

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

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

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| 1 | a) Define a) Sullage b) Sewage c) Storm water d) Night soil (4) | (4) |
| | b) Explain Time of concentration (3) | (3) |
| | c) Determine the size of circular sewer for a discharge of 700lps running half full. (8) | (8) |
| | Assume $i=0.0001$ and $n=0.015$ | |
| 2 | a) Discuss the merits & demerits of separate and combined system of sewage (8) | (8) |
| | b) Discuss the purposes served by an inverted siphon with help of a neat sketch. (5) | (5) |
| | c) Explain the term relative stability. (2) | (2) |
| 3 | a) Define a) BOD b) COD (4) | (4) |
| | b) Explain physical characteristics of sewage (6) | (6) |
| | c) The 5 day BOD of a sewage sample is 150 mg/l. Determine its 3 days 20°C BOD. (5) | (5) |
| | Assume deoxygenation constant at 20°C as 0.1 | |

PART B

Answer any two full questions, each carries 15 marks.

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| 4 | a) Give the flow diagram of a conventional municipal wastewater treatment. (3) | (3) |
| | b) A city discharges $100 \text{ m}^3/\text{s}$ of sewage into a river, which is fully saturated with oxygen flowing at the rate of $1500 \text{ m}^3/\text{s}$ and with a velocity of 0.2 m/s . The 5 days BOD of sewage at the given temperature is 250 mg/l . Find when and where the critical D.O deficit will occur in the downstream portion of the river and what is its amount? Assume coefficient of purification of the stream (f) as 4 and coefficient of deoxygenation as 0.1. (12) | (12) |
| 5 | a) Explain sludge volume index. (5) | (5) |

- b) What are the limitations of activated sludge process? (5)
- c) Write short notes on rotating biological contactors. (5)
- 6 a) Compare a standard rate trickling filter with a high rate one. (7)
- b) A rectangular grit chamber is designed to remove particle with a diameter 0.2 mm and specific gravity 2.65. The settling velocities of these particles are found to be 0.02 m/s. A flow through velocity of 0.30 m/s will be maintained by the proportioning weir. Determine the channel dimensions for a maximum wastewater flow of 10,000 m³/day. (8)

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 a population of 20000 persons ,with sewage flow rate of 180 litres per day (14)
- b) What are the advantages and disadvantages of oxidation ponds? (6)
- 8 a) What are the features of acid regression stage and alkaline fermentation stage of sludge digestion? (10)
- b) Explain the working of an Up flow Anaerobic Sludge Blanket (UASB) reactor. Discuss any three drawbacks of UASB. (10)
- 9 a) What are the methods of sludge disposal. (6)
- b) Explain sludge drying bed? (8)
- c) What are the various factors affecting sludge digestion? (6)
