

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth Semester B.Tech Degree Supplementary Examination October 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) Define the term 'Relative stability'. (3)
- b) Design a circular sewer running half full for a maximum sewage flow of 500 lps. (8)
Assume $i=0.0001$ and $n=0.013$. Make use of Manning's equation and assume any missing data.
- c) Briefly explain the factors affecting storm water flow (4)
- 2 a) Define the term 'Time of Concentration' (4)
- b) Explain the working of an inverted siphon with a neat sketch. (8)
- c) Define self- cleansing velocity and explain its significance. (3)
- 3 a) The 2-day BOD of a sewage sample incubated at 20°C is 200 mg/l. Determine its 5 days BOD value at 20°C if the deoxygenation constant at 20°C is 0.1/day. (5)
- b) Discuss the three systems of sewerage adopted in practice. (8)
- c) Define population equivalent. (2)

PART B*Answer any two full questions, each carries 15 marks.*

- 4 a) Give the Streeter Phelp's equation to compute the critical DO deficit. (2)
- b) Explain the operational troubles in an activated sludge process and its remedial measures (9)
- c) Compare the disposal of waste water by dilution and disposal by land treatment. (4)
- 5 a) Explain the working of intermittent sand filters. (5)
- b) Explain the zones of pollution in a river. (6)
- c) Define the terms: (a) Sludge Volume Index (b) F/M ratio (4)
- 6 a) Compare a conventional and high-rate trickling filter. (5)
- b) Design a circular sedimentation tank for a population of 30,000 with a water (5)

supply rate 200 lpcd and provided with mechanical cleaning facility. Assume any missing data.

- c) Explain the working of a Rotating Biological Contractor (5)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) What is sludge thickening? Mention the three methods of sludge thickening (4)
- b) Design a septic tank for a population of 100 with a maximum sewage flow rate of 150 lpcd. Make suitable assumptions. Sketch the plan and section. (10)
- c) Explain factors affecting the sludge digestion process. (6)
- 8 a) What are the major components of an Imhoff tank? (4)
- b) Design a sludge digestion tank for primary sludge for the following data: (10)
- Average sewage flow=200 MLD, Total suspended solids in raw sewage=500 mg/l, Moisture content of digested sludge=85%. Assume any other suitable data required.
- c) Mention the various types and working of an oxidation pond. (6)
- 9 a) Discuss any two types of sludge disposal (6)
- b) Design an imhoff tank to treat the sewage from a small town with a population of 20000 persons ,with sewage flow rate of 180 litres per day (14)
