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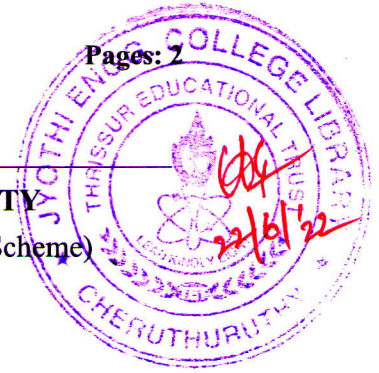
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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Eighth Semester B.Tech Degree Examination June 2022 (2015 Scheme)



Course Code: CE402

Course Name: ENVIRONMENTAL ENGINEERING – II

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) Differentiate between dry weather flow and storm water flow. (3)
b) What is meant by COD? (2)
c) Design a sewer running 0.7 times full at maximum discharge for a town provided with the separate system, serving a population 80,000 persons. The water supplied from the water works to the town is at a rate of 190 LPCD. The manning's $n = 0.013$ for the pipe material and permissible slope is 1 in 600. Variation of n with depth may be neglected. Check for minimum and maximum velocity assuming minimum flow $1/3$ of average flow and maximum flow as 3 times the average. (for $d/D = 0.7$, $q/Q = 0.838$, $v/V = 1.12$) (10)
- 2 a) Explain the classification of sewers based on shape and materials. (7.5)
b) What is meant by first stage BOD?. (2.5)
c) In a test for relative stability, the period of incubation comes out to be 8 days. Determine the relative stability, if the test temperature is a) 20°C b) 37°C 84.2 98.2. (5)
- 3 a) List and explain any four physical characteristics of sewage. (4)
b) The BOD of sewage incubated for 1 day at 30°C is found to be 110mg/l . What will be the 5 day BOD at 20°C . Assume deoxygenation constant at 20°C as 0.1 per day. (9)
c) Write notes on time of concentration (2)

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) Discuss the various conditions favouring disposal by dilution (2.5)
b) A town discharges $80\text{ m}^3/\text{s}$ of sewage into a stream having a rate of flow of $1200\text{ m}^3/\text{s}$ during lean days, at a 5-day BOD of sewage at the given temperature is (10)

250mg/l. Find the amount of critical DO deficit & its location in the downstream portion of the stream. Assume deoxygenation coefficient as 0.1 and coefficient of self-purification (f_s) as 3.5. Assume saturation DO at given temperature as 9.2mg/l and DO of effluent as 0.

- c) Write notes on activated sludge process. (2.5)
- 5 a) What is meant by sewage sickness? Discuss the various methods for its prevention. (7.5)
- b) What is meant by Ponding nuisance in a trickling filter? How to prevent it? (4.5)
- c) Explain the working of a grit chamber (3)
- 6 a) Write notes on DO sag curve.. (4)
- b) Explain the features and operation of contact beds with neat sketch. (6)
- c) Compare the characteristics of conventional or standard trickling filters with high rate trickling filters. (5)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Design an Imhoff tank to treat the sewage from a small town with 25000 population. The sewage flow rate is 180 litres per capita per day. Assume any other data, if required. (10)
- b) Discuss the different stages of sludge digestion process (6)
- c) Discuss the advantages and disadvantages of aerating lagoons. (4)
- 8 a) Explain the functioning of an oxidation ditch with neat sketch. (5)
- b) Explain the working of an Upflow anaerobic sludge blanket reactor. (5)
- c) List and explain any five methods for the final disposal of sludge. (10)
- 9 a) Explain the classification of oxidation ponds.. (4)
- b) Design a sludge digestion tank for the primary sludge for the following data (12)
- i) Average flow =250 million litres per day, ii) Total suspended solids in raw sewage=350mg/l, iii) raw sludge has a moisture content of 95% and specific gravity 1.02. iv) Moisture content of digested sludge=85%.
- c) Explain sludge drying beds with neat sketch. (4)
