

Duration:-03 Hrs

Marks: 80

N.B:-

- 1) Question No 1 is compulsory
- 2) Attempt **any three** questions from the remaining **five** questions.
- 3) Assume suitable data wherever necessary.
- 4) Figures to the right indicate full marks.

Q.1] Write short notes (any four)

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- a) Effect of pollution on lakes
- b) Classification of particulates.
- c) Physical characteristics of waste water
- d) Classification of solid waste.
- e) The Gaussian Plume Model

Q.2] a) Discuss in brief various methods for recovery of materials from process effluents.

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b) Discuss in brief aerodynamic effects of structures and terrain.

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Q.3] a) Explain in detail Combustion for air pollution control.

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b) In a completely mixed activated sludge system determine:

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- i) The aeration basin volume
- ii) The Hydraulic retention time
- iii) The sludge volume wasted daily
- iv) The mass of sludge wasted daily
- v) The fraction of sludge recycled
- vi) The F/M ratio

Given:

- Population equivalent 50000 (11250 m³/day)
- Influent BOD₅ = 200mg/L
- effluent BOD₅ is 10 mg/L
- Yield Coefficient Y = 0.6
- Decay rate k_d = 0.06 d⁻¹

Assume:

- MLSS in aeration basin = 3.5 kg/m³
- MLSS in clarifier sludge = 15 kg/m³
- Mean cell residence time = 10 days.

Q.4] a) Explain in brief Source correction methods for air pollution control.

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b) What is BOD? Deduce expression for BOD with time? What are the factors on which the deoxygenation constant (K) depends?

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Q.5] a) Explain the solid waste transfer station in detail.

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b) Explain DO Sag curve and derive the formula for critical time and critical deficit.

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Q.6] a) Discuss the design criteria for Activated Sludge Process in detail. Derive the necessary derivation for volume of Aeration tank.

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b) A following data is obtained in a High volume filtration method for measurement of mass concentration of suspended particulates.

- (i) Air flow through clean filter = 1.7m³/min.
- (ii) Air flow through filter at the end of the test = 1.4m³/min
- (iii) Weight of clean filters = 5gms
- (iv) Weight of filters after exposures = 5.348 gms.

The test was carried out for 24hrs. Find the concentration of suspended particulates in µg/m³.

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