Roll No. ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚   Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (2011 & 2012) (Sem.–4)
INTERNAL COMBUSTION ENGINES
Subject Code : BTAE-401
Paper ID : [A1161]

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

   a) Define Air standard efficiency and relative efficiency.

   b) Define mean effective pressure and explain its importance in I.C. Engine.

   c) What is the use of multi grade oils?

   d) What is the function of Choke in a carburetor?

   e) Differentiate between a cylinder liner and a sleeve.

   f) What do you understand by scavenging and scavenging losses?

   g) Explain the function of thermostat in Engine cooling system.

   h) Explain the need and working of Pre-combustion chamber.

   i) Define phasing and calibration of injector nozzles.

   j) Define volumetric efficiency.

SECTION-B

2. Why actual valve timing diagram deviates from theoretical one, draw port timing diagram for a two stroke engine?

3. Explain with neat sketch working of full pressure lubrication system.

4. Draw a line diagram of Electronic Fuel Injection system, discuss it briefly and state its merits over carburetor System.

5. Explain working of jerk type fuel injection pump with neat sketch.

6. Explain briefly working of Turbo charger and what is VGT.

SECTION-C

7. Discuss in detail the different stages of combustion in a C.I engine. Explain briefly the influence of various factors on knocking in C.I. engine.

8. Explain with neat sketch construction and working Solex carburetor and its compensating circuits.

9. During a trial on a single cylinder, 4-stroke diesel engine the following observations were recorded :

Bore = 340mm; stroke = 440mm; r.p.m. = 400; area of indicator diagram = 465mm^2; length of indicator diagram = 60mm; spring constant = 0.6 bar/mm; load on hydraulic dynamometer = 950N; dynamometer constant = 7460; fuel used = 10.6kg/h; L.C.V. = 49500kJ/kg; cooling water circulated = 25kg/min; rise in temperature of cooling water = 25°C; The mass analysis of fuel : carbon = 84%, Hydrogen = 15%, Incombustible = 1% and the volume analysis of exhaust gases : carbon dioxide = 9%, Oxygen = 10%, Nitrogen=81%, Temperature of exhaust gases = 400°C, Sp. heat of gases = 1.05kJ/Kg °C, ambient temperature = 25°C, partial pressure of steam in exhaust = 0.03 bar and sp. heat of superheated steam = 2.1kJ/kg °C. Draw up heat balance sheet on minute basis.

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