sewerage.	8
b.	A population of 40,000 is residing in a town having an area of 60 hectares. If the average coefficient of runoff for this area is 0.6 and the time of concentration of the design rain is 30 min. Calculate the discharge for which the sewers of a proposed combined system will be designed for the town.	6
c.	Write the Empirical formulas used to calculate the peak drainage discharge.	6
2 a.	Justify the need for self cleaning velocity in sewages. How does it differ from non-scouring velocity?	6
b.	Enumerate the merits and demerits of water carriage system.	8
c.	Determine the velocity of the flow in a sewer running one half full. The sewer is laid at 1 in 550 slope. The diameter of the sewer is 1500 mm. Also determine the discharge flowing through the sewer. Assume N = 0.12.	6

UNIT - II

3 a.	Discuss about the conditions to be fulfilled while selecting material for sewer.	10
b.	Explain with neat sketch : (i) Catch basins (ii) Grease trap.	10
4 a.	Briefly discuss on : (i) The Hydraulic testing of sewers (ii) Ventilation of sewer.	10
b.	With a neat sketch, explain the Pneumatic Ejector.	10

UNIT - III

5 a.	Comment on the importance of CNS cycle in sewage decomposition.	8
b.	Enumerate the objectives of wastewater examination.	4
c.	Explain the procedure of BOD determination.	8
6 a.	Discuss about the significance of oxygen sag curve with respect to waste disposal.	4
b.	Describe the methods of wastewater disposal on land.	10
c.	State the effluent standards for waste disposal into surface waters as per IS.	6

UNIT - IV

7 a. Explain the levels of wastewater treatment systems with flow diagram.   10

   b. Write about :

      (i) Screens   (ii) Comminutors.   10

8 a. A municipal wastewater treatment plant processes an average flow of 5000 m^3/d, with peak flows as high as 12,500 m^3/d. Design a primary clarifier to remove approximately 60% of the suspended solids at average flow. Take SOR = 35 m^3/m^2 d.   6

   b. Discuss biological decomposition of sewage in secondary treatment.   10

   c. Distinguish between attached growth and suspended growth of system.   4

UNIT - V

9 a. With neat sketch, explain :

      (i) Activated Sludge Process (ASP)

      (ii) Oxidation Pond.   10

   b. The design flow of sewage is 3.8 million liters per day, and the BOD of the raw sewage is 300 mg/L. Design a single stage Bio-filter to produce an effluent having a BOD of 45 mg/L or less.   10

10 a. Explain the Anaerobic sludge digestion tank.   10

   b. Discuss about the wastewater reuse.   10

＊ ＊ ＊ ＊