AUE-703A

COMBUSTION & POLLUTION CONTROL IN AUTOMOBILE

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
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. Answer *all* questions. 10×1 = 10

(i) Blue smoke in diesel engine indicate

(A) NO_x (B) HC
(C) CO (D) unburnt oil

(ii) Photochemical smog is mainly due to

(A) NO_x and HC (B) soot and particulate matter
(C) CO and CO_2 (D) excess O_2

(iii) Strictest emission norms are initiated in the world first in

(A) London (B) New Delhi
(C) Tokyo (D) California

(iv) NO_x emission is maximum in SI engines when the air-fuel ratio is

(A) nearly stoichiometric (B) lean
(C) rich (D) none of these

(v) One of the major exhaust emissions from CI engine compared to SI engine is

(A) oxides of nitrogen (B) unburnt hydrocarbons
(C) particulates (D) CO and CO_2

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(vi) Chemiluminescence analyzer is used for measuring

(A) NO_x (B) HC
(C) CO_2 (D) CO

(vii) Fumigation technique is used to control

(A) HC (B) NO_x
(C) unburnt oil (D) CO

(viii) Efficient operation of catalytic converters require maintenance of

(A) temperature (B) equivalence ratio
(C) (A) and (B) (D) pressure

(ix) Non-dispersive infrared analyzer is widely accepted instrument for measuring

(A) HC (B) NOx
(C) CO (D) CO_2

(x) Evaporative emission in SI engine account for emission of

(A) 50 % CO (B) 50 % HC
(C) 25 % HC (D) 100 % HC

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. Explain emission as function of equivalence ratio in a SI and CI Engine.

3. Describe the causes of hydrocarbon emissions from SI engines.

4. Describe the Evaporative Emission Control Method.

5. Explain the incomplete combustion losses in automobile.

6. Define crankcase blow-by and state the reason of its creation?

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GROUP C
(Long Answer Type Questions)

Answer any *three* questions. $3 \times 15 = 45$

7. (a) What is EGR? How does it control the auto emission? 5+5+5
   (b) What is Evaporative Loss? Explain Evaporative Loss Control System with schematic diagram for SI engine.
   (c) Discuss the open type PCV system? What is its demerit and how is it rectified?

8. (a) Explain the sources of evaporative HC emission from automobile engine. 8+7
   (b) Discuss the factors which may increase the NO_x concentration.

9. (a) Explain the internationally accepted methods of measuring unburned hydrocarbon emission. 9+6
   (b) Explain the working principle of Hertridge smoke meter.

10. What is Catalytic and Thermal Converter? How are they helpful in reducing HC, CO and NO_x emission? 6+9

11. Write notes on Effect of Crevice Volume, Valve Overlap and Equivalence Ratio in automotive pollution. Describe in details how particulate emissions are caused. 9+6