

Alkanes Quiz Answer Key PDF

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What is the main environmental concern associated with burning alkanes?

- A. Ozone depletion
- B. Acid rain
- C. Greenhouse gas emissions ✓**
- D. Water pollution

What type of bonds do alkanes primarily contain?

- A. Double bonds
- B. Triple bonds
- C. Ionic bonds
- D. Single bonds ✓**

Which of the following are properties of alkanes? (Select all that apply)

- A. High reactivity
- B. Saturated hydrocarbons ✓**
- C. Strong C-C and C-H bonds ✓**
- D. Presence of double bonds

How does the structure of alkanes affect their boiling and melting points?

The boiling and melting points of alkanes increase with chain length and decrease with branching.

Which of the following statements about the physical properties of alkanes are correct? (Select all that apply)

- A. Boiling points increase with molecular weight. ✓**
- B. Alkanes are highly soluble in water.

C. Melting points increase with chain length. ✓

D. Alkanes are generally non-polar. ✓

What is the general formula for alkanes?

A. C_nH_{2n}

B. C_nH_{2n+2} ✓

C. C_nH_{2n-2}

D. C_nH_n

Which of the following alkanes are gases at room temperature? (Select all that apply)

A. Methane ✓

B. Butane

C. Octane

D. Ethane ✓

What is the primary use of alkanes in industry?

A. As solvents

B. As fuels ✓

C. As fertilizers

D. As catalysts

Which of the following is a branched alkane?

A. Methane

B. Propane

C. Isobutane ✓

D. Ethane

What are common sources of alkanes? (Select all that apply)

A. Natural gas ✓

B. Coal

C. Petroleum ✓

D. Biomass

Which of the following alkanes is a liquid at room temperature?

- A. Methane
- B. Ethane
- C. Pentane ✓**
- D. Octane

Describe the process and products of the combustion of alkanes.

The combustion of alkanes is a chemical reaction where alkanes react with oxygen (O₂) to produce carbon dioxide (CO₂) and water (H₂O), along with the release of energy. In complete combustion, sufficient oxygen is present, resulting in CO₂ and H₂O as products, while incomplete combustion occurs with limited oxygen, producing carbon monoxide (CO) and/or soot (C) as byproducts.

Discuss the environmental impact of using alkanes as fuels.

Alkanes, when burned as fuels, release carbon dioxide (CO₂), a significant greenhouse gas, along with other pollutants like nitrogen oxides (NO_x) and particulate matter, leading to air quality deterioration and contributing to global warming.

What is the significance of structural isomerism in alkanes?

The significance of structural isomerism in alkanes lies in the fact that it allows for the existence of multiple compounds with the same molecular formula but different structures, resulting in varied properties and behaviors.

How are alkanes named according to IUPAC nomenclature rules? Provide an example.

Alkanes are named by identifying the longest carbon chain and using the appropriate prefix for the number of carbons, followed by '-ane'. For example, 'butane' for four carbons.

Which of the following is the simplest alkane?

- A. Ethane
- B. Propane
- C. Methane ✓**

D. Butane

At room temperature, which state are the lower alkanes (C1-C4) typically found in?

- A. Solid
- B. Liquid
- C. Gas ✓**
- D. Plasma

Which of the following alkanes are used as fuels? (Select all that apply)

- A. Propane ✓**
- B. Butane ✓**
- C. Hexane ✓**
- D. Methanol

Explain why alkanes are considered saturated hydrocarbons.

Alkanes are considered saturated hydrocarbons because they contain only single bonds between carbon atoms, which allows them to have the maximum number of hydrogen atoms attached.

Which of the following statements about alkane isomerism are true? (Select all that apply)

- A. Alkanes can have structural isomers. ✓**
- B. Isomers have different molecular formulas.
- C. Isomers have the same molecular formula but different structures. ✓**
- D. Isomerism is not possible in alkanes.