Seventh Semester B.E. Degree Examination, June/July 2017

Environmental Engineering – II

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a. Briefly explain the necessity of sanitation of a community. **(06 Marks)**
    b. Explain briefly the different types sewerage system. Mention the advantages and disadvantages of each. **(08 Marks)**
    c. Work out the ratio of dry weather flow and wet weather flow of a city having the following particulars: area = 1 lakh hectares, water supply rate = 135 lpcd, population = 18×10^5, intensity of rainfall = 15 mm/hr, average impervious factor = 0.55. **(06 Marks)**

2   a. Give expression for hydraulic elements of circular sewer when running full and partially full. **(10 Marks)**
    b. A town has a population of 100000 persons with a per capita water supply of 200 litres/day. Design a sewer running 0.7 times full at maximum discharge. Take a constant value of N = 0.013 at all depths of flow. The sewer is to be laid at a slope of 1 in 500. Take peaking factor of 3. **(10 Marks)**

3   a. What are sewer appurtenances? Explain with neat sketch, construction and working of man hole. **(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. Explain with a neat sketch, the salient features of oxygen sag curve. **(06 Marks)**
    c. Write notes on:
       i)   Carbon cycle,
       ii) Nitrogen cycle. **(06 Marks)**

PART – B

5   a. Write short notes on:
       i)   Self purification of streams
       ii) Sewage forming **(10 Marks)**
    b. A stream saturated with dissolved oxygen, has a flow of 1.2 m^3/s, BOD of 4 mg/ℓ and a rate constant of 0.3 per day. It receives an effluent discharge of 0.25 m^3/s having BOD of 20 mg/ℓ, dissolved oxygen 5 mg/ℓt and rate constant 0.13 per day. The average velocity of flow of the stream is 0.18 m/s. Calculate the dissolved oxygen deficit at point 20 kms and 40 kms down streams. Assume the temperature as 20°C, throughout and BOD is measured at 5 days. Take saturation DO at 20°C of 9.17 mg/ℓt. **(10 Marks)**

6 a. Write a flow diagram employed for a conventional waste water treatment plant. Indicate the importance of each unit indicated in the flow diagram. **(10 Marks)**

b. Design a rectangular sedimentation tank for a population of 1.5 lakh, with an assured water supply of 135 ℓpcd. Assume peak factor as 1.2, flow velocity = 0.3 m/min. **(10 Marks)**

7 a. Explain the importance of screens and types of screens in the sewage treatment process. **(10 Marks)**

b. Explain with a neat sketch the working of a trickling filter. **(10 Marks)**

8 Write notes on:
a. Septic tank
b. Sludge digestion process
c. Oxidation ditch
d. Low cost waste water treatment methods. **(20 Marks)**

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