

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CE) (2011 Onwards) (Sem.-6)

**ENVIRONMENT ENGINEERING-II**

Subject Code : BTCE-606

M.Code : 71087

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION-B contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. SECTION-C contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A**

**Q1. Answer briefly :**

- a) Differentiate between separate sewer and combined sewer
- b) What is meant by Dry weather flow (DWF)? How is it different from WWF?
- c) How does the sewage flow fluctuate during 24 h period? How does this fluctuation affect design of sewers?
- d) What is meant by self cleansing velocity in sewers? How is it important?
- e) Differentiate between lamp holes and man holes.
- f) Give **any two** unit operations and unit processes from wastewater treatment.
- g) Differentiate between Ejectors and Pumps
- h) What is meant by biological solids retention time? How is it different from hydraulic retention time?
- i) What is meant by relative stability?
- j) "Septic tank can only be considered as a primary treatment and the effluent needs treatment before disposal". Why?

### SECTION-B

- Q2. A main sewer is to be designed to receive a flow from 1 km<sup>2</sup> area of a community where population density is 200 persons/ha. The average flow is 150 lpcd. What is the design flow for the main sewer?
- Q3. Sketch and explain the construction and working of inverted siphons.
- Q4. What are the different measures of organic content in wastewater? Discuss the importance of BOD/COD ratio.
- Q5. A channel - type grit chamber has a flow through velocity of 0.25 m/s, a depth of 0.8 m and a length of 10 m. For inorganic grit particles with specific gravity 2.5, determine the particle size that can be removed with 100 percent efficiency, (assume  $\nu = 1.01 \times 10^{-2} \text{ cm}^2/\text{s}$ ).
- Q6. Differentiate between oxidation pond and oxidation ditch.

### SECTION-C

- Q7. Compare the advantages and disadvantages of aerobic and anaerobic systems of wastewater treatment. Use at least two examples from each to substantiate your point.
- Q8. a) Calculate the surface area required for a stabilization pond to serve a population of 1 lakh sewage flow of 189 lpcd. BOD is 200 mg/L hydraulic loading of 250kg BOD/d.ha. if the average liquid depth 1.5m. Calculate the retention time of the sewage based on influent flow. Sketch the process diagram.
- b) A trickling filter has a diameter of 20m and depth 2.5m. it is operated with a direct circulation ratio of 1.5 and influent sewage rate of 2 million litres per day. Influent BOD into the filter is 200 mg/L and effluent BOD is 30 mg/L. Calculate the hydraulic loading rate and organic loading rate. What is the efficiency of the filter?
- Q9. Write short notes differentiating the following :
- a) One Pipe system and two pipe system of plumbing
  - b) Grease trap and Grit chamber
  - c) Pump capacity and pump efficiency
  - d) Stabilization pond and constructed wet land

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**