

Mid-West University
Examinations Management Office
End Semester Examinations 2081

Bachelor level/ B.E. Civil/ 7th Semester

Time: 3 hours

Full Marks: 50

Pass Marks: 25

Subject: Sanitation Engineering (CE422)

- *Attempt all the questions*
 - *Figures in the margin indicate full marks.*
 - *Assume suitable values, with a stipulation, if necessary.*
 - *Candidates are required to answer the questions in their own words as far as possible.*
1. a) Describe the different types of sanitation system with merits and demerits. [4]
b) The catchment area of the city is 150 hectares and overall runoff coefficient of that area is 0.42, if the maximum intensity of rainfall is 40 mm/hr. calculate the quantity of storm water, which will reach the sewer lines. [2]
 2. a) Calculate the capacity of sewer, which 0.6m diameter is laid at a gradient of 1 in 400 runs full. Use $N=0.013$. [4]
b) Enlist and describe different sewer appurtenances. [4]
 3. a) Briefly explain Bio-Chemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). [4]
b) What are the methods of application of sewage on land? Briefly describe any five methods with figure. [5]
 4. a) What do you mean by settling tank? Design a circular sewage sedimentation tank for a town having population of 40,000. The average water demand is 140 litres/capita/day. Assume that 70% water reaches at the treatment unit and the maximum demand is 2.7 times the average demand. [1+6]
b) What is grit chamber? Design a rectangular grit chamber from the following data. Flow of sewage = 50MLD, Specific Gravity of grit = 2.7, Specific Gravity of organic matter = 1.2, Temp. = 20°C, Size of the both organic and grit particles to be removed = 0.21mm, $K = 0.06$ and $f = 0.03$. Assume other necessary data. [1+7]
 5. a) How do you achieve sludge treatment by Dewatering? Explain. [4]
b) Design a VIP latrine for a family of 10 persons. Assume necessary data. [4]
c) What do you mean by solid waste disposal? Describe different methods of solid waste disposal? [4]

The End