(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.   Answer the following   **20**

(a) What is carbonaceous and nitrification demand in BOD?

(b) To show that the ratio of the 2 & $1/4^{th}$ –day, 35 ºC BOD to the 5-day 20 ºC BOD is approximately unity. Take $\theta = 1.056$

(c) Classification of solid waste

(d) Noise pollution causes, consequences and abatement methods

02. (a) Explain the construction and working of the Venturi scrubber used for air pollution control.   **10**

(b) How are water pollutants classified? List the major water pollutants, explain any one in detail.   **10**

03. (a) Explain Plume behavior depending on atmospheric stability and wind turbulence.   **10**

(b) Explain activated sludge process of secondary biological treatment with a neat diagram   **10**

04. (a) What are advance wastewater treatments? Explain Electrodialysis process in detail with a neat diagram.   **10**

(b) What is DO Sag-Curve? Explain in brief.   **10**

05. (a) Following BOD test was carried out to laboratory and results were tabulated as follows: -   **10**

Time in day t	0	1	2	4	6	8
BOD (mg/lit)	0	32	56	85	105	110

Determine the reaction rate constant and ultimate BOD.

(b) How are air pollutants classified? List the major types of Air pollutants. **5**
Briefly explain the dry deposition mechanism and wet precipitation
mechanism of nature for removal of particulate matter.

06. (a) Discuss the classification of hazardous waste based on material properties. **10**

(b) A complete mixed activated sludge process is to be treat wastewater flow of **10**
500 m^3/hr having a soluble BOD_5 of 250 mg/l. The concentration of soluble
BOD_5 escaping treatment is 10 mg/l. Design criteria are as follows: Y=
0.5, k = 5 day^{-1}, K_d= 0.06 day^{-1}, K_s = 100 mg/l. and the concentration of
MLVSS (X) = 2000 mg/l. Compute the following
      a) The treatment efficiency,
      b) Mean cell residence time θc
      c) Hydraulic retention time θ,
      d) Volume of aeration tank,
      e) F/M ratio.

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