

Answer the Following Questions:

Question (1)

Explain briefly each of the following:

- a) If the price of gasoline, diesel fuel and methanol were the same per gallon (after taxes), which would be the best buy for automobile use from a consumer standpoint? What factors other than density and LHV are involved here?
- b) Types of gaseous fuels and their characteristics.
- c) Emissions from Gas – Fired Furnaces.

Question (2)

For a gaseous mixture consists of 10 % hydrogen (H_2) and 90 % methane (CH_4) by weight, estimate each of its higher and lower heating values. [Take HHV for $H_2 = 142000$ kJ/kg and for $CH_4 = 55500$ kJ/kg]

Question (3)

Discuss briefly each of the following:

- a) Types of liquid fuels and their characteristics.
- b) What are the deficiencies of the elementary carburetor?
- c) Gasoline additives and their functions.

Question (4)

Explain briefly each of the following:

- a) Modification to control NO_x .
- b) Distillation curves for different liquid fuels.
- c) Describe briefly types of liquid fuel injectors.

Question (5)

An industrial power plant has an average annual load of 150 MW and the overall thermal efficiency of the plant is 33 %. Estimate the annual cost of the used fuel, if the plant operates 8000 hour/year and the fuel used has net calorific value equal to 42 MJ/kg and the unit fuel price equal to 1.25 LE/kg.

Question (6)

Explain briefly each of the following:

- a) Specification of engine lubricants.
- b) Additives of engine lubricants and their functions.
- c) Classification of engine lubricants.
- d) Performance tests of engine lubricants.

Good Luck
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