Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (AUE)/SEM-6/AUE-603/2010

2010

TWO AND THREE WHEELER

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 × 1 = 10

i) Alpha methyl naphthalene has a cetane no. of

a) 0 b) 10

c) 100 d) 72.

ii) A fuel of octane no. 60 means

a) 60% normal haptane + 40% iso-octane

b) 40% normal haptane + 60% iso-octane

c) 40% normal haptane + 60% HMN

d) 40% normal alcohol + 60% iso-octane.

iii) The correct mixture strength for LPG engine is

a) 18 : 1 b) 15·4 : 1

c) 22·4 : 1 d) 8·2 : 1.

iv) If power output of an engine is 14 kW, N = 900 rpm, then torque is

a) 142 Nm b) 182 Nm

c) 252 Nm d) none of these.

v) McPherson strut combines

a) Shock absorber and chassis

b) Shock absorber and coil spring

c) Shock absorber and frame

d) None of these.

vi) In 'complete short circuiting' scavenging process, scavenging efficiency is

a) 100% b) 50%

c) 25% d) 0%.

vii) Purpose of lubricating oil is

a) Cooling

b) Lubricating

c) Cleaning

d) All of these.

viii) Front brake of a motor cycle is operated by

a) right leg b) right hand.

ix) For same power engine is heavy for

a) four-stroke

b) two-stroke

c) same for both

d) none of these.

x) Morse test is performed for finding

a) BP

b) IP

c) FP

d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. a) What is the difference between blow down and scavenging in connection with 2-stroke engines ?

   b) Write the advantages of petrol injection sysem than a carburetor fueling system. 2 + 3

3. What does an LPG auto conversion system involve ? Describe in detail.

4. Describe all theoretical Scavenging Processes.

5. a) Can any vehicle be converted to run on LPG ?

   b) A diesel engine is working with a compression ratio of 15 and expansion ratio of 10. Calculate the air standard efficiency of the cycle. 2 + 3

6. How spark plug is specified ? What is the difference between heater plug and spark plug ?

GROUP – C

(Long Answer Type Questions)

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

7. a) What are the remedies can be taken to control emission in two-stroke SI engines ?

   b) Why are two-stroke autos banned nowadays ?

   c) A two-stroke SI engine having a cylinder volume of 1100 cc and compression ratio 8 runs at 2800 rpm, scavenging efficiency is 0·5. Calculate the trapping efficiency, delivery ratio for a charge flow of 4 kg/min. If brake thermal efficiency is 0·25, fuel-air ratio is 0·065, calculate brake power and bsfc. Also calculate short circuiting loss per hour. Take calorific value of fuel as 45 MJ/kg and density of charge as 1·2 kg/m^3 .

   3 + 2 + 10

8. Describe the following terms : 5 × 3

   a) Trapping efficiency

   b) Relative Cylinder Charge

   c) Pure Air Ratio

   d) Excess air factor

   e) Cross scavenging.

9. a) Determine the air standard efficiency of a diesel engine having a cylinder with bore 240 mm, stroke 365 mm and a clearance volume of 1200 c.c. with fuel cut-off occurring at 6% of the stroke. Take $\gamma = 1{\cdot}4$.

b) A uniform disc having a mass of 8 kg and radius of gyration of 150 mm is mounted on one end of a horizontal arm length 200 mm. The other end of the arm can rotate freely in a universal bearing. The disc is given a clock-wise spin of 250 rpm as seen from the disc end of the arm. Determine the motion of the disc if the arm remains horizontal. 7 + 8

10. a) Derive the equation of stability of a two wheeler while taking a turn.

b) Find the angle of inclination with respect to vertical of a two wheeler negotiating a turn. Given total mass of the vehicle 250 kg, mass moment of inertia of engine is $0{\cdot}3$ kg-m^2, MMI of front wheel is 1 kg-m^2 and MMI of rear wheel is $1{\cdot}08$ kg-m^2, speed of engine is 5 times of wheel in same direction. Height of c.g. is $0{\cdot}6$ m, two wheeler speed is 90 km/hr, wheel radius 300 mm and radius of turn 50 m. 8 + 7

11. a) Describe the purpose of using lubricating oil in automobile applications.

b) Describe in detail the purpose of using additives in lubricating oil.

c) Describe the braking system of a two wheeler with the help of a flow diagram for both front and rear brakes.

4 + 5 + 6