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17AU54

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. Difference between the Exhaustible and non Exhaustible sources give an example of each.
                                                                                    (08 Marks)
    b. With a neat sketch, explain the following:
        i)   Solar energy
        ii)   Geo-thermal plant
        iii)   Hydrogen-oxygen fuel cell.   (12 Marks)

OR

2   a. Explain petroleum refining process.   (08 Marks)
    b. Explain briefly
        i)   Cracking and polymerization
        ii)   Flash and fire point
        iii)   Cloud and pour point.   (12 Marks)

Module-2

3   a. Explain briefly unleaded gasoline and Ultra-Low Sulphur Diesel (ULSD).   (08 Marks)
    b. Write a short note on: i) LPG   ii) Bio-diesel   iii) Alcohol.   (06 Marks)
    c. What is dual fueling? Explain with a working principle of hydrogen and diesel using as a dual fuel.   (06 Marks)

OR

4   a. With neat sketch explain gaschromoto graph.   (10 Marks)
    b. A solid fuel contains by weight, carbon 71%, hydrogen 40%, oxygen 9%, sulphur 3%, nitrogen 1% and the remainder 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. Explain different stages of combustion in S.I. engines. With neat pressure and crank angle diagram.   (10 Marks)
    b. What are the basic requirements of good combustion chamber in S.I. engine and explain types of combustion chamber.   (10 Marks)

OR

6   a. Briefly explain: i) Swirl   ii) Squish   iii) Diesel knock and its effect.   (12 Marks)
    b. Explain:
        i)   Swirl chamber
        ii)   Pre-combustion chambers in CI engines.   (08 Marks)

Module-4

7 a. Explain basic performance parameters of a engine. **(10 Marks)**
   b. What is dynamometer? Explain with a neat sketch, Eddy current dynamometer. **(10 Marks)**

OR

8 a. List the measurement of friction power of an engine explain briefly any one. **(08 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 = 11cm
   Stroke = 13cm
   Engine speed = 2250 rev/min
   b.p = 36kW
   fuel consumption = 10.5kg/n
   calorific value of fuel = 42,000kJ/kg
   pressure drop across the orifice = 4.1cm of H_2O atmospheric temperature and pressure are 15°C and 1.013bar
   Calculate:
   i)   Thermal efficiency on b.p basis
   ii) Brake mean effective pressure
   iii) Volumetric efficiency based on free air conditions. **(12 Marks)**

Module-5

9 a. What do you mean by combustion in dual fuel engine? Discuss any three factors affecting combustion in dual fuel engine. **(10 Marks)**
   b. i) List the methods of knock controls in dual fuel engine. **(04 Marks)**
      ii) Write the advantages of dual fuel engine. **(06 Marks)**

OR

10 a. Explain the characteristics of multifuel engine. **(10 Marks)**
   b. Discuss the modification required for fuel system of a multifuel engine. **(10 Marks)**

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