

A. Carbon compounds as fuels and feedstock – part 1 - Crude oil, hydrocarbons and alkanes

1. Crude oil is a finite resource. What does finite mean?
2. How was crude oil formed?
3. What is crude oil?
4. What is the definition of a hydrocarbon?
5. What is the general formula of the alkanes?
6. Name the first four members of the alkanes.
7. What would be the formula of an alkane with nine carbons?
8. Draw the structural formula of propane.

B. Carbon compounds as fuels and feedstock – part 2 – Fractional Distillation, Petrochemicals and Properties of Hydrocarbons

1. What are the fractions from fractional distillation used for? What do we call the many hydrocarbons in crude oil?
2. How can the hydrocarbons in crude oil be separated out?
3. The hydrocarbons in crude oil can be processed to produce...
4. List the following fractions from fractional distillation in order of boiling point, the fraction with the lowest boiling point should be first.

Kerosene, diesel oil, heavy fuel oil, liquefied petroleum gases, petrol.
5. Give three examples of useful materials produced by the petrochemical industry.
6. How would you describe the boiling point, the viscosity and the flammability of a very large alkane molecule?
7. Nonane C_9H_{20} was combusted in oxygen to produce carbon dioxide and water. Write the balanced symbol equation for this reaction.

C. Carbon compounds as fuels and feedstock – part 3 – Cracking and Alkenes

1. Define the term 'cracking'.
2. Name two methods of cracking.
3. What are the conditions needed for cracking?
4. Which are more reactive: alkanes or alkenes?
5. What is the test for alkenes?
6. Complete the following equation for a cracking reaction.

$$\text{C}_{14}\text{H}_{30} \longrightarrow \text{C}_{11}\text{H}_{24} +$$

D. Reactions of Alkenes – CHEMISTRY ONLY

1. What type of bond do all alkenes contain?
2. What is the general formula for the homologous series of alkenes?
3. Why are alkenes unsaturated?
4. What are the first four members of the homologous series of alkenes?
5. What would be the formula of an alkene that contained 18 hydrogen atoms?
6. Draw the structural formula of butane C_4H_8
7. Write the balanced symbol equation for the incomplete combustion of octane C_8H_{16} to produce carbon monoxide and water.
8. What alcohol will be produced when water reacts with butane?
9. What chemical is produced when bromine reacts with pentene?

E. Reactions of Alcohols and Carboxylic Acids – CHEMISTRY ONLY

1. What type of bond do all alkenes contain?
2. What is the general formula for the homologous series of alkenes?
3. Why are alkenes unsaturated?
4. What are the first four members of the homologous series of alkenes?
5. What would be the formula of an alkene that contained 18 hydrogen atoms?
6. Why are alkene molecules described as unsaturated?
7. Draw the structural formula of butane C_4H_8
8. Write the balanced symbol equation for the incomplete combustion of octane C_8H_{16} to produce carbon monoxide and water.
9. What alcohol will be produced when water reacts with butane?
10. What chemical is produced when bromine reacts with pentene?

F. Synthetic and Naturally Occurring Polymers – CHEMISTRY ONLY

1. What is polymerisation?
2. What type of polymerisation joins alkenes together to make polymers?
3. What is the monomer called which forms the polymer poly(ethene)?
4. What type of polymer would butene make and what would it be called?
5. HT ONLY - What happens during condensation polymerisation?
6. HT ONLY - Explain how amino acids polymerise to form a polypeptide.
7. HT ONLY - Name and give the formula of one amino acid that polymerises in this way.

G. DNA and Other Naturally Occurring Polymers

1. What is DNA?
2. What does DNA do?
3. Describe the structure of DNA.
4. What are the monomers that make up DNA?
5. What three substances make up these monomers?
6. Name three other naturally occurring polymers important for life.
7. Name the monomer for each of the polymers in question 5.