

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Eighth semester B.Tech degree examinations, September 2020

**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 population equivalent. (2)
- b) List and explain the factors affecting storm water flow. (3)
- c) A city has a projected population of 60,000 spread over an area of 50 hectare. (10)  
Assume rate of water supply of 250 litres per capita per day, and out of this total supply only 75 % reaches in sewer as wastewater. Assume a peak factor of 1.5. Design a separate circular sewer line running half full. Consider Manning's rugosity coefficient of  $n = 0.012$ , and gradient of sewer  $S = 0.0001$ .
- 2 a) Define self- cleansing velocity and explain its significance. (4.5)
- b) Explain the classification of sewers according to the material. (3)
- c) Explain the working of an automatic flushing tank with neat sketch. (7.5)
- 3 a) Discuss the three systems of sewerage adopted in practice. (9)
- b) Differentiate between dry weather flow and wet weather flow. (2)
- c) Determine ultimate first stage BOD for a wastewater having 5 day BOD at 20°C (4)  
as 160 mg/l. Assume deoxygenation constant at 20° C as 0.2 per day.

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

- 4 a) Discuss in detail the zones of pollution in a river or stream. (8)
- b) Compare the disposal by dilution and disposal by land treatment. (5)
- c) What is meant by rotating biological contactor? (2)
- 5 a) List and explain any five factors affecting self-purification capacity of a stream. (7.5)
- b) Explain grit chamber with the help of a neat sketch. (4)
- c) Write notes on activated sludge process. (3.5)
- 6 a) Discuss the working of intermittent sand filter. (2)
- b) Explain the features and operation of contact beds with neat sketch. (8)
- c) Explain streeter phelp's equation. (5)

**PART C**

*Answer any two full questions, each carries 20 marks.*

- 7 a) Design the dimensions of a septic tank for a small colony of 150 persons (10)  
provided with an assured water supply at a rate of 120 litres per person per day.  
Assume any other data if required.
- b) Discuss any two types of sludge disposal (5)
- c) Explain the features of an Imhoff tank with neat sketch (5)
- 8 a) An oxidation pond is to be constructed in a hot climatic area for treating the (10)  
sewage from a residential colony with 5000 persons contributing sewage at 120  
litres/capita/day. The 5day BOD of sewage is 300mg/ litre. Assume organic  
loading in the pond as 300kg/ hectares/day. Calculate the dimensions required  
for the tank and its detention time.
- b) Write notes on sludge thickening? (4)
- c) Explain the features of a sludge digestion tank with a neat sketch. (6)
- 9 a) List and explain the factors affecting anaerobic digestion. (4)
- b) Explain oxidation ditch with a neat sketch. (4)
- c) Calculate the area of land required for drying the sludge from the digestion tank (12)  
for 50,000 population, Also design the dimensions of beds. The dry sludge  
content per capita per day is 0.068kg. The moisture of the sludge is 95%. The  
specific gravity of wet sludge is 1.02.

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