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15CV/CT551

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Air Pollution and Control

Time: 3 hrs.

Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Define Air Pollution. Discuss the various sources of air pollutants. **(08 Marks)**
   b. Explain the causes and effects of inversion of atmosphere. **(08 Marks)**

OR

2 a. Explain the classification and properties of air pollution. **(08 Marks)**
   b. What are the factors affecting the photo – chemical reactions? With the necessary reactions, explain the basic theory of formation of photo – chemical smog. **(08 Marks)**

Module-2

3 a. With a neat sketch, explain the wind speed recorder and wind direction recorder devices used in measuring meteorological variables. **(08 Marks)**
   b. Obtain an expression for particulate concentration at any co-ordinate and distance by Gaussian plume dispersion model. **(08 Marks)**

OR

4 a. With a neat sketch, explain the effective stack height. How do you calculate the effective stack height? **(08 Marks)**
   b. Define Wind rose. With a neat sketch, explain how a wind rose is plotted. **(08 Marks)**

Module-3

5 a. What is meant by Air sampling? Explain non – isokinetic , isokinetic sampling and sampling train. **(08 Marks)**
   b. Explain the colourimetric method and chromatographic method of analysis of atmospheric samplers. **(08 Marks)**

OR

6 a. What are the various analytical methods used for monitoring air pollution? **(08 Marks)**
   b. How do you measure the oxides of sulfur and oxides of Nitrogen present in the ambient atmosphere using the high volume sampler and absorption solution? **(08 Marks)**

Module-4

7 a. List the different particulate control devices. Explain the principle , construction and working of an electrostatic precipitator, with a neat sketch. **(08 Marks)**
   b. A thermal power plant installed an ESP with $5000m^2$ of collector plate area. The ESP is 95% efficient in treating $200m^3/s$ of flue gas. Estimate how large the plate area should be to achieve 98 – 99% efficiencies for the ESP. **(08 Marks)**

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8 a. With a neat sketch, explain the operation of fabric filter. **(08 Marks)**

b. In a fabric filter, a bag house is to be designed to handle effluent gas flowing with the velocity of 600m³/min. The filtering velocity is 4m/min. Each bag is 0.2m in diameter and 40m high. The bag house is to be square in cross section, with 0.30m spacing between bags and 0.20m clearance from the walls. Calculate

i) The number of bags required and   ii) The width of the bag house. **(08 Marks)**

Module-5

9 a. Define Equivalent Sound Level (α_{eq}). Discuss the general control methods of noise pollution due to heavy vehicular traffic. **(08 Marks)**

b. Give the constituents of clean and dry atmospheric air quality. Also discuss the salient features of Air Pollution (prevention) Act 1981. **(08 Marks)**

OR

10 a. Define Noise. Write the units of noise and explain the intensity of noise. **(08 Marks)**

b. What are the various approaches to minimize exhaust emission? Explain. **(08 Marks)**

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