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Roll No .....

ME-501-CBGS

B.Tech., V Semester

Examination, December 2020

Choice Based Grading System (CBGS)

Internal Combustion Engines

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

iii) In case of any doubt or dispute the English version question should be treated as final.

1. a) Define the following. 7

   i) Bore ii) Stroke
   iii) Displacement volume iv) Clearance volume
   v) Compression ratio vi) Cubic capacity

   b) With neat sketches explain the working principle of four stroke spark ignition engine. 7

2. a) In a SI engine working on ideal auto cycle, the compression ratio is 5.5. The pressure and temperature at the beginning of compression are 1 bar and 27°C respectively. The peak pressure is 30 bar. Determine the pressure and temperatures at the salient points, the air standard efficiency and the mean effective pressure. Assume ratio of specific heats to be 1.4 for air. 7

SI

5.5 1 ~ma

30

1.4

b) How do the specific heats vary with temperature? What is the physical explanation for this variation? 7

3. a) What are the different kinds of fuels used in an IC engine? Briefly explain the petroleum refining processes. 7

b) Define carburetion. Explain the following Rich mixture, Stoichiometric mixture and lean mixture. 7

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4. a) Describe with suitable sketches of the following systems of a modern carburetor: 7
   i) Main metering system
   ii) Idling system
   iii) Economizer system
   iv) Acceleration pump system
   v) Choke

b) What are Homogeneous and Heterogeneous Mixtures? In which engines these mixtures are used? Explain. 7

5. a) Explain the phenomenon of knock in CI engines and compare it with SI engine Knocks. 7

b) Explain with figures various types of combustion chambers used in CI engines. 7

6. a) Clearly explain the various wet sump lubrication system. Compare wet sump and dry sump lubrication system. 7

b) Explain only two of the following: 7
   i) Thermosyphon cooling system
   ii) Forced circulation cooling system
   iii) Evaporative cooling system

7. a) What are the factors that affect the power output of an engine? Explain how super charging help the power output. 7

b) Give a brief account of emissions of CI engines. 7

CI

8. a) Give the general chemical formula of the following fuels: 7

i) Paraffin ii) Olefin

iii) Naphthene iv) Aromatic

Also state their molecular arrangements and mention whether they are saturated and unsaturated.

b) Briefly explain the stages of combustion in SI engines elaborating the flame front propagation. 7

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