19.4.14 (FN)

Roll No. | | | | | | | | | | |

B.E / B.Tech (Part Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

CIVIL ENGINEERING

V SEMESTER

PTCE339 / PTCE384 / PTCE9354 WASTE WATER ENGINEERING

(Regulation 2002 / 2005 / 2009)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Differentiate between Volatile Solids and Fixed Solids.
2. What do you understand by Population Equivalent?
3. Mention which type of pump is most suitable for sewage pumping. Give reasons.
4. What are the factors affecting the selection of materials for sewer construction?
5. What are the two methods adopted for the secondary treatment of septic tank effluent?
6. What do you mean by Facultative process?
7. Differentiate clearly between attached growth process and suspended growth process.
8. What is a rotating biological contactor?
9. Why dewatering of Sludge is necessary?
10. What are the conditions necessitating the treatment of sewage before its disposal by dilution?

Part – B (5 x 16 = 80 marks)

11. (i) Explain the rational method of determining the quantity of storm water. Discuss the methods of determining various parameters used in the Rational formula. (12)

    (ii) What are the relative advantages and disadvantages of conservancy system and water Carriage System? (4)

12. (a) (i) Calculate the Velocity of flow and discharge in a sewer of circular section having diameter 1.2 m laid at a gradient of 1 in 500.The sewer runs partially full at 0.6 depth. Use Manning's Formula taking n=0.012. (10)

(ii) Why a Circular section is more commonly used in the construction of Sewer? What are the advantages of the egg-shaped section and under what conditions of flow, does it become more useful? (6)

(OR)

12.(b) (i) Describe the procedure for laying and testing of sewers. (8)

(ii) State the functions of a manhole. Describe with the help of neat sketches the components of a manhole. (8)

13.(a) (i) Design a screen channel for a peak sewage flow of 45 million liters per day (mld) using the following data (10)

- Size of bars=15 mm X 50 mm
- Clear spacing between bars = 30 mm
- Angle of inclination of screen with horizontal = 45°
- Diameter of incoming sewer = 0.65m.

(ii) What is a Grit Chamber? Describe with the help of neat sketches a horizontal flow grit Chamber. (6)

(OR)

13.(b) (i) Design a Septic tank for a hostel with the following data: (10)

- Number of Users = 150
- Peak discharge = 205 lpm
- Desludging period = 1 year.

Assuming the population rate as 20 minutes per cm design dispersion trench system for the disposal of the septic tank effluent.

(ii) What do you understand by physical Unit operations? Write a note on applications of various physical Unit operations employed in Sewage treatment. (6)

14.(a) (i) Describe with sketches the treatment of sewage by activated sludge process. Mention the advantages and disadvantages of this process. (8)

(ii) Design a Standard Trickling filter plant to treat 6 million liters of sewage per day having a 5 day BOD of 160 mg/l.Also design the under drain system as well as rotary distributors for the filter. Assume Suitable data wherever required. (8)

(OR)

14. (b) (i) Design an Oxidation Pond for treating domestic sewage of 10,000 persons supplied with 200 liters per capita water per day. The BOD and the suspended solids are each 300 mg/l.Permissible organic loading for the pond is not less than 500 Kg/ha/day. The detention period is not to exceed 6 days. Assume width of the pond to its length as 1:2 and the operational `depth is 1.2 m. Assume any other suitable data. (8)

(ii) Mention the various methods used for the removal of Nitrogen from sewage. Discuss in detail any one of these methods. (8)

15. (a) (i) What do you understand by Oxygen-Sag Curve? Derive Streeter-Phelps Equation. (10)

(ii) What is Sewage Farming? What are its advantages over the method of disposal of sewage by Dilution? (6)

(OR)

15.(b) (i) Write note on Sludge Conditioning. Why elutriation is necessary prior to Chemical Conditioning. (8)

(ii) What do you understand by thickening (or) concentration of sludge? List the various methods of sludge thickening. Describe with the help of neat sketch gravity-sludge thickener? (8)