

# CBCS SCHEME

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## Fifth Semester B.E. Degree Examination, Jan./Feb. 2021 Automotive Fuels and Combustion

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Does Renewable energy causes pollution? Explain briefly Solar Energy and Geo – thermal energy with block diagrams. (10 Marks)  
b. What is Synthetic Fuel cell? Explain brief introduction of hydrogen cell, with a neat sketch. (10 Marks)

OR

- 2 a. Explain chemistry of following : i) Normal Paraffin's ii) Iso – paraffin's  
iii) Olefins iv) Naphthalene. (10 Marks)  
b. Explain the following : i) Cracking ii) Polymerization iii) Flash and Fire point  
iv) Diesel index. (10 Marks)

### Module-2

- 3 a. Describe briefly properties and ratings of fuels in I.C. Engines. (10 Marks)  
b. Write a short note on :  
i) LSD & ULSD ii) LPG & CNG. (10 Marks)

OR

- 4 a. Explain analysis of flue gases by Orsat apparatus with neat sketch. (10 Marks)  
b. A solid fuel contains by weight , Carbon 71% , Hydrogen 40% , Oxygen 9% , Sulphur 3% , Nitrogen 1% and the remaining is ash. Determine the minimum quantity of air required for complete combustion of 1kg of fuel. If the actual air supplied is 0.3 times the minimum required for complete combustion. Estimate the percentage gravimetric composition of dry gases. (10 Marks)

### Module-3

- 5 a. With neat sketch, explain the Stages of combustion in S.I. engines. (10 Marks)  
b. With neat sketch, explain Precombustion chamber. Give its advantages and disadvantages. (10 Marks)

OR

- 6 a. Explain briefly with a neat sketch, three phases of C.I. engine combustion. (10 Marks)  
b. Explain Ignition lag in C.I. engines. Briefly explain the important factors on which the ignition lag depends. (10 Marks)

### Module-4

- 7 a. List the Basic measurement of Engine Testing. Explain briefly Fuel consumption measurement. (10 Marks)  
b. What is Dynamometer? Explain with a neat sketch of Eddy Current dynamometer. (10 Marks)

OR

- 8 a. Describe briefly performance maps of an IC Engines. (10 Marks)
- b. The air flow to a four cylinder four stroke petrol engine is measured by means of a 7.5cm diameter Sharp – edged Orifice  $C_d = 0.6$ . During a test on the engine following data were recorded :
- Bore = 11 cm ; Stroke = 13 cm ; Engine speed = 2250 rev/min ; Brake power = 36 KW  
Fuel consumption = 10.5 kg/hr ; Calorific value of fuel = 42000 kJ/kg ,  
Pressure drop across the Orifice = 4.1 cm of H<sub>2</sub>O.  
Atmospheric temperature and pressure are 15°C and 1.013 bar. Calculate
- i) Thermal efficiency on b.p, basis    ii) Brake mean effective pressure  
iii) Volumetric efficiency based on free air. (10 Marks)

**Module-5**

- 9 a. What do you mean by Dual fuel engine? What are the modification required to use CNG as fuel in Diesel engine? List the advantages of it. (10 Marks)
- b. Discuss the five factors affecting combustion in dual fuel engines. (10 Marks)

**OR**

- 10 a. What is Multifuel Engine? With suitable graph, explain performance of Alcohol as multifuel in Diesel engine. (10 Marks)
- b. Explain the modification required for fuel system of a multifuel engine. (10 Marks)

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