

**CV503**

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# **M S RAMAIAH INSTITUTE OF TECHNOLOGY**

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

## **SEMESTER END EXAMINATIONS – DEC 2013 / JAN 2014**

**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 free hand sketches wherever necessary.
- Answer are to be brief and to the point

### **UNIT – I**

- Explain different water carriage systems in the conveyance of wastewater from a community. Include suitability, merits and demerits. (08)
  - Draw a sketch of hourly variation of flow of sewage and explain its significance. (06)
  - Define time of concentration and return period. (06)
- Explain the need for collection, conveyance, treatment and disposal of wastewater from a community. (08)
  - Discuss the factors that affect dry weather flow. (06)
  - A particular drainage area is 220 hectares consisting of 20% wooded area with 'C' as 0.20, 30% thinly developed with 'C' 0.35, 22% roads with 'C' as 0.7 and 28% buildings with 'C' as 0.85. If the design intensity of rainfall is 2.5cm/hour. Calculate storm water discharge. (06)

### **UNIT-II**

- Define self-cleaning velocity and non-scouring velocity. Give the recommended values and state on what factors do these velocities depend upon? (08)
  - A 600mm sewer is flowing half full, if the gradient of the sewer is 1 in 625, calculate the velocity of flow and discharge. Is the velocity self-cleaning? Take mannings 'n' as 0.015 (06)
  - How the newly laid sewers are tested. (06)
- Discuss the different sewer materials that are used for sewers. Mention its suitability, advantages and disadvantages. (10)
  - A town has a population of 215 423 persons, with a water supply rate per capita is 240 litres per day of which 70% becomes wastewater with peak factor of 2.0. The town has an area of 1800 hectares with design intensity of rainfall of 28mm/hour and overall coefficient of runoff as 0.52. Design the combined trunk sewer to flow half full at peak discharge. Take manning's 'n' as 0.013 and average slope as 1 in 485. (10)



**UNIT-III**

5. a) Sketch different street inlets and catch basin. (06)  
b) Define BOD and COD. State the applications of both. (08)  
c) Write a note on sampling of wastewater and effluent standards (06)
6. a) List the locations where the man hole is located along the sewer line. (10)  
Sketch a drop manhole and label its parts.  
b) Sketch and explain the importance of aerobic and anaerobic (10)  
decomposition of wastewater.

**UNIT-IV**

7. a) Draw a flow diagram of typical wastewater treatment plant with (10)  
secondary biological treatment. Label the parts and list the need of each  
unit  
b) Sketch and explain the operation of Trickling filters. (10)
8. a) Design a Circular sedimentation Tank for design flow of 8 MLD. Take the (06)  
detention period as 2 hours and surface loading rate as  $30 \text{ m}^3/\text{m}^2/\text{day}$ .  
The tank will have hopper bottom of side slope of 1 in 10.  
b) Explain activated sludge process and its modifications with sketches (10)  
c) What is the purpose of screening and grit chamber in wastewater (04)  
treatment

**UNIT-V**

9. a) Explain with sketch the process of standard rate anaerobic sludge (10)  
digester. Write a note on sludge drying beds  
b) Draw a typical house drainage plan for one bedroom house. Draw a one (10)  
bed building plan of your choice. Show traps, waste and soil pipe lines  
and inspection chambers
10. a) Explain different systems of plumbing in building drainage. Classify (10)  
different types of trap with brief explanation.  
b) List out different types of closets and its suitability. (05)  
c) Write a note on onsite treatment (05)

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