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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Automobile Engineering

Semester End Examination; Dec. - 2019

Automotive Fuels and Combustion

Time: 3 hrs

Max. Marks: 100

Note: Answer **FIVE** full questions, selecting **ONE** full question from each unit.

UNIT - I

- 1 a. Define the following terms:
 - i) Calorific value
 - ii) Viscosity
 - iii) Flash point
 - iv) Fire point
- b. Compare the Otto, Diesel and Dual cycles for the,
 - i) Same compression ratio and same heat input
 - ii) For the constant maximum pressures same heat input
- 2 a. Explain briefly the principle of conversion of solar energy directly into electrical energy.
- b. Explain the construction and working of wind power along with advantages and disadvantages of it.
- c. With neat diagram, discuss the Geo-thermal power.

UNIT - II

- 3 a. Explain the petroleum refining process. With Flowchart.
- b. With chemical formula, explain paraffin series and olefin series petroleum.
- c. Discuss the important properties of S.I engine fuels. briefly
- 4 a. Explain the rating of C.I engine fuels.
- b. Discuss the important properties of C.I engine fuels.
- c. A six cylinder gasoline engine operates on the four- stroke cycle. The bore of each cylinder is 20 mm and the stroke 100 mm. The clearance volume per cylinder is 70CC. At a speed of 4000 rpm. The fuel consumption is 20 kg/h and the torque developed is 150 N-m. Calculate;
 - i) The brake power
 - ii) The brake mean effective pressure
 - iii) Brake thermal efficiency, if the calorific value of the fuel is 43000 kJ/kg

UNIT - III

- 5 a. What you meant by abnormal combustion? Explain the phenomena of knock in SI engines.
- b. Explain the stages of combustion in S.I engines.
- c. What are the various types of combustion chambers used in S.I engine? Explain them briefly.
- 6 a. Discuss the advantages and disadvantages of induction swirl in C.I engines.
- b. What is delay period? What are the factors that affect the delay period?
- c. Bring out clearly the process of combustion in C.I engines and also explain the various stages of combustion.

UNIT - IV

- 7 a. What is dual fuel engine? Where does this type of engine finds application? 4
- b. With neat sketch, discuss the working of dual-fuel engine. 6
- c. Discuss the factors affects the dual fuel combustion (any five). 10
- 8 a. Explain the different characteristics of a multi-fuel engine. 8
- b. Discuss the parameters related fuel system modification in multi-fuel engine. 8
- c. What is a multi fuel engine? Where does this type of engine finds application? 4

UNIT - V

- 9 a. Discuss briefly about the stratified charge engine. 4
- b. List the advantages and disadvantages of stratified charged engine. 6
- c. Describe the following methods of charge stratification by fuel injection and positive ignition:
- i) The first approach 10
- ii) Pre chamber stratified charge
- 10 a. Write a short note on VCR engine. 5
- b. With neat sketch, describe BICERI piston. 5
- c. List and discuss the challenges in HCCI engine development. 10

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