

1. Which of the following is not a commonly used liquid alternative fuel for internal combustion engines?

- a) LPG
- b) Biogas
- c) Hydrogen
- d) Ethanol

Answer: d) Ethanol

Explanation: Ethanol is primarily used as a biofuel additive in gasoline rather than being used as a standalone alternative fuel in internal combustion engines.

2. Which characteristic is desirable for both spark ignition (SI) and compression ignition (CI) engine fuels?

- a) Low volatility
- b) High octane number (SI) / Cetane number (CI)
- c) High viscosity
- d) Low flash point

Answer: b) High octane number (SI) / Cetane number (CI)

Explanation: Both SI and CI engines benefit from fuels with high octane numbers for SI engines and high cetane numbers for CI engines, which indicate better combustion characteristics.

3. What is the primary factor that determines the rating of SI engine fuels?

- a) Octane number
- b) Cetane number
- c) Calorific value
- d) Density

Answer: a) Octane number

Explanation: The octane number is a measure of a fuel's ability to resist knocking in SI engines, thus it primarily determines the rating of SI engine fuels.

4. Which alternative fuel is commonly used in compressed natural gas (CNG) engines?

- a) Methanol
- b) Propane
- c) Butane
- d) Methane

Answer: d) Methane

Explanation: Compressed natural gas (CNG) primarily consists of methane and is commonly used as an alternative fuel in dedicated CNG engines.

5. What is the stoichiometric air-fuel ratio for complete combustion in an internal combustion engine?

- a) 14.7:1 (by mass)
- b) 10:1 (by volume)
- c) 20:1 (by mass)

d) 7.3:1 (by volume)

Answer: a) 14.7:1 (by mass)

Explanation: The stoichiometric air-fuel ratio represents the perfect balance of air and fuel for complete combustion, which is approximately 14.7 parts of air to 1 part of fuel by mass for gasoline.

6. Which gas is the primary combustion product of hydrocarbon fuels in internal combustion engines?

- a) Nitrogen
- b) Oxygen
- c) Carbon dioxide
- d) Carbon monoxide

Answer: c) Carbon dioxide

Explanation: Carbon dioxide is the primary combustion product resulting from the oxidation of hydrocarbon fuels in internal combustion engines.

7. What does HHV stand for in relation to fuels?

- a) High Heating Value
- b) High Hydrocarbon Volume
- c) Heat-to-Hydrogen Value
- d) Heat Holding Volume

Answer: a) High Heating Value

Explanation: HHV refers to the high heating value of a fuel, also known as the gross calorific value, which represents the total heat released when a fuel is completely combusted.

8. Which characteristic of a fuel is measured by its lower heating value (LHV)?

- a) Heat released during complete combustion
- b) Heat absorbed during vaporization
- c) Heat content excluding the latent heat of vaporization
- d) Heat content including the latent heat of vaporization

Answer: c) Heat content excluding the latent heat of vaporization

Explanation: Lower heating value (LHV) of a fuel measures the heat content excluding the latent heat of vaporization, providing a more realistic indication of the usable energy content of the fuel.

9. Which of the following is a gaseous alternative fuel commonly used in spark ignition engines?

- a) Biodiesel
- b) Biogas
- c) Dimethyl ether (DME)
- d) Renewable diesel

Answer: b) Biogas

Explanation: Biogas, produced from organic waste, is a gaseous alternative fuel commonly used in spark ignition engines after suitable processing.

10. What is the primary desirable characteristic of an alternative fuel for internal combustion engines?

- a) Low energy density
- b) High emissions
- c) Renewable sourcing
- d) High cost

Answer: c) Renewable sourcing

Explanation: The primary desirable characteristic of an alternative fuel for internal combustion engines is its renewable sourcing, promoting sustainability and reducing dependence on finite fossil fuels.

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