



Printed Pages : 3

TEN – 404

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

PAPER ID : 0071

Roll No.

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B. Tech.

(SEM. IV) EXAMINATION, 2006-07

AIR POLLUTION & CONTROL

Time : 3 Hours]

[Total Marks : 100

- Note :
- (i) Attempt *all* questions.
 - (ii) All questions carry *equal* marks.
 - (iii) Assume suitably any data not given.

1 Attempt any **four** parts of the following : **5×4=20**

- a) What is air pollution? Present a brief account of air pollution scenario in India.
- b) Define troposphere, stratosphere, mesosphere and thermosphere with respect to the ranges of altitude. Also mention the ranges of temperature and important gases found in each one of these layers.
- c) Discuss the role played by anthropogenic activities in generation of air pollutants. Highlight the importance of afforestation in mitigating the adverse effects of air pollution.
- d) Mention the names of some important sources generating hydrocarbons in air. Also explain the role played by hydrocarbons in the formation of photochemical smog.

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- e) Discuss the adverse effects of carbon monoxide on human health. How can the reduction in carbon monoxide emission help mitigate these effects ?
 - f) Discuss the mechanism of formation of acid rain along with the impacts on health and property caused by it.
- 2** Attempt any **four** parts of the following : **5×4=20**
- a) Briefly summarize the indoor reactions of air pollutants.
 - b) How is maximum mixing depth (MMD) determined? Explain the significance of maximum mixing depth in air pollution control.
 - c) Briefly discuss the effect of moisture on dispersion of air pollutants.
 - d) Describe different ways of heat transfer resulting in tropospheric heating.
 - e) Briefly describe the Gaussian dispersion model for air pollutants. Also write Holland's equation for the calculation of plume height.
 - (f) Discuss the criteria for fixing stack height.
- 3** Attempt any **two** parts of the following : **10×2=20**
- a) What is a high volume sampler? Explain its salient features and procedure adopted for the sampling and measurement of suspended particulate matter in air.
 - b) Briefly discuss the following collection techniques and sampling devices for gaseous air pollutants :
 - i) Absorption sampling
 - ii) Condensation sampling.
 - d) Enumerate the aims and objectives of stack monitoring. Discuss the importance of Isokinetic conditions and procedure adopted for the determination of mass emission rate in stack monitoring.

- 4 Attempt any **two** parts of the following : **10×2=20**
- a) Describe the principle of operation, advantages and limitations of the following control devices for particulate contaminants:
 - i) Gravitational settling chamber
 - ii) Fabric filter
 - b) What are wet collectors? Discuss the advantages and drawbacks of wet collectors and mention the salient features of spray tower, wet cyclone scrubber and venture – scrubber.
 - c) How is a low voltage two stage electrostatic precipitator different from a high voltage single stage electrostatic precipitator, show the schematic view of a plate type electrostatic precipitator and mention the size efficiency relationship.
- 5 Attempt any **two** parts of the following : **10×2=20**
- a) Discuss the pollution control process of gaseous contaminants through absorption. With the help of suitable diagrams explain the working principles of spray tower, tray tower, packed tower and venture scrubber used for the absorption of gaseous contaminants.
 - b) What are the approaches for controlling the oxides of nitrogen in combustion gases? Discuss the control methodology of oxides of nitrogen by combustion modification.
 - c) Describe various types of pollutants emitted from petrol-driven and diesel-driven motor vehicles. Also write Euro-1 and Euro-II. Specifications for pollution control in petrol driven passenger cars.