

CBCS SCHEME

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Fifth Semester B.E. Degree Examination, Feb./Mar. 2022 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. Explain the following energy sources with sketch i) Solar energy ii) Wind energy. (10 Marks)
- b. What is fuel cell? With a neat sketch explain the working of fuel cells. (10 Marks)

OR

- 2 a. Explain the following properties of fluid :
 - i) Specific gravity
 - ii) Calorific value
 - iii) Annealing point
 - iv) Diesel index
 - v) Vapour pressure.(10 Marks)
- b. Explain the refining process of petroleum with a neat sketch. Mention the products produced. (10 Marks)

Module-2

- 3 a. Explain the rating of S.I and C.I engine fuels. (10 Marks)
- b. What are the properties of good air fuel mixture? Explain. (10 Marks)

OR

- 4 a. Explain the flue gas analysis by gas chromatography with a neat sketch. (10 Marks)
- b. Find the stoichiometric A/F ratio for the combustion of the ethyl alcohol C_2H_6O in a petrol engine. Calculate the A/F ratio for a mixture strength of 80% and determine the wet and dry analysis by volume at exhaust gas. (10 Marks)

Module-3

- 5 a. Explain combustion stages in S.I. engine. (10 Marks)
- b. List the different types of combustion chamber. Explain any one with a neat sketch. (10 Marks)

OR

- 6 a. Discuss the various stages of combustion in C.I. engine with neat P-Q diagram. (10 Marks)
- b. With a neat sketch illustrate the concept of delay period in C.I. engine. (10 Marks)

Module-4

- 7 a. Explain rope brake dynamometer with a neat sketch. (10 Marks)
- b. A gasoline engine working on 4 stroke develops a brake power of 20.9KW. A Morse test was conducted on this engine and the brake power (KW) obtained when each cylinder was made inoperative by short circuiting the spark plug are 14.9, 14.3, 14.8 and 14.5 respectively. The test was conducted at constant speed. Find the indicated power, mechanical efficiency and brake mean effective pressure when all the cylinders are firing. The bore of the engine is 75mm and the stroke is 90mm. The engine is running at 3000rpm. (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.

OR

- 8 a. Explain retardation test and derive the equation for same. (10 Marks)
- b. An 8 cylinder, 4 stroke engine at 9cm bore and 8cm stroke with a compression ratio of 7 is tested at 4500rpm on a dynamometer which has 54cm arm. During a 10 minutes test the dynamometer scale reading has 42kg and engine consumed 4.4kg of gasoline having a calorific value of 44000kJ/kg. Air 27°C and 1 bar was supplied to the carburetor at the rate of 6 kg/min. Find :
- i) Brake power
 - ii) Brake mean effective pressure
 - iii) Brake specific fuel consumption
 - iv) Brake thermal efficiency
 - v) Volumetric efficiency
 - vi) A/F ratio.
- (10 Marks)

Module-5

- 9 a. Discuss the working of a dual fuel engine. State its advantages and disadvantages. (10 Marks)
- b. Discuss any four factors affecting combustion in dual fuel engine. (10 Marks)

OR

- 10 a. What are the modification required to use CNG as fuel in diesel engine. (10 Marks)
- b. Outline the requirement of multi-fuel engine modification. (10 Marks)
