



TE / CIVIL / SEM VI / EE-II / CBCS

28 MAY 2019

(Time: 3 Hours)

[Total Marks: 80]

- N.B: 1. Question No.1 is compulsory  
 2. Attempt any **three** questions from remaining **five** questions.  
 3. Assume any suitable data where ever required.  
 4. Figures to the right indicate full marks.

Q.1 Attempt any **four**

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|----|--|----|
| a. | Differentiate between combined and separate system of sewerage.  | 05 |
| b. | Draw neat sketch of inverted siphon.   | 05 |
| c. | A 3% solution of sewage sample is incubated for 5 days at 20°C. The depletion of oxygen was found to be 3ppm. Determine the BOD of raw sewage. | 05 |
| d. | Define F/M and Sludge age  | 05 |
| e. | Why oil and grease should be removed from waste water? Draw neat diagram of skimming tank.   | 05 |

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| Q.2 a. | Describe the procedure for laying and testing of sewers.   | 10 |
| b.     | State the routine tests carried out in the laboratories at sewage treatment and disposal works and explain the significance of each of them. | 10 |

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| Q.3 a. | What do you understand by self-purification property of a stream? Explain the factors affecting this property.                          | 10 |
| b.     | Design a high rate single stage trickling filter for treating the following wastewater of a town having a population of 40,000 persons: | 10 |

a) Domestic sewage @ 150 lpcd having 200mg/lit of BOD

b) Industrial wastewater @ 0.25 million litres per day having 600mg/lit of BOD.

Assume the following:

i) BOD removal in primary clarifier = 35%

ii) Permissible organic loading of filter = 8000 kg/hectare-m/day (excluding recirculated sewage)

iii) Recirculation ratio = 1.0

iv) Permissible surface loading = 160 ML/hectare/day (including recirculated sewage)

Also, Determine the efficiency of the filter.

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| Q.4 a. | Enumerate the various methods which can be used for disposal of municipal solid waste and explain the two most widely adopted in India. | 10 |
| b.     | Differentiate between single pipe and single stack plumbing system with neat sketch.  | 10 |

- Q.5 a. Explain the working of Activated Sludge Process with neat sketch. Discuss the role of return sludge. 10
- b. Design the dimensions of a septic tank for the following data: 10
- No. of People=150  
Sewage/capita/day=130lit  
Desludging period=2years  
Length: Width =4:1
- Q.6 Write short note on (any four) 20
- a. Sludge thickener  
b. Oxidation ditch  
c. Recycling and reuse of waste water  
d. Constructed wetland  
e. Pumping station

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