Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/B.TECH (AUE)/SEM-6/AUE-604/2011

2011
AUTOMOTIVE 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 the following :

                                                    $10 \times 1 = 10$

    i)   The escape of burned gases from the combustion
         chamber past the pistons and into the crankcase is
         called

         a)   Gas loss   b)   Blow by

         c)   By pass   d)   Passed gas.

    ii) Dirt or gum in fuel nozzle or jets may cause

         a)   excessive fuel consumption

         b)   lack of engine power

         c)   smoky black exhaust

         d)   white exhaust.

6323   [Turn over

iii) Deposit of carbon in the exhaust system

    a)   increases back pressure

    b)   reduces back pressure

    c)   results in black smoke

    d)   increases noise level.

iv) Cyan uric acid is used to reduce the emission of

    a)   HC   b) NO_X

    c)   CO   d) SO_X

v) NO_X emission is maximum in SI engine, when air-fuel ratio is

    a)   nearly stoichiometric   b)   lean

    c)   rich   d)   none of these.

vi) Photochemical smog is mainly due to

    a) NO_X & HC   b)   Soot & PM

    c)   CO & CO_2 d)   Excess O_2.

vii) Alcohol is the major source for the emission of

    a)   HC   d)   Aldehydes

    c) NO_X d)   Soot.

viii) Blue smoke in diesel engine indicates

    a) NO_X b)   HC

    c)   CO   d)   unburnt oil.
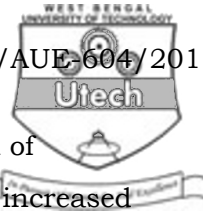
ix) If lead is added to gasoline, the emission of

    a) HC is reduced   b) NO_X is increased

    c) HC is increased   d) PM is increased.

x) One of the major exhaust emissions from CI engines compared to SI engine is

    a) NO_X b) HC

    c) PM   d) CO & CO_2

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.

$3 \times 5 = 15$

2. What is PCV ? Describe with a neat sketch.

3. Explain Ammonia Injection System.

4. Describe functioning of ORSAT APPARATUS.

5. What is Thermal Reactor ? Describe briefly.

6. Describe the function of Charcoal Canister with a neat sketch.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Theoretical amount of air required for the complete combustion of 1 kg fuel is 15kg. If it is composed of carbon & hydrogen only, find the percentage composition of its constituents. Assume air contains 21% oxygen by weight.

b) Derive the stiochoimetric fuel-air ratio and describe it.

8 + 7

8. During trail the dry flue gas analysis by volume was reported as,

CO_2 = 13%, CO = 0.3%, O_2 = 6%, N_2 = 80.7%

The fuel analysis by weight was reported as,

C = 62.4%, H_2 = 4.2%, O_2 = 4.5%, Moisture = 15%, Ash = 13.9%

Calculate :

a) Minimum air required to burn 1kg of fuel.

b) Weight of air actually supplied per kg of fuel.

c) The amount of excess air per kg of fuel burnt.   5 + 5 + 5

9. a) What is the function of catalytic converter ? Describe it with a neat sketch.

b) Describe the internationally accepted measurement technique of HC. 8 + 7

10. a) What are the operating factors of engine involved in pollution formation ? Explain their functioning briefly.

b) What is photochemical smog ? 10 + 5

11. a) Explain LPG (propane) fuel feed system with a neat sketch.

b) Explain the Hydrogen Injection system with a neat sketch. 8 + 7

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