Time: 3 Hours **Marks: 80**

N.B. 1 Question number ONE is compulsory
2 Attempt any THREE questions out of remaining FIVE
3 Figure to right indicate full marks

01. Write short notes on (any four) **20**

(a) Environmental legislation and regulations.

(b) Oxygen Sag Curve

(c) Classification of hazardous waste based on material properties.

(d) Electrostatic precipitator

(e) ISO 14001

02. (a) List the potential methods for disposal of solid waste and discuss any one in detail **10**

In a completely mixed activated sludge system determine: **10**
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 Data:
Population equivalent 50000 (11250 m^3/day)
Influent BOD_5 = 200 mg/L
Effluent BOD_5 is 10 mg/L
Yield Coefficient Y = 0.6
Decay rate k_d = 0.06 d
Assume:
MLSS in aeration basin = 3.5 kg/m^3
MLSS in clarifier sludge = 15 kg/m^3
Mean cell residence time = 10 days

03. (a) Discuss the design criteria for Activated Sludge Process in detail. Derive the necessary derivation for volume of Aeration tank. **10**

(b) What is Plume behavior? Explain different types of plume behavior with a neat diagram. **10**

04. (a) How are air pollutants classified? List the major types of Air pollutants. Briefly explain the dry deposition mechanism and wet precipitation mechanism of nature for removal of particulate matter. **10**

(b) Describe techniques for removal of gaseous pollutants from an effluent stream? **10**

05. (a) What do you understand by inversion? What are the various types of inversion? Explain in detail along with diagram. **10**

(b) Show that the ratio of 2.25 day, 35 ºC BOD to the 5-day 20 ºC BOD is approximately unity **5**

(c) Explain Biological film system with a neat diagram. **5**

06. (a) Explain in brief about Source correction methods for air pollution control. **10**

(b) Explain Nitrification-Denitrification process in detail with a neat diagram and reactions involve in it. **10**
