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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)
BANGALORE – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2016

Course & Branch : **B.E.- Civil Engineering**   Semester   : **V**

Subject   : **Environmental Engineering-II**   Max. Marks : **100**

Subject Code   : **CV503**   Duration   : **3 Hrs**

Instructions to the Candidates:
- Answer *one* full question from each unit.
- Write sketches wherever necessary.
- Assume suitable data wherever necessary..

UNIT – I

1. a) Explain briefly the different types of sewerage system. Mention advantages and disadvantages of each.   CO1   (10)

   b) Explain how you estimate DWF. Explain the factors affecting the quantity of DWF   CO1   (10)

2. a) Explain the rational method of estimation of storm water with assumptions made   CO1   (05)

   b) Explain the following: Time of concentration, time of entry and time of flow.   CO1   (05)

   c) A certain district of a city has a projected population of 50000 residing over an area of 40 Ha. Find the design discharge for the sewer line, for the following data: CO1   (10)

       i.   Rate of water supply = 200 lpcd

       ii.   Average impermeability factor for the area = 0.3

       iii.   Time of concentration = 50 minutes

   The sewer line is to be designed for a flow equivalent to the WWF plus twice the DWF. Take sewage generated as equal to 75% of water supplied. Use the formula: $R_i = 25.4\, a/(t+b)$. Comment on the result.

UNIT – II

3. a) Explain the effect of flow variations on velocity of flow in sewers. Also explain the differences in the hydraulic design of water supply lines and sewer lines.   CO2   (10)

   b) Briefly explain the self-cleaning velocity and non-scouring velocity giving their desired values.   CO2   (05)

   c) Design a sewer to serve a population of 36,000 the rate of water supply being 135 lpcd of which 80% finds its way into sewer. The sewer is laid at a slope of 1 in 625 and sewer should be designed to carry three times dry weather flow when running full. N=0.012.   CO2   (05)
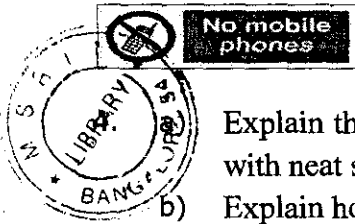
Explain the different shapes of sewers and their applications on the field with neat sketches.　　CO2　(10)

b) Explain how laying and testing of sewers are carried out.　　CO2　(10)

UNIT – III

5.　a)　What are sewer appurtenances? List them. Describe with neat sketch the components of a manhole.　　CO3　(10)

　　b)　Explain the following with sketches: i) Catch basins ii) Oil and grease traps.　　CO3　(10)

6.　a)　Clearly bring out the differences between the following terms: i) Aerobic and anaerobic decomposition ii) BOD and COD iii) Carbonaceous BOD and Nitrogenous BOD.　　CO3　(10)

　　b)　The BOD of sewage incubated for 1 day at 30°C has been found to be 200 mg/L. What will be its 5 day BOD at 20°C? Assume de-oxygenation constant (base 10) as 0.12 per day at 20°C.　　CO3　(10)

UNIT – IV

7.　a)　Draw a flow diagram of a municipal sewage treatment plant including sludge digestion. Give the removal of important polluting parameters by each of the treatment units.　　CO4　(10)

　　b)　Calculate the diameter, depth and weir loading of a primary sedimentation tank, using the following data:
Sewage flow　　- 6 MLD
Detention period　- 2 hrs
Overflow rate.　　- 1500 Its/m^2/hr.　　CO4　(10)

8.　a)　What are HRTF's? Explain importance of recirculation and its effect on the efficiency of HRTF's.　　CO4　(10)

　　b)　Determine the depth of the filter, volume of the filter media and the efficiency of treatment of a standard the trickling filter, from the following data :
Quantity of settled Sewage - 4.5 x10^6 l/day
BOD of raw sewage - 150 mg/l
Rate of organic loading - 159 gms/m^3/day
Rate of surface loading - 2000 l/m^2/day　　CO4　(10)

UNIT – V

9.　a)　Explain the stages of anaerobic sludge digestion.　　CO4　(10)

　　b)　Name the various traps used in sanitary plumbing system depending upon their shapes and their uses. Explain at least one type of trap briefly. What are the qualities of a good trap used in sanitary plumbing system.　　CO4　(10)

10.　a)　Name the various systems of plumbing. Explain any one in detail along with a neat sketch.　　CO4　(10)

　　b)　Draw a detailed drainage plan for a single storyed residential building.　　CO4　(10)

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