CBCS SCHEME

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15AU54

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
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. Distinguish between the exhaustible and inexhaustible sources of energy with examples. **(08 Marks)**

b. What is fuel cell? Explain the working of fuel cell with sketch. **(08 Marks)**

OR

2 a. Sketch and explain the petroleum refining process by fractional distillation. **(08 Marks)**

b. Distinguish between paraffin and olefin series of hydrocarbons. **(04 Marks)**

c. Define the following properties:
i) Pour point
ii) API gravity **(04 Marks)**

Module-2

3 a. What are the properties of good air fuel mixture? Explain. **(08 Marks)**

b. Write a note on the following:
i) LPG as fuel for SI engine
ii) Bio-diesel as a fuel for CI engine **(08 Marks)**

OR

4 a. Sketch and explain the Orsat apparatus for flue gas analysis. **(08 Marks)**

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

Module-3

5 a. Explain the stage of combustion in SI engines with sketch. **(08 Marks)**

b. Explain the effect of engine variables on flame propagation in SI engine. **(08 Marks)**

OR

6 a. Explain the three stages of CI engine combustion. **(08 Marks)**

b. Explain the induction air swirl in C.I. engine combustion with sketch. **(08 Marks)**

Module-4

7 a. Explain the rope brake dynamometer to determine brake power of the engine. **(08 Marks)**

b. Single cylinder 4 stroke cycle engine is fitted with rope brake dynamometer, the dia of the brake wheel is 500 mm, rope dia is 25 mm and the dead load on the brake is 200 N, spring balance reading is 30 N, speed is 450 rpm. Calculate the brake power. **(04 Marks)**

c. Explain the measurement of fuel consumption in the I.C. engine. **(04 Marks)**

OR

8 a. Explain the Willam's line method for the determination of friction power of the engine. **(04 Marks)**

b. During the test trail of a single cylinder 4 stroke oil engine. The following results were obtained. Cylinder diameter = 20 cm, stroke = 40 cm, mean effective pressure = 6 bar, torque = 407 Nm, speed = 250 rpm, oil consumption = 4 kg/hr, calorific value of the fuel = 43 MJ/kg, coding water flow = 4.5 kg/min, air used per kg of fuel = 30 kg, raise in cooling water temperature is 45°C, temperature of exhaust gases = 420°C, room temperature = 20°C, mean specific heat is 1 kJ/kg°K, specific heat of water = 4.18 kJ/kg°K. find IP, BP, mechanical efficiency, thermal efficiency and draw the heat balance sheet in kJ/hr. **(12 Marks)**

Module-5

9 a. Write the factors affecting combustion in a dual fuel engine. **(08 Marks)**

b. What is dual fuel engine? Give its advantages. **(08 Marks)**

OR

10 a. Explain the characteristics of multi fuel engine. **(08 Marks)**

b. What are the modifications required for the fuel system of multi fuel engine? **(08 Marks)**

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