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15AU54

Fifth Semester B.E. Degree Examination, June/July 2018
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. Differentiate between Exhaustible and Inexhaustible source of energy with examples.

(06 Marks)

   b. Sketch and explain the working of i) Geothermal energy plant   ii) Fuel cell.   (10 Marks)

OR

2   a. Explain i) Paraffin series   ii) Olefin series   iii) Aromatic series of hydro carbon.

(06 Marks)

   b. Sketch and explain the petroleum refining by fractional distillation.   (08 Marks)

   c. Define the terms : i) Polar point   ii) API gravity.   (02 Marks)

Module-2

3   a. What are the basic requirements of fuels for internal combustion engine?   (06 Marks)

   b. What are the advantages of liquid fuels over the gaseous fuels for the use in I.C. Engines?

(06 Marks)

   c. Explain the properties of Air fuel mixture.   (04 Marks)

OR

4   a. Explain with a neat sketch, the working of Orsat apparatus for flue gas analysis.   (08 Marks)

   b. In a boiler trial the fuel analysis was carbon 88%, hydrogen 3% , sulphur 0.5% by mass and the remainder being ash. Determine the mass of air required for complete combustion. If the actual supply of air is 50% more of this, estimate the percentage analysis of dry flue gas by mass.   (08 Marks)

Module-3

5   a. With a neat sketch, explain the stages of Combustion in SI Engine.   (08 Marks)

   b. Explain the Normal and abnormal combustion in SI engines with sketches.   (08 Marks)

OR

6   a. Explain the Ignition delay period in CI Engines and write the important factors on which it depends.   (08 Marks)

   b. Sketch and explain the Direct Combustion chamber and Pre – Combustion chamber.

(08 Marks)

Module-4

7   a. Explain the following :   i) Rope brake dynamometer   ii) Willan's line to measure frictional power   iii) Morse Test.   (12 Marks)

   b. A single cylinder 4 stroke cycle oil engine is fitted with a rope brake, the diameter of brake wheel is 600mm and rope diameter 26mm, the dead load on the brake is 200N and the spring balance reads 30N, the speed of the engine is 450 rpm. Calculate the Brake power.(04 Marks)

OR

8   a. List and explain the variables affecting performance characteristics of IC engine. **(08 Marks)**
    b. During the test trial of single cylinder 4 stroke oil engine the following results were obtained
        Cylinder diameter = 20cm   ,   Stroke = 40cm ,   Mean effective pressure = 6 bar   ,
        Torque = 407 N-m ,   Speed = 250 rpm   ,   Oil consumption = 4 kg/hr ,   Calorific value of
        the fuel = 43 MJ/kg ,   Cooling water flow = 4.5 kg/min ,   Air used per kg of fuel = 30kg ,
        Cooling water temperature raise = 45^0C , Exhaust gas temperature = 420^0C ,
        Room temperature = 20^0C ,   Mean specific heat = 1kJ/kg^0K ,
        Specific heat of water = 4.18kJ/kg^0K. Find the Indicated power , Brake power and draw the
        heat balance sheet in kJ/hr.   **(08 Marks)**

Module-5

9   a. Explain the factors affecting the combustion in a dual fuel engine.   **(08 Marks)**
    b. Explain the process of Combustion in dual fuel engine.   **(08 Marks)**

OR

10 a. What is Multi fuel engine? Explain the characteristics of multi fuel engine.   **(08 Marks)**
    b. Explain the modification of fuel system in multi fuel engine briefly.   **(08 Marks)**

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