

6E3050

Roll No. _____

Total No. of Pages : **4****6E3050****B.Tech VI Sem. (Main/Back) Exam. April-May, 2012
Mechanical Engineering
6ME2 I.C. Engines & Diesel Power Plant****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 24***Instructions to Candidates:*

*Attempt any **five questions**, selecting one question from each unit.
All Question carry **equal marks**. Schematic diagrams must be shown
wherever necessary. Any data you feel missing suitably be assumed
and stated clearly.*

Units of quantities used/ calculated must be stated clerly.

Use of following supporting material is permitted during examination. (Men-
tioned in form No. 205)

1. _____ **Nil** _____2. _____ **Nil** _____

Unit-I

1. (a) Compare the S.I. and C.I. on the basis of following characteristics:
- (i) Thermondynamic cycle and properties of fuel used
 - (ii) Method of Governing
 - (iii) Compression ratio range
 - (iv) Supercharging
 - (v) Power output per unit weight
 - (vi) Initial Cost and Maintenance Cost

9

- (b) The air flow to a 4 cylinder 4-stroke petrol engine is measured by means of a 7.5 cm sharp-edged orifice, $C_d = 0.6$. During a test on the engine the following data were recorded. Cylinder bore = 110 mm, stroke 130 mm, engine speed = 2250 rpm, brake power = 36 kW, fuel consumption = 10.5 kg/hr, Calorific value of fuel = 42,000 kJ/kg, pressure drop across the orifice = 4.1 cm of water. Atmospheric temperature and pressure are 15 °C and 1.013 bar. Calculate (a) brake thermal efficiency, (b) brake mean effective pressure (c) volumetric efficiency based on free air conditions. 7

Or

1. (a) How the IC engine are classified? Show by a diagram the energy flow in a reciprocating internal combustion engine. [5+3]
b) Discuss the cause of formation of CO, UBHC and NO_x in exhaust emission from petrol engine. 8

Unit - II

2. (a) Discuss the requirements of a good combustion chamber used in SI engine. 8
(b) What is delay period in C.I. engines & what are the factors that effect the delay period? 8

Or

2. (a) Discuss the effect of following variables upon detonation in S.I. engine (i) Compression ratio (ii) Spark advance (iii) Increasing flame-travel distance (iv) Location of spark plug and exhaust valve (v) Octane rating of fuel 10
(b) Discuss the suitability of vegetable oil as a fuel in C.I. engine. 6

Unit-III

3. (a) A petrol engine has a carburettor of 32 mm venturi size. The jet diameter is 2 mm. The pressure difference at throat is 50 mm of Hg. The atmospheric pressure is 1 bar and temperature 27° C. The coefficient of discharge for venturi is 0.85 and for fuel jet 0.66. The density of petrol is 740 kg/m³. The distance of top of jet from the petrol level in the float chamber is neglected. Relative density of Hg is 13.6. Determine the fuel velocity, fuel flow, air velocity and air flow, F/A , neglecting compressibility. 7

- (b) Explain the Battery ignition system with the help of neat sketch. Compare its advantages and disadvantages with that of Magneto Ignition system. [6+3]

Or

3. (a) What are the requirements of Diesel injection system? Draw a schematic diagram of helix bypass pump and explain its working principle. [3+5]
- (b) Explain why rich mixture is required for (i) Idling (ii) Acceleration. 4
- (c) What are the factors which must be considered before deciding the firing order of a multicylinder engine? 4

Unit-IV

4. (a) Enumerate the various components of Engine friction. Explain briefly, the Mist Lubrication system used in 2 stroke engines. List out its two disadvantages. [2+4+2]
- (b) Why the cooling of I.C. engines is necessary? Explain with the help of neat sketch the Thermo-syphon method of cooling? What is the disadvantage of overcooling? [2+5+1]

Or

4. (a) What are the supercharging limits for S.I. and C.I. engine? Describe with neat sketches the different methods of supercharging. [3+5]
- (b) Compare the construction of 4 stroke engine with that of 2 stroke engine. Draw the valve timing diagram of 4 stroke SI engine. [4+4]

Unit-V

5. (a) Explain the working principle of Dual fuel engines. How the quantity of pilot fuel and its cetane number affect the combustion in Dual-Fuel engine? [5+3]
- (b) Compare the performance of variable compression ratio engine with that of a conventional constant compression ratio engine. 8

Or

5. (a) Explain briefly, the working of Free Piston engine, stating its typical applications. List its two advantages and two disadvantages. [4+4]
- (b) What are the basic requirements of a Diesel power plant? Discuss briefly, the operation and safety of the Diesel power plant? [4+4]
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