

**(3 Hours)****[Total Marks: 80**

- N.B:** 1. Question No.1 is compulsory  
2. Attempt any **three** questions from remaining **five** questions.  
3. Assume any suitable data where ever required.  
4. Figures to the right indicate full marks.

- Q.1** Solve the following : **20**
- a. What is conservancy system and water carriage system?
  - b. Compare, in a tabular form, low rate and high rate tricking filters.
  - c. What are drop manholes and lamp holes?
  - d. What is self-purification of stream?
- Q.2**
- a. Design a septic tank for a hostel housing 125persons. Also design the soil absorption system for the disposal of the septic tank effluent, assuming the percolation rate as 20 minutes per cm. **10**
  - b. Explain with the help of diagram, various systems of plumbing used for house drainage. **10**
- Q.3**
- a. Explain the necessity and process mechanism of anaerobic digestion of sludge. How the solid, liquid and gaseous products of digestion are disposed off? **10**
  - b. Design a conventional activated sludge plant to treat domestic sewage ,given **10**  
the following data:  
Population=40,000  
Average sewage flow=180 lpcd  
BOD of sewage=240mg/lit  
BOD removed in primary clarifier=25%  
Overall BOD reduction=80%  
Based on the information above, determine  
(a)Volume of aeration tank  
(b)Aeration period or H.R.T.  
(c)Sludge Retention Time  
(d)Tank dimensions
- Q.4**
- a. During BOD test conducted on a 5% dilution of waste, the following observations were taken. **10**  
i)DO of aerated water used for dilution=3.6mg/lit  
ii)DO of original sample=0.8mg/lit  
iii)DO of diluted sample after 5day incubation=0.7mg/lit  
Compute  
a)5day BOD b)Ultimate BOD
  - b. Explain with diagram various equipment's used for the control of particulate pollutants. **10**

- Q.5**
- a.** Draw a neat sketch of a typical sewage pumping station and describe in brief the functions of each. **08**
  - b.** Explain in brief different testing methods for sewer pipes and why sewers run partially full. **06**
  - c.** Design a circular primary settling tank for a town having a population of 50,000 with a water supply of 180 litres per capita per day. **06**
- Q.6** Write short note on (**any four**) **20**
- a.** Sampling of sewage
  - b.** Control measures of noise pollution
  - c.** Recycling and reuse of waste water
  - d.** Grit Chamber
  - e.** Anti-siphonage pipe
  - f.** Inverted siphon.
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