Total No. of Questions—**12**] [Total No. of Printed Pages—**4**

Seat No.	

[4957]-117

SE (Mech./Auto.) (Second Sem.) EXAMINATION, 2016

IC ENGINE

(2008 PATTERN)

Time : Three Hours **Maximum Marks : 100**

N.B. :— (*i*) Answer *three* questions from Section I and *three* questions from Section II.

(*ii*) Answers to the *two* Section should be written in separate answer-books.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Figures to the right indicate full marks.

(*v*) Assume suitable data, if necessary.

Section I

1. (*a*) Derive an expression for air standard efficiency of an Otto cycle with usual notations. Hence show that the efficiency of the Otto cycle is lower than that of a Carnot cycle. [8]

(*b*) In an ideal otto cycle, air at 17C and 1 bar is compressed adiabatically until the pressure is 15 bar. Heat is added at constant volume until the pressure rises to 40 bar. Calculate :

(*i*) The air standard efficiency.

(*ii*) The compression ratio.

(*iii*) The mean effective presser for cycle.

Assume R = 8.314 kJ/Kmol K, C_v = .717 J/kg-k for air. [10]

Or

2. (*a*) Explain pumping and friction losses and their effects on the Power output of the engine. [6]

P.T.O.

(*b*) Draw theoretical and actual valve timing diagrams for four stroke petrol engine. Explain the reasons for the difference. [6]

(*c*) State the assumption made for air standard cycle. [6]

3. (*a*) Explain the basic requirements of a good combusion chamber of S.I. engine and draw a neat sketch of T-head combustion chamber ? [8]

(*b*) Explain with neat sketch the following systems of a carburetor :

(*i*) Idling system

(*ii*) Chock. [8]

Or

4. (*a*) Explain any two types of combustion chambers used in C.I. engines. [8]

(*b*) What are the advantages and disadvantages of petrol injection system over conventional carburetor system ? [4]

(*c*) Explain the factors which affect the tendency to detonate. [4]

5. (*a*) How air-less injection systems are classified ? Explain the working of distributor system with the help of neat sketch. Discuss their relative merits and demerits. [8]

(*b*) What are the functions of a nozzle ? Explain various types of nozzles with neat sketches. [8]

Or

6. (*a*) Explain stages of combustion in C I Engine. [8]

(*b*) Write short notes on the following :

(*i*) Supercharging

(*ii*) Turbo charging. [8]

Section II

7. (*a*) What are the basic requirements of an ideal injection system ? [4]

(*b*) What are the main functions of lubricating system ? Explain wet Sump lubricating system. [8]

(*c*) Write a short note on oxygenated additives used. [4]

Or

8. (*a*) Define intake manifold and their function. State materials used. Discuss the requirement for design of intake manifolds. [8]

(*b*) Explain the working of pneumatic governor with the help of neat sketch used for Diesel engine. [8]

9. (*a*) What is a dynamometer ? Name various types of dynamometers. Explain eddy current type of a dynamometer with the help of a neat sketch. [10]

(*b*) Explain Morse test. Why it is not suitable for single cylinder engine. [8]

Or

10. (*a*) A six cylinder gasoline engine operators on the four stroke cycle. The bore of each cylinder is 80 mm and stroke 100 mm. the clearance Volume per cylinder is 70CC. At a speed of 4000 rpm., the fuel Consumption is 20 kg/hr. and the torque developed is 150 Nm. Calculate : [12]

(*i*) The brake power

(*ii*) The brake mean effective pressure

(*iii*) The brake mean thermal efficiency.

Assume the C.V. of fuel as 43,000 kJ/kg. Also estimate relative efficiency when engine works on constant volume cycle with = 1.4 for air.

(*b*) Compare Battery Ignition and Magneto Ignition system. [6]

11. (*a*) Enlist the specification of an automobile engine. [6]

(*b*) Discuss various types exhaust emissions from an automobile. Which of these are harmful ? [6]

(*c*) Explain alternate fuel for S.I. Engine. [4]

Or

12. Write short notes on : [6]

(*i*) EGR

(*ii*) Electronic Control Unit for

(*iii*) Turbocharged Engine

(*iv*) Splash Lubrication System.