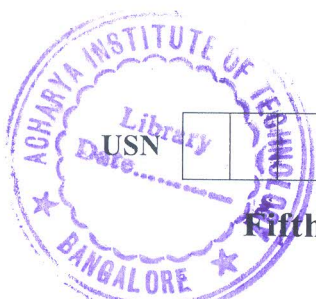


CBCS SCHEME

18AU54



Fifth Semester B.E. Degree Examination, July/August 2021

Automotive Fuels and Combustion

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Differentiate between exhaustible and inexhaustible energy sources with example. (10 Marks)
b. Write a note on following : i) Geo – thermal power ii) Wind power. (10 Marks)
- 2 a. With a block diagram, explain the petroleum refining process. (10 Marks)
b. Describe the structure of petroleum with example. (10 Marks)
- 3 a. Explain the following : i) Alcohol as diesel fuels ii) LPG as SI engine fuel. (10 Marks)
b. How do you rate SI engine and CI engine fuels? Explain in detail. (10 Marks)
- 4 a. A sample of fuel has the following percentage composition by weight : Carbon = 84%, oxygen = 3.5%, Hydrogen = 10%, Ash = 1%, Nitrogen = 1.5%. Determine :
i) The stoichiometric air – fuel ratio by mass
ii) If 20% excess is supplied, find the percentage composition of dry flue gases by volume. (10 Marks)
b. Sketch and explain gas chromatography. (10 Marks)
- 5 a. With the help of P- θ diagram. Explain the combustion stages in SI engine. (10 Marks)
b. Discuss the general principles of SI engine combustion chamber design. (10 Marks)
- 6 a. What do you mean by diesel knock? Also explain the methods of controlling diesel knock. (10 Marks)
b. Discuss the variables affecting the delay period. (10 Marks)
- 7 a. Explain the measurement of brake power of an IC engine by,
i) Prony brake dynamometer ii) Rope brake dynamometer. (10 Marks)
b. The following observations were recorded in a test of one hour duration on a single cylinder oil engine working on four strokes. Bore = 300mm, Stroke = 450mm, Fuel used = 8.8kg, CV of fuel = 41800 kJ/kg, Average speed = 200RPM, MEP = 5.8 bar, brake friction load = 1860N, Diameter of brake wheel = 1.22m. Calculate : i) Mechanical efficiency ii) Brake thermal efficiency iii) BSFC iv) BMEP. (10 Marks)
- 8 a. During a test on a 4-stroke cycle oil engine the following data and results were obtained. MEP = 5.6bar, swept volume = 14 liters, speed = 6.6 RPS, load = 0.75kN, radius of brake drum = 0.7m, Fuel consumption = 0.002kg/s, Calorific value of fuel = 46000kJ/kg, Cooling water circulation = 0.15 kg/s, cooling water inlet temperature = 38°C, cooling water outlet temperature = 71°C. Determine :i) Brake power ii) Indicated power iii) Mechanical efficiency iv) Indicated thermal efficiency. (10 Marks)
b. Explain the following : i) Morse test ii) Willan's line method. (10 Marks)
- 9 a. Describe the combustion in Dual-Fuel engine. (10 Marks)
b. With suitable sketch, explain the supercharged dual fuel engine. (10 Marks)
- 10 a. Explain the factors affecting combustion in Dual-fuel engine. (10 Marks)
b. Describe the need of modification of fuel system in a multifuel engine. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.