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18AU54

Fifth Semester B.E. Degree Examination, July/August 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. List and explain types of energy sources.   (10 Marks)
    b. With a neat sketch illustrate wind energy harnessing system.   (10 Marks)

OR

2   a. With a neat sketch, explain petroleum refining process by fractional distillation.   (10 Marks)
    b. Interpret the following: i) Diesel index   ii) Amiline point   iii) Cloud point   iv) Pour point   v) Isomerization.   (10 Marks)

Module-2

3   a. Explain the rating of S.I and C.I engine fuels.   (10 Marks)
    b. Explain:
        i)   LPG as fuel for S.I engine
        ii) Bio-diesel as fuel for C.I engine.   (10 Marks)

OR

4   a. Explain the fuel gas analysis by gas chromatography.   (10 Marks)
    b. The following are the percentage of coal sample on mass basis C = 82%. Hydrogen = 6%, oxygen = 9% and ash = 3%. Determine: i) Maximum air required for complete combustion ii) Volumetric analysis of products of combustion. Assume 10% excess air supplied.   (10 Marks)

Module-3

5   a. With a neat sketch interpret the phenomenon of knocking in S.I engine.   (10 Marks)
    b. Interpret the effect of engine variables on ignition lag in S.I engine.   (10 Marks)

OR

6   a. Explain the different stages of C.I engine with 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. With a neat sketch, explain prony brake dynamometer.   (10 Marks)
    b. Briefly explain the following terms:
        i)   Mechanical efficiency
        ii)   Volumetric efficiency
        iii) Brake specific fuel consumption
        iv)   Indicated power
        v)   Brake power.   (10 Marks)

OR

8 a. Explain the William's line method of determination of friction power of the engine.

(10 Marks)

b. A 4-stroke cycle, four cylinder petrol engine was tested at full throttle at constant speed. The cylinders have diameters of 80mm and stroke 100mm. Fuel was supplied at the rate of 5-44kg/hr and plugs of the four cylinders were successively short circuited without the change of speed the power measured was as follows:

With all cylinders working = 14.7kW, with cylinder cut off = 10.1kW, with cylinder 2 cut off = 10.3kW, with cylinder 3 cut off = 10.4kW, with cylinder 4 cut off = 10.2kW. Calorific value of petrol was 41900kJ/kg. Find: i) Mechanical efficiency   ii) Indicated thermal efficiency   iii) Frictional power.

(10 Marks)

Module-5

9 a. List and explain the factors affecting combustion in duel fuel engine. (10 Marks)

b. With a neat sketch, explain the working principle of duel fuel engine. (10 Marks)

OR

10 a. What is a multifuel engine? What are the requirements of multifuel engine? (10 Marks)

b. Outline the requirements of multifuel engine modifications. (10 Marks)

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