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10CV71

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019

Environmental Engineering – II

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Explain the different types of sewerage systems with their merits, demerits and suitability. (08 Marks)
- b. Explain the factors affecting dry weather flow. (04 Marks)
- c. A city having catchment area of 6000 hectares and population density of 150 persons per hectare is supplied with water at the rate of 200 litres per capita per day. The intensity of rainfall is 40 mm/hr and average runoff coefficient is 0.50. If 75% of water supplied contributes to the sewage. Determine the ratio of sanitary sewage (D.W.F) and storm water (W.W.F). (08 Marks)
- 2 a. Briefly explain the self cleaning velocity and non-scouring velocity giving their desired values. (06 Marks)
- b. Explain the desirable characteristics of a sewer material. List the sewer materials commonly used. (06 Marks)
- c. Calculate the velocity, discharge and chezy's coefficient for a stonework sewer running full. The diameter of sewer is 150 mm and it is laid at a gradient of 1 in 60. Assume $N = 0.013$ in mannings formula. (08 Marks)
- 3 a. Explain with a neat sketch, working of a deep manhole. (10 Marks)
- b. Explain the following with sketches: (10 Marks)
 - i) Catch basins
 - ii) Oil and grease traps.
- 4 a. Explain different types of sampling. (06 Marks)
- b. Write a note on carbon cycle. (06 Marks)
- c. The BOD of a sewage incubated for one day at 30°C has been found to be 110 mg/lit. What will be the 5-day 20°C BOD? Assume $K_1 = 0.1$ at 20°C. (08 Marks)

PART – B

- 5 a. Explain: (06 Marks)
 - i) Self purification of streams
 - ii) Zones of purification.
- b. Explain: (06 Marks)
 - i) Sewage farming
 - ii) Sewage sickness.
- c. Using the following data, find out DO at the end of 2 days.

| | River | Wastewater |
|---------------------------|-------|------------|
| Flow in m ³ /s | 19 | 1 |
| DO in mg/lit | 9 | 0 |
| BOD in mg/lit | 3 | 200 |

Assume $R = 0.12$ per day, $r = 0.42$ per day.

(08 Marks)



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- 6 a. Explain with a flow diagram a conventional sewage treatment plant. Discuss the function of each component. (10 Marks)
- b. A grit chamber is designed to remove particles with a diameter of 0.2 mm, specific gravity 2.65. Settling velocity for these particles has been found to range of 0.016 to 0.022 m/sec, depending on their shape factor. A flow through velocity of 0.3 m/sec will be maintained by proportioning weir. Determine the channel dimensions for a maximum waste water flow of 10000 cum/day. (10 Marks)
- 7 a. With the help of a neat sketch, explain the working of trickling filter. (10 Marks)
- b. Mention the modification of activated sludge process. Explain any two of them. (10 Marks)
- 8 Write short notes on:
- a. Oxidation pond
 - b. Reuse and recycle of wastewater
 - c. Sludge digestion tank
 - d. Low cost waste treatment
- (20 Marks)
