CBCS SCHEME

15AU54

Fifth Semester B.E. Degree Examination, Aug./Sept.2020
Automotive Fuels and Combustion

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1   a.   Briefly explain need for alternative fuels.   (04 Marks)
    b.   Discuss merits and limitations of solar energy.   (04 Marks)
    c.   Define the terms : i) Flash point   ii) Fire point   iii) Cloud point   iv) Viscosity.
                                                                                                 (08 Marks)

OR

2   a.   Explain the following with merits , demerits and applications :
         i) Biomass energy   ii) Wind energy.   (08 Marks)
    b.   What are the major hydrocarbon structures in petroleum? Discuss with the help of neat
         sketch   (08 Marks)

Module-2

3   a.   Write short notes on the following :
         i) LPG as a fuel for a S.I. engine   ii) Bio – Diesel as fuel for a C.I. engine.   (08 Marks)
    b.   Dry exhaust gas from an oil engine had the following composition by volume :
         CO_2 = 8.85% , CO = 1.2% , O_2 = 6.8% and N_2 = 83.15%. The fuel oil had a percentage
         composition by mass as C = 84% , H_2 = 14% and O_2 = 2%. Determine
         i) Mass of carbon per kg of dry flue gas   ii) A : F ratio.   (08 Marks)

OR

4   a.   Explain analysis of flue gases by Orsat apparatus, with neat sketch.   (08 Marks)
    b.   Discuss the properties of alcohol – petrol blend fuels.   (08 Marks)

Module-3

5   a.   Explain the different stages of combustion in S.I. engine, with the help of $P - \theta$ diagram.
                                                                                                 (08 Marks)
    b.   Write basic requirements of a good combustion chamber for S.I. engine.   (08 Marks)

OR

6   a.   What is meant by a delay period? Explain the variables affecting the delay period in C.I.
         engine.   (08 Marks)
    b.   Discuss the advantages and disadvantages of induction swirl and compression swirl.
                                                                                                 (08 Marks)

Module-4

7   a.   Describe with sketches how the brake power can be measured by the following methods :
         i) Prony brake   ii) Rope brake.   (10 Marks)
    b.   With a neat sketch, explain the working of Bosch smoke meter.   (06 Marks)

OR

8   A four stroke cycle petrol engine has a six single acting cylinders of 7.5cm bore and 9 cm stroke. The engine is coupled to a brake having a torque arm radius of 38cm. At 3300 rev/min, with all cylinders operating the net brake load is 324N. When each cylinder in turn is rendered in operative, the average net brake load produced at the same speed by the remaining five cylinders is 245N. Estimate the indicated mean effective pressure of engine.
With all cylinders operating the fuel, consumption is 0.3 kg/min, fuel calorific value 42000 KJ/kg, the jacket water flow rate and temperature rise are 65kg/min and 12^0C. On test the engine is enclosed in a thermally insulated box, through which the output drive, water , fuel , air and exhaust connectors pass ventilating air blown up through the box at the rate of 14 kg/min enters at 10^0C and leaves at 55^0C. Draw up a heat account of the engine, stating the items as a percentage of the fuel.   (16 Marks)

Module-5

9   a.   What do you mean by dual fuel engine? Discuss any three factors affecting combustion in dual fuel engine.   (08 Marks)
    b.   Explain the modifications required for fuel system of a multi fuel engine.   (08 Marks)

OR

10 a.   Describe with a sketch and dual fuel , engine and comment on its performance.   (08 Marks)
    b.   What are the design features required for multifuel operation?   (08 Marks)

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