Roll No .....

ME - 604

B.E. VI Semester

Examination, June 2015

Internal Combustion Engines

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) How do you classify engines on the basis of method of cooling the cylinder.
   b) What is volumetric efficiency? Enumerate the factors on which it depends.
   c) What is dissociation? How does it affect the power developed by the engine?
   d) What is Heat Balance Sheet? Explain it in detail.

   OR

   A 4-cylinder, four stroke cylinder engine, 82.5 mm bore and 130 mm stroke develops 28 kW. While running at 1500 rpm and using a 20 percent rich mixture. If the volume of the air in the cylinder when measured at 15.5°C and 762 mm of mercury is 70 percent of swept volume, the theoretical air fuel ratio is 14.8, heating value of petrol used is 45980 kJ/kg and mechanical efficiency of the engine is 90%, find the indicated thermal efficiency and brake mean effective pressure. Take R = 287 N-m/kg k.

2. a) What is ignition lag? What is effect of engine speed on ignition lag.

   b) What do you mean by octane number of 85?
   c) Explain the phenomenon of Auto ignition.
   d) Discuss the effects of following factor on flame propagation.
      i) Compression ratio ii) Fuel-air ratio
      iii) Turbulence iv) Engine load

   OR

   Discuss the general principles of SI engine combustion chamber design.

3. a) What is diesel knock?
   b) Differentiate between knocking in a petrol and diesel engine.
   c) Explain briefly stages of combustion in CI engine.
   d) Explain the wet sump lubrication system.

   OR

   What is the purpose of fuel injector? Mention the various parts of fuel injector and its working.

4. a) Explain the principle of carburetion.
   b) Explain why a rich mixture is required for idling and maximum power.
   c) What are the components of CI Engine exhaust?
   d) Derive an expression for air fuel ratio for a simple carburetor neglecting compressibility.

   OR

   Discuss the essential requirements to be fulfilled by a fuel-injection system of a CI Engine.

5. a) What is super charging?
   b) State the advantage of Hydrogen gas as an alternate fuel in IC engine.
   c) Differentiate between turbocharging and supercharging.
   d) Explain briefly working of centrifugal supercharger.

   OR

   Explain with neat sketch the principles of exhaust turbocharger of a single cylinder engine.

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