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NME-505

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2012258 Roll No.

B.TECH.

Regular Theory Examination (Odd Sem - V), 2016-17

I.C. Engines & Compressors

Time : 3 Hours *Max. Marks : 100*

Section - A

Note: Attempt all parts. All parts carry equal marks. Write answer of each part in short. (10×2=20)

1 a) Define compression Ratio.

b) Compare SI and CI Engine with respect to Compression ratio & Ignition.

c) Why a rich mixture is required for maximum power?

d) What is supercharging in a IC engine?

e) Define ignition delay.

f) What is the cause for diesel smoke?

g) List the use of LPG as SI Engine fuel.

h) What is the significance of flash and fire points of a lubricant?

i) Differentiate between single stage and multi stage air compressor.

j) Define volumetric efficiency.

Section - B

Note: Attempt any five questions from this section (5×10=50)

2. An amount of a perfect gas has initial condition of volume 1m^3, pressure 1 bar and temperature 18°C. It undergoes ideal diesel cycle operation, the pressure after isentropic compression being 50 bar and the volume after constant pressure expansion being 0.1 m^3. Calculated the temperature at the major point of the cycle and evaluate the thermal efficiency of diesel cycle.

3. Briefly explain with a neat sketch the operation of a simple float type carburetor.

4. Describe high tension magneto ignition system with a neat sketch.

5. Explain the stages of combustion in a CI Engine.

6. How are the injection system classified? Describe them briefly.

7. A six cylinder, 4 stroke SI engine having a piston displacement of 700 cm^3 per cylinder developed 78 kW at 3200 rpm and consumed 27 kg of petrol per hour. The calorific value of petrol is 44 MJ/kg. Estimate

   a) Volumetric efficiency of the engine if the air fuel ratio is 12 and intake air is at 0.9 bar, 32°C.

   b) Brake thermal efficiency and

   c) Braking torque.

8. A single stage single acting reciprocating air compressor has a bore of 200 mm and a stroke of 300 mm. It receives air at 1 bar and 20°c delivered it at 5.5 bar. If the compression follows the $pv^{1.3} = C$ and clearance volume is 5% of stroke volume, determine :

   a) Mean effective pressure,

   b) Power to drive the compressor, if it runs at 500 rpm.

9. Describe with a neat sketch the working principle of vane blower.

Section - C

Note: Attempt any two questions from this section (2×15=30)

10. a) Explain the significance of fuel air cycle. **(5)**

    b) Compare the following :

       i) Two stroke and four stroke engine.

       ii) Otto, diesel & dual cycle. **(10)**

11. a) Explain the stages of combustion in SI Engine. **(7)**

    b) Sketch some important designs of open combustion chamber for CI engines. **(8)**

12. Discuss Engine cooling and lubrication systems in detail with required sketches. **(20)**

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