

CBCS SCHEME

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18AU54

Fifth Semester B.E. Degree Examination, Jan./Feb. 2023 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. Write a short note on :
i) Bio-Energy ii) Synthetic fuels. (10 Marks)
b. Explain the following :
i) Cracking ii) Polymerization iii) Flash and fire point iv) Diesel index. (10 Marks)

OR

- 2 a. Explain briefly solar energy and Geo-thermal energy with block diagram. (10 Marks)
b. Explain with neat sketch, the refining process of petroleum. (06 Marks)
c. List the various properties of liquid fuels. Explain any two in brief. (04 Marks)

Module-2

- 3 a. Describe briefly properties and rating of fuels in IC engines. (10 Marks)
b. Explain the fuel gas analysis by gas chromatography. (10 Marks)

OR

- 4 a. Explain the working of Orsat Apparatus with a neat sketch. (10 Marks)
b. Explain the production process of Biodiesel. List out the advantages and disadvantages of biodiesel. (10 Marks)

Module-3

- 5 a. Discuss the effects of engine variables on ignition lag. (10 Marks)
b. With neat sketch, explain the stages of combustion in S.I engines. (10 Marks)

OR

- 6 a. Discuss the effects of engine variables on flame propagation. (10 Marks)
b. List the different types of combustion chamber. Explain any one with neat sketch. (06 Marks)
c. List the different effects of detonations and controlling methods of the same. (04 Marks)

Module-4

- 7 a. What is dynamometer? Explain with a neat sketch of Eddy current dynamometer. (10 Marks)
b. A 6-cylinder petrol engine operates on the four-stroke cycle. The bore of each cylinder is 70mm and the stroke 100mm. The clearance volume per cylinder is 67cm^3 . At a speed of 3960rpm the fuel consumption is 19.5Kg/h and the torque developed is 140Nm. Calculate :
i) the brake power ii) brake mean effective pressure iii) Brake thermal efficiency if C.V of the fuel is 44000 kJ/Kg iv) Relative efficiency on a brake power basis assuming the engine works on the constant volume cycle. Assume $\tau = 1.4$ for air. (10 Marks)

OR

- 8 a. List the basic measurement of engine Testing. Explain briefly Fuel consumption measurement. (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 1.25m. Net load on brake 1236N ; average speed 226.7rpm, average explanation per minute, 77 ; mep of indicator cards 7.5bar, gas used 13m^3 at 15°C and 771mm of mercury pressure ; lower calorific value of gas 22000kJ/m^3 at N.T.P cooling water used 625Kg, inlet temperature 25°C . Outlet temperature 60°C . Determine :
- The mechanical efficiency
 - The gas consumption in m^3 at N.T.P per i.p hour
 - The indicated thermal efficiency
 - Draw up a heat balance for the engine on minute basis. (10 Marks)

Module-5

- 9 a. Discuss the five factors affecting combustion in dual fuel engines. (10 Marks)
- b. Explain modification required for fuel system of multifuel engine. (10 Marks)

OR

- 10 a. Discuss the working of dual fuel engine. State its advantages and disadvantages. (10 Marks)
- b. What are the modification required to use CNG as fuel in diesel engine? (10 Marks)
