TME-602 144

Even Semester Examination - 2017

B.TECH. (VI SEMESTER)

IC ENGINES

Time: 03:00 Hours **Max Marks : 100**

Note : Attempt all questions.

1. Attempt any four parts of the following: (5 × 4 = 20)

a) Explain the ideal and actual port timing diagrams of a 2-stroke S.I engine.

b) Draw the neat sketch of fuel pump for C.I Engine. Explain.

c) Explain the principle of scavenging and its importance.

d) How do you classify I.C. Engines? Explain in detail.

e) Name the type of I C engines generally having valves and ports. How are these valves or ports operated?

f) In an engine working on the diesel cycle air fuel ratio is 50:1. The temperature of air at the beginning of compression is 60 °C and the compression ratio used is 14:1. What is ideal efficiency of the engine? Calorific vale of fuel used is 42000 kJ/Kg , C_P = 1.005 kJ/kg-K and C_V = 0.717kJ/kg-K for air .

2. Attempt any four parts of the following: (5 × 4 = 20)

a) What is the need and requirement of cooling in IC engines?

b) Define volumetric efficiency and discuss the effect of various factors affecting the volumetric efficiency.

c) How the antiknock additives prevent detonation in S.I. Engine? What are the different additives used in S.I. Engine?

d) Explain the phenomenon of knocking in IC engines.

e) Describe the mixture requirement in S.I. engine for different speed conditions. How to achieve above requirements from the carburettor?

f) A four stroke gas engine having a cylinder of 250 mm diameter and stroke 450 mm has a volumetric efficiency of 80%, ratio of air to gas is 8: 1, and calorific value of gas is 20MJ/m^3 at NTP. Find the heat supplied to the engine per working cycle. If the compression ratio is 5, what is the heating value of the mixture per working stroke per m^3 of total cylinder volume?

3. Attempt any two parts of the following: (10 × 2 = 20)

a) What is surging in axial-flow compressors? What are its effects? Describe briefly.

b) Draw P-V and T-S diagram for a single stage reciprocating air compressor, without clearance. Derive the expression for the work done when compression is isentropic.

c) Compare reciprocating and rotary air compressors in detail.

4. Attempt any two parts of the following: (10 × 2 = 20)

a) With the help of neat sketches explain wet sump lubrication system.

b) What are the various types of combustion chambers used in SI engines? Explain them briefly.

c) The following date was recorded during testing of a four stroke cycle gas engine. Area of indicator diagram = 900 mm^2; Length of indicator diagram = 70 mm; spring scale = 0.3 bar/mm; Diameter of piston = 200 mm; Length of stroke = 250 mm; Speed = 300 rpm. Determine (i) Indicated mean effective pressure (b) Indicated power.

5. Attempt any two parts of the following: (10 × 2 = 20)

a) What is carburettor? Draw a neat sketch showing carburetion process?

b) What are the main differences between battery and magneto ignition system?

c) What is supercharger? Explain different types of supercharging.

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