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10AU56

Fifth Semester B.E. Degree Examination, May 2017
Automotive Fuels and Combustion

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Compare renewable energy sources Vs non renewable energy sources. **(06 Marks)**

b. Explain the utilization of following energy sources: i) Solar energy; i) Wind energy. **(08 Marks)**

c. State the merits and demerits of hydrogen as a fuel for automotives. **(06 Marks)**

2 a. Discuss the various steps involved in petroleum refining process, with the help of flow diagram. **(10 Marks)**

b. Explain the following fuel properties: i) Fire point; ii) Volatility; iii) Calorific value. **(06 Marks)**

c. Explain the test procedure for carbon residue content. **(04 Marks)**

3 a. Describe the working of a gas chromatograph, used in the flue gas analysis. **(10 Marks)**

b. Write a short notes on:
i) LPG as a fuel for SI engine; ii) Biodiesel as a fuel for CI engines. **(10 Marks)**

4 a. Derive an expression for the efficiency and mean effective pressure of Otto cycle. **(10 Marks)**

b. A gas engine working on the constant volume cycle gave the following results during a one hour test run. Cylinder diameter 24cm, stroke 48cm, effective diameter of brake wheel 1.25mt, Netload on the brake 1236 N, average speed 226.7 rev/min, average exploration per minute 77, mean effective pressure of indicator cards 7.5 bar, gas used $13m^2$ at 25°C and 771mm of mercury pressure, lower calorific value of gas 22000 kJ/m^3 at NTP. Cooling water used 625kg, inlet temp 25°C. Outlet temp 60°C.
Determine:
i) Mechanical efficiency.
ii) The gas consumption in m^3 at NTP per ip in hour.
iii) The indicated thermal efficiency. **(10 Marks)**

PART – B

5 a. Explain the flame propagation and variables effecting on the same. **(08 Marks)**

b. What is ignition lag? Discuss the parameters influencing. **(06 Marks)**

c. Compare normal vs abnormal combustion in SI engines with P-θ diagram. **(06 Marks)**

6 a. Explain the different stages of combustion in CI engine with P-θ diagram. **(10 Marks)**

b. Discuss the features and design considerations for combustion chambers. **(10 Marks)**

7 a. Explain the following terms: i) Delay period; ii) Swirl. **(10 Marks)**

b. Explain the construction and working M type of combustion chamber, state merits and demerits. **(10 Marks)**

8 a. Discuss the working principle of a dual-fuel engine with P-θ diagram. **(10 Marks)**

b. Discuss the main requirements of multifuel engine, state the advantages and disadvantages. **(10 Marks)**

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