Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech/CE/SEM-8/CE-801/2/2013

2013

ENVIRONMENTAL POLLUTION AND CONTROL

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) Albedo is the term mainly used to refer to the

      a) average temperature of the earth

      b) average reflectivity of the earth

      c) average pressure

      d) none of these.

   ii) Ozone depletion is as a consequence of

      a) greenhouse effect

      b) emissions of volatile organic carbon

      c) emissions of CFC

      d) emissions of nitrogen oxides.

iii) Lignin is the waste generally derived from

a) dairy industry b) paper & pulp

c) oil & refinery d) fertilizer plant.

iv) The common audible range of sound is between

a) 10 - 10,000 Hz b) 20 - 20,000 Hz

c) 45 - 45,000 Hz d) 80 - 80,000 Hz.

v) Which of the following is not a major constituent of a photochemical smog ?

a) PAN b) CO

c) HC d) O_3.

vi) The major photochemical oxidant is

a) Hydrogen peroxide

b) Ozone

c) Nitrogen oxides

d) Peroxyl acetyl nitrate (PAN).

vii) Electrostatic percipitators remove

a) Sulphur dioxide

b) Particulate matter

c) Both (a) & (b)

d) None of these.

viii) Carbon monoxide is hazardous to health, because

a) it causes loss of sense of smell

b) it is carcinogenic in nature

c) it reduces oxygen carrying capacity of blood

d) it may cause conjunctivitis.

ix) The air pollutant which causes severe damage to plants, even at much lower concentrations than what may be harmful to human health, is

a) Fluorine b) Ozone

c) PAN d) None of these.

x) The important gaseous pollutants, contributing to acid rains, are

a) SO_2 and NO_X b) CO_2 and H_2S

c) NO_X and O_3 d) None of these.

xi) The fossil fuels responsible for causing acid rains are used in

a) industries

b) domestic cooking and heating

c) automobiles

d) all of these.

xii) High altitude aircrafts lead to

a) destruction of oxygen

b) destruction of ozone

c) formation of ozone

d) none of these.

xiii) The device which can be used to control gaseous as well as particulate pollutants in the industrial emissions is known as

a) cyclone b) spray tower

c) dynamic precipitator d) fabric filter.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What is noise ? Explain the concept of noise level in terms of Sound Pressure, Sound Power, and Sound Intensity with relevant mathematical expressions. Explain the terms 'bale' and 'decibel' in this respect. 1 + 3 + 1

3. Write a short note on any *two* of the following : $2 \times 2\frac{1}{2}$

   a) The Water (Prevention and Control of Pollution) Act, 1974

   b) The Air (Prevention and Control Pollution) Act, 1981

   c) The Environmental (Protection) Act, 1988.

4. Write short notes on any *two* of the following : $2 \times 2\frac{1}{2}$

   a) Radiation inversion

   b) Electrostatic precipitator

   c) Cyclone collectors

   d) Spray towers.

5. Write a short note on automobile pollution mentioning the chief pollutants in auto-exhaust and the methods of control. 2 + 3

6. What are the dry adiabatic lapse rate and the wet adiabatic lapse rate ? Explain why they differ.

7. Define stable, unstable and neutral conditions in the atmosphere. Under which atmospheric condition would pollutants disperse quickly in the atmosphere ? 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. Describe the pollution characteristics and suggested treatments for any *five* of the following industries : 5 × 3

   a) Dairy

   b) Distillery

   c) Fertilizers

   d) Oil refineries

   e) Pulp and paper mills

   f) Petrochemicals

   g) Pharmaceutical

   h) Sugar

   i) Tannery

   j) Textile.

9. Describe different types of plumes which are generated from different atmospheric conditions, with proper sketching.

10. a) Mention the natural self cleansing properties of the environment. What is meant by effective height of a chimney and how is it computed ? State its use. 3 + 5

b) Determine the stack height required when SO_2 emissions are 100×10^6 g/sec and SO_2 concentration of 30 $\mu g/m^3$ is permitted at a distance of 500 m from the stack. Assume wind velocity of 5 m/sec and stability co-efficient as 35 and 19 respectively. Also determine the stack height required when the particulate emissions are at the rate of 3×10^{-3} ton/hr. 7

11. Make a comparison between environmental lapse rate and adiabatic lapse rate. What do you understand by radiation inversion & subsidence inversion ? 10 + 5

12. Write short notes on any *three* of the following : 3 × 5

a) Acid rain

b) Ozone depletion

c) Greenhouse gases / Global warming

d) Environmental impacts of mining

e) Natural self-cleansing properties of the environment

f) Environmental impact on thermal power plant.

13. a) Name any six criteria for air pollutant and write in detail about their sources. 6

b) Write in detail about the effects of these air pollutants. 9