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## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Sixth Semester, B.E. - Civil Engineering

Semester End Examination; June/July - 2015

Environmental Engineering - II

Time: 3 hrs

Max. Marks: 100

*Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.*

### PART - A

- 1 a. Differentiate between conservancy system and water carriage system. 6
- b. Explain the system of sewerage with its advantages and disadvantages. 10
- c. Explain the rational method of estimation of storm water flow. 4
2. a. Distinguish between Time of entry and Time of flow. 6
- b. Describe with neat sketches, any Three types of joints used in sewer lines. 10
- c. Find the minimum velocity required to transport coarse sand through a sewer with sand particles of 1 mm dia. and specific gravity 2.66. Assume  $\beta = 0.06$  and  $f = 0.02$  4
- 3 a. Write neat figures of different shapes of sewers. 6
- b. What are the factors to be considered while selection of materials of sewer. 6
- c. A combined sewer is to be designed to serve an area of 12 sq. km with a population density of 250 persons/ hectare. The average rate of sewage flow 250 litres/capita/day. The maximum flow is 100% in excess of average together with a rainfall equivalent of 15mm in 24 hrs, all of which are runoff. Determine the capacity of the sewer. Taking the maximum velocity of flow on 3 m/s, Determine the size of the circular sewer. 8
- 4 a. With flow diagram, explain Nitrogen cycle. 6
- b. With neat sketch, explain the function of drop manhole. 8
- c. Determine ultimate BOD for a sewage having 5-day BOD at 20°C as 160 ppm. Assume the deoxygenation constant as 0.2 per day. 6

### PART - B

- 5 a. Explain the various actions involved in self-purification process of a polluted stream. 10
- b. Differentiate between:
  - (i) Aerobic and Anaerobic decomposition 10
  - (ii) Sewage farming and Sewage sickness.
- 6 a. What do you understand by unit operation with respect to various unit operation and process involved in Municipal Waste-water Treatment plant? 12

- b. Design a circular sewage sedimentation tank for a town having population of 50,000. Assume any suitable data. 8
- 7 a. Write a schematic diagram; explain the working of activated sludge process. 10
- b. With the aid of a neat sketch explain the working principles of Trickling filter. 10
- 8 a. Explain the process of Anaerobic Sludge digestion. 10
- b. Write short notes on:
  - (i) Operation problems of Trickling filter 10
  - (ii) Septic Tank

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