

Propane Chemistry Questions with Solutions

Q-1: The general formula used for alkanes is C_nH_{2n+2} . What is the value of “n” for propane?

- a) 1
- b) 2
- c) 4
- d) 3

Answer: d) 3

Explanation: In organic chemistry the prefix “prop” refers to the number three, indicating 3 carbon atoms in the compound.

Q-2: What is the name given to propane when it is used as vehicle fuel?

- a) Fuel gas
- b) Auto gas
- c) Vehicle gas
- d) All of the above

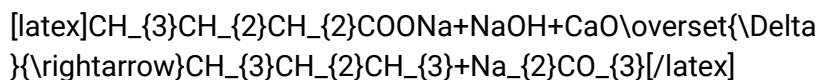
Answer: b) Auto gas

Q-3: Which of the following can be decarboxylated to produce propane?

- a) Sodium salt of butanoic acid
- b) Potassium salt of propanoic acid
- c) Sodium salt of ethanoic acid
- d) Sodium salt of pentanoic acid

Answer: a) Sodium salt of butanoic acid

Explanation: Decarboxylation is a chemical reaction that removes a carboxyl group and releases carbon dioxide (CO_2). The reaction occurs in the presence of soda lime ($NaOH+CaO$).



Q-4: Are structural/chain isomers of propane possible?

Answer: No

Explanation: Isomerism occurs when two substances have the same chemical formula but distinct structures. At least four carbon atoms are required for structural/chain isomers to exist. There are just three carbon atoms in propane, hence there will be no isomerism.

Q-5: What is bond line notation? Give the bond line notation for propane.

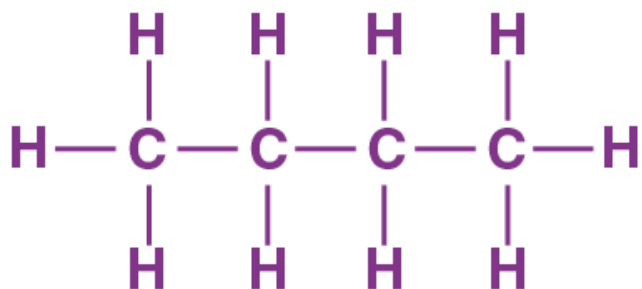
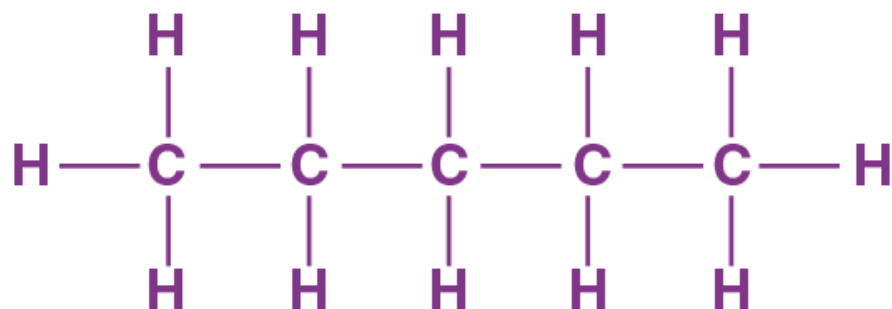
Answer: The bond line notation method is used to express the structural formulas of organic compounds. The carbon and hydrogen atoms are not shown in this method, instead, just the bonds between the carbon atoms are shown as lines. The carbon atoms are represented by the ends and vertices. According to the valence laws, the number of hydrogens must be estimated. Other atoms, besides carbon and hydrogen, are represented.



Q-6: Give the names and structural formulae of the next two higher homologues of propane.

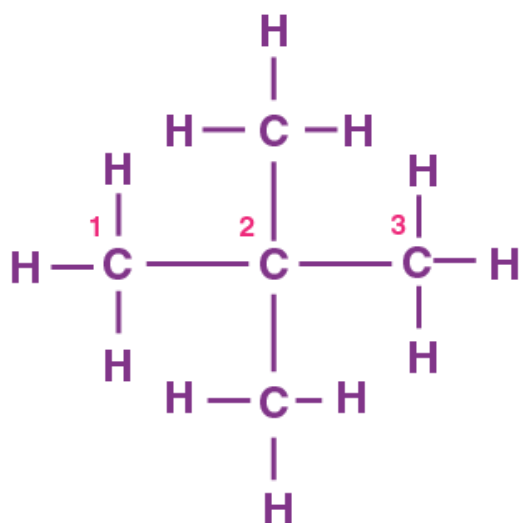
Answer: Butane(C_4H_{10}) and Pentane(C_5H_{12}) are the next two higher homologues of propane.

Their structural formulas are shown below:



Q-7: What is the other name of 2,2-Dimethylpropane? Draw the structure for the same.

Answer: Neopentane is the other name given to 2,2-Dimethylpropane. The structure is shown below:



Q-8: Write the balanced chemical equation for the combustion of propane.

Answer: Combustion is the process of a substance burning in the presence of oxygen, producing heat and light as a result.

The balanced equation for the combustion of propane is



Q-9: Propane is formed by the hydrogenation of

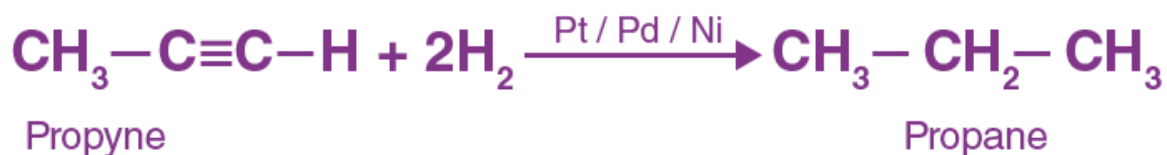
- Ethene
- Propyne
- But-2-ene
- None of the above

Answer: b) Propyne

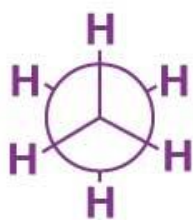
Explanation: In the presence of finely split catalysts such as platinum, palladium, or nickel, dihydrogen gas reacts with alkenes and alkynes to create alkanes.

This is referred to as hydrogenation.

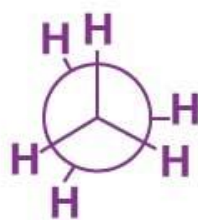
The hydrogenation of propyne is shown below:



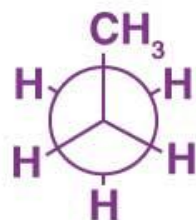
Q-10: In the case of propane, which of the following is the Newmann projection of an eclipsed conformation?



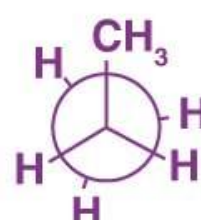
I



II



III



IV

- a) I
- b) II
- c) IV
- d) III

Answer: c) IV

Explanation: The arrangement of atoms or groups of atoms in a molecule that results in a 0° dihedral angle is known as eclipsed conformation.

In II and IV, the dihedral angle is zero. But II is the case of the ethane molecule, not propane.

Q-11: State any three uses of propane.

Answer: The three main uses of propane are:

1. Propane is utilised in a variety of applications including propellant, refrigerant, motor fuel, and petrochemical feedstock.

2. The gas is used to melt aluminium, bronze and other metals in stationary and tilting crucible furnaces. In addition, the gas is used in furnaces that melt gold and silver jewellery.
3. Propane is a common source of house and water heating and cooking fuel.

Q-12: Is propane flammable?

Answer: Yes, propane is highly flammable gas. It can explode the container when heated.

Q-13: Propane is not soluble in

- a) Carbon tetrachloride
- b) Ethyl ether
- c) Water
- d) Benzene

Answer: c) Water

Explanation: Polar compounds dissolve in polar solvents, while non-polar compounds dissolve in non-polar substances, according to the "like dissolves like" principle.

Water is polar, although propane is not. As a result, propane is insoluble in water.

Since the remaining compounds are nonpolar, propane is soluble in them.

Q-14: Is propane harmful to one's health?

Answer: Yes, propane is harmful for human health. Propane as a vaporising liquid can induce gangrene. If the concentration in the air exceeds 10%, it can produce dizziness, and a higher amount can cause narcosis and asphyxiation.

Q-15: Propane belongs to the class of

- a) Saturated hydrocarbons
- b) Unsaturated hydrocarbons
- c) Aromatic hydrocarbons
- d) Alicyclic hydrocarbons

Answer: a) Saturated hydrocarbons

Explanation:

A **hydrocarbon** is an organic substance with solely carbon and hydrogen as components.

A **saturated hydrocarbon** is one in which all of the carbon-carbon bonds are single. Alkanes are referred to as "saturated hydrocarbons."

Unsaturated hydrocarbons are organic molecules composed completely of carbon and hydrogen atoms that have a double or triple bond between two neighbouring carbon atoms.

Aromatic hydrocarbons are organic molecules with a circular structure and sigma bonds as well as delocalized pi electrons.

Alicyclic hydrocarbons are ring-shaped carbon chains that are saturated.

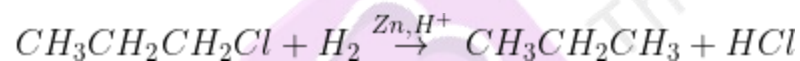
Propane is a saturated hydrocarbon because it fits the requirements for being saturated.

Practise Questions on Propane

Q-1: How can you prepare propane from 1-chloropropane?

Answer: Alkyl halides (except fluorides) on reduction with zinc and dilute hydrochloric acid give alkanes.

The following reaction illustrates the preparation of propane from 1-chloropropane.



Q-2: Is propane polar or nonpolar?

Answer: Nonpolar compounds will be symmetric, which means that all of the sides around the core atom will be identical, bonded to the same element with no unshared electron pairs.

Propane is non-polar in nature because it meets the requirements.

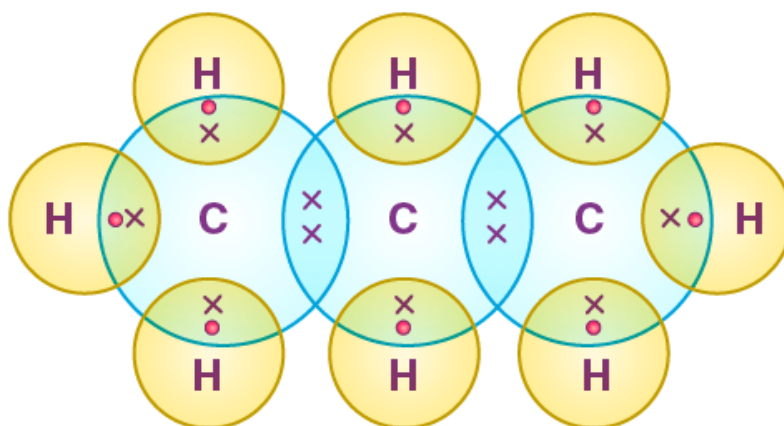
Q-3: What are electron dot structures? Draw a propane molecule electron dot structure.

Answer: Lewis structures also known as electron dot structures or Lewis electron dot structures (LEDS), are diagrams that depict the bonding between atoms in a molecule as well as any lone pairs of electrons that may occur. Any covalently bonded molecule, including coordination compounds, can be represented by a Lewis structure.

Dots and crosses are used to indicate the valence electrons of the atom in electron dot structures.

Each carbon atom in propane contains four valence electrons, as indicated by the cross, while each H-atom has one valence electron, as indicated by the dots.

The diagram below shows the electron dot structure of propane:



Q-4: Which of the following is not the correct name of propane?

- a) Propyl hydride
- b) Dimethyl methane
- c) n-propane
- d) Dimethylethane

Answer: d) Dimethylethane

Q-5: Propane is the major component of

- a) CNG
- b) Natural gas
- c) LPG
- d) Petrol

Answer: c) LPG