Printed Pages : 3

ECH-031

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : **151751**

Roll No.

B. Tech.

(SEM. VII) (ODD SEM.) THEORY EXAMINATION, 2014-15

AIR POLLUTION AND CONTROL EQUIPMENT

Time : **3** Hours] [Total Marks : **100**

1 Attempt any four parts : **5×4=20**

a) Define air pollution and discuss clean air act.

b) Briefly explain primary and secondary pollutants with example.

c) Elobarate the formation mechanism of photo chemical smog.

d) What is ambient air monitoring? Discuss national ambient air quality standards.

e) Discuss the different layers of atmosphere with respect to altitude and the temperature profile of the same.

f) How air pollution is effecting the environment? Explain.

2 Attempt any two parts : **10×2=20**

a) Explain the effect of meterological factors on air pollution.

b) Sulphur dioxide is emitted at a rate of 2kg/s from the top of a chimney that is 120m high. The plume initially rises vertically a further 10m above the chimney exit, before being converted horizontally by a wind speed of 15m/s under conditions of neutral stability. The surrounding terrain is flat with a roughness length z_0 of 0.01m. Calculate:

i) The concentration (kg/m^3) on the plume centre-line at a distance of 800m downwind of the chimney.

ii) The ground level concentration at a distance of 800m downwind of the chimney (that is, along the x-axis).

iii) The location (x) where the maximum ground level concentration occurs downwind of the chimney on the x-axis.

iv) The concentration at this location.

c) Write short notes on

i) Air sampling and measurement

ii) Analysis of air pollutants.

3 Attempt any two parts : **10×2=20**

a) Explain the source correction methods of air pollution.

b) The dimensions of a bag in a filter unit are 8 inches in diameter and 15 feet long. Calculate the filtering area of the bag. The filtering unit consists of 40 such bags and is to treat 480,000 ft^3/hr of gas from an open-hearth furnace. Calculate the "effective" filtration velocity in feet per minute and acfm per square foot of filter area. Also calculate the mass of particles collected daily assuming that the inlet loading is 3.1 gr/ft^3 and the unit operates at 99.99+% collection efficiency.

c) What are wet collectors? Explain the design parameters affecting the overall performance of a wet scrubber.

4 Attempt any two parts : **10×2=20**

a) Mention the sources of hydrocarbons and discuss the control methods.

b) Discuss various methods to control sulphur dioxide emissions.

c) Explain the role of APC techniques in petroleum refinary.

5 Attempt any two parts : **10×2=20**

a) What is noise pollution? Discuss outdoor noise propagation.

b) Discuss noise pollution standards and measures of noise.

c) Explain how to control noise pollution.