Paper Code: ENV-22	Roll No.										

M.Tech.
(SEM II) EVEN SEMESTER EXAMINATION, 2015-16
AIR & NOISE POLLUTION CONTROL

[Time: 3 hrs.]   **[Max. Marks: 100]**

Note: Attempt all five questions.

Q.1. Attempt any two parts of the following: **[10x2=20]**

    (a) Define "Air Pollution" giving background air quality and classify primary and secondary air pollutants with examples. How secondary pollutants are formed in atmosphere?

    (b) Write down the ambient air quality standards for air pollutants as published by CPCB. A sample of air analyzed at 0°C and 1 atmospheric pressure is reported to contain 8 ppm of CO. Determine the equivalent CO concentration in micrograms per cubic meter and milligrams per cubic meter?

    (c) Explain relationship between source, medium and receptor. Describe the effect of Lead and PM_{10} on human health with the help of suitable diagram of human respiratory system.

Q.2. Attempt any two parts of the following: **[10x2=20]**

    (a) What do you mean by effective stack height? Determine the effective height of a stack given the following data:
       i. Physical stack is 203 m tall with 1.07m inside diameter
      ii. Wind velocity at 10m height= 3.56 m/sec
     iii. Air temperature = 13 °C
     iv. Barometric pressure = 1000 millibars
      v. Stack gas velocity = 9.14 m/s
     vi. Stack gas temperature = 149 °C

    (b) Describe the plume behaviors due to variation in lapse rate with the help of sketches. Explain wind rose.

    (c) Differentiate between :
      i.   Subsidence inversion and radiation inversion
     ii.   Environmental Lapse rate (ELR) and Adiabatic Lapse rate (ALR)

Q.3. Attempt any two parts of the following: **[10x2=20]**

    (a) Calculate the air-fuel ratio of burning of propane (C_3H_8) with 130 percent theoretical air.

    (b) Derive Gaussian plume model equation and state its assumptions and limitations. How you will determine maximum ground level concentration?

(c) Determine the efficiency of cyclone having the following characteristics of particle diameter = 10 μm, density = 1500 kg/m^3, cyclone diameter = 0.5 m, gas flow rate = 4 m^3/sec, gas temperature = 25 °C and μ = 2.1 X 10^{-5} kg/m.s.

Q.4. Attempt any two parts of the following: **[10x2=20]**

(a) Explain with a neat sketch, the principle and construction of fabric filter. Give applications. A fabric filter is to be constructed using bags that are 0.3 m in diameter and 6 m long. The baghouse is to receive 10 m^3/s of air, and the appropriate filtering velocity has been determined to be 2 m/min. determine the number of bags required for a continuously cleaned operation.

(b) Define absorption as it relates to air pollution control devices. Name and describe four types of absorption units. Describe its advantage and disadvantage.

(c) What is 'Vehicular Pollution'? What are the steps to control vehicular pollution?

Q.5. Attempt any four parts of the following: **[5x4=20]**

(a) Define 'Noise' and explain as to how and why it should be regarded as an environmental pollutant.

(b) Derive relation between intensity of sound and distance from the source.

(c) What are the sources and causes of noise pollution?

(d) Write a short note on "Indoor Air Pollution".

(e) 50 dB noise lasting for 55 minutes is followed by 90 dB noise lasting for 5 minutes. What is L_{eq} of this noise?

(f) What are the methods to control noise pollution?