Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (AUE)/SEM-6/AUE-604/2010

2010

AUTOMOTIVE POLLUTION 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 the following : $10 \times 1 = 10$

   i) Exhaust gas recirculation is the most effective way of reducing emission of

   a) NO_x b) HC

   c) CO and HC d) CO.

   ii) NO_x emission in SI engines will be lowest during

   a) cruising b) idling

   c) accelerating d) decelerating.

   iii) Lead compounds are added in gasoline to

   a) reduce HC

   b) reduce knocking

   c) increase power output

   d) reduce exhaust temperature.

iv) Flame ionization detector is used for measuring

a) CO b) CO_2

c) NO_x d) HC.

v) Decrease in air-fuel ratio in SI engine results in

a) increase of NO_x

b) decrease of CO and unburnt HC

c) increase of CO and unburnt HC

d) none of these.

vi) Alcohol is the major source for the emission of

a) HC b) NO_x

c) CO d) smoke.

vii) Chemiluminescence technique is used to measure

a) HC b) CO_2

c) CO d) NO_x.

viii) Flame ionization detector is used for measuring

a) HC b) NO_x

c) CO d) CO_2.

ix) Fumigation technique is used to control

a) HC b) NO_x

c) unburnt oil d) CO.

x) Three-way catalytic converters reduce emission of

a) CO, CO_2 and soot b) CO, CO_2 and HC

c) CO, CO_2 and NO_x d) CO, HC and NO_x.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What are the problems created by exhaust emissions ?

3. Explain emission as a function of equivalence ratio in a CI engine.

4. What are the areas to be taken into consideration to control the automobile emission ?

5. What is cranks blow-by ? How is it controlled ?

6. Discuss about the photochemical smog.

GROUP – C

(Long Answer Type Questions)

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

7. a) Discuss in detail the mechanisms of formation of the major pollutants from I.C. engine exhaust.

   b) What are particulates ? Describe in detail how the particulate emissions are caused. 9 + 6

8. a) Explain the sources of unburnt HC emission from exhaust in an automobile engine.

   b) Explain the method of measurement of smoke by comparison methods. 8 + 7

9. a) Explain the internationally accepted methods of measuring oxides of nitrogen from emission.

   b) Discuss the various factors which may increase the NO_x concentration. 6 + 9

10. a) What is catalytic converter ?

    b) Explain the oxidation reaction in a converter.

    c) What does a cataclysm perform in a catalytic converter ? 2 + 8 + 5

11. a) Explain the various methods used to control exhaust emission from I.C. engines.

    b) What do you understand by the term EGR ? Explain how EGR reduces NO_x emission. 7 + 8