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10CV71

**Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015**  
**Environmental Engineering – II**

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer FIVE full questions, selecting  
at least TWO questions from each part.  
2. Assume suitable data wherever required.**

**PART – A**

- 1 a. Explain merits, demerits and suitability of combined system and separate system of sewerage. (12 Marks)
- b. Differentiate between:
  - i) Sewage and Sullage
  - ii) Infiltration and exfiltration.
  - iii) Minimum and Maximum velocities in sewers.
  - iv) D.W.F and W.W.F (08 Marks)
- 2 a. Explain the differences in the hydraulic design of water supply lines and sewer lines. (06 Marks)
- b. Explain the factors affecting dry weather flow. (06 Marks)
- c. Find the minimum velocity and gradient required to transport coarse sand through a sewer of 60 cm diameter with sand particles of 1 mm diameter and specific gravity 2.66. Assume  $\beta = 0.06$  and  $f = 0.02$ . Assume the sewer to run half full. Take  $N = 0.012$ . (08 Marks)
- 3 a. What are sewer appurtenances? Explain with a neat sketch, construction and working of a manhole. (10 Marks)
- b. Explain the following, with sketches:
  - i) Catch basins.
  - ii) Oil and grease traps. (10 Marks)
- 4 a. Define BOD. Derive the expression for first stage BOD. (08 Marks)
- b. Write a note on carbon cycle. (04 Marks)
- c. The  $BOD_5$  of wastewater has been analysed as 600 mg/L. If  $K_1 = 0.23/\text{day}$  (base e), what is the ultimate  $BOD_u$  of the waste. What proportion of  $BOD_u$  would remain unoxidised after 20 days? (08 Marks)

**PART – B**

- 5 a. Explain : i) Self purification of streams ii) Zones of purification. (05 Marks)
- b. Explain : i) Sewage farming ii) Sewage sickness. (05 Marks)
- c. A stream, saturated with D.O., has a flow of  $1.2 \text{ m}^3/\text{sec}$ , BOD of 4 mg/L and rate constant of 0.3 per day. It receives an effluent discharge of  $0.25 \text{ m}^3/\text{sec}$  having BOD of 20 mg/L, D.O. 5 mg/L and rate constant 0.13 per day. The average velocity of flow of the stream is 0.18 m/sec. Calculate the D.O. deficit at point 20 kms and 40 kms downstream. Assume the temperature as  $20^\circ\text{C}$ , throughout and BOD is measured at 5 days. Take saturation D.O. at  $20^\circ\text{C}$  as 9.17 mg/L. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg,  $42+8 = 50$ , will be treated as malpractice.

- 6 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. (10 Marks)
- b. Explain the importance of screens and types of screens in the sewage treatment process. (10 Marks)
- 7 a. Give the comparison between conventional and high rate trickling filters. (10 Marks)
- b. Design the dimensions of a septic tank for a small colony of 150 persons provided with an assured water supply of 120 lpcd. Assume any data, you may need. (10 Marks)
- 8 Write short notes on:
- a. Sludge digestion tank.
- b. Sampling techniques.
- c. Skimming tank.
- d. Reuse and recycle of sewage. (20 Marks)

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