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(Following Roll No. to be filled by candidate)

Roll No. | 1 | 1 | 6 | 4 | 3 | 4 | 0 | 0 | 4 | 3 |

B. TECH.
FIFTH SEMESTER EXAMINATION 2013-14
EME-505

I C ENGINES AND COMPRESSORS

Time: 2 Hours **Max. Marks:** 50

Note:

- Attempt all questions.
- Assume missing data suitably. Illustrate the answers with suitable sketches

1. Attempt any ***TWO*** parts of the following: [2×6]

   a. Derive the formula for the efficiency of diesal cycles. Hence show that the efficiency of diesal cycle is always lower than the efficiency of the otto cycle for the same compression ratio.

   b. Calculate the thermal efficiency and mean effective pressure for an air standard otto cycle that has a compression ratio of 6 to 1. At the start of the compression P = 100 kPa and $T = 290^0$ K, Q = 2800 kJ/kg air.

   c. Discuss the suitability of the following fuels in Diesal engine:

      i. Alcohols

      ii. Vegetable oils

      iii. Biogas

2. Attempt any ***TWO*** parts of the following: [2×6]

   a. Explain the construction and working of simple carburetor in a S.I. engine. Explain carburetion by compensating jet method with sketch.

   b. Explain the phenomenon of diesel knock. Compare it with the phenomenon of detonation in SI engine.

   c. What is 'M' combustion chamber? What advantages are claimed for the design of combustion chamber?

3. Attempt any ***TWO*** parts of the following: [2×6.5]

   a. Determine the diameter of a fuel orifice for a 4-stroke engine developing 15 kW per cylinder at 2000 rev/min using 0.272 kg / kW-hr fuel of 32° API. The duration of injection is 30° of crank travel. The fuel injection pressure is 120 bar and the combustion chamber pressure is 30 bar. Take velocity coefficient 0.9 and

$$\rho = \frac{141.5}{131.5 + {}^\circ\text{API}}$$

   b. Describe a high tension magneto ignition system and compare its advantages and disadvantages with a coil ignition system.

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c. Explain the phenomenon of combustion in C.I. engine. What is ignition delay and factors which affect it?

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4. Write short notes on any ***TWO*** of the following: [2×6.5]

a. What is the effect of supercharging on the following parameter?
   (i) Power and put
   (ii) Mechanical Efficiency
   (iii) Fuel consumption

b. What is evaporative cooling? What are the various types of radiators? Sketch the tube and fin arrangements in these radiators.

c. Write short notes on any two:
   (i) Centrifugal compressors
   (ii) Surging and stalling
   (iii) Roots blower
   (iv) Reciprocating compressors