

C5.1 Mastery Quiz: Carbon Chemistry

Section A

1. Choose the correct word to complete the sentence:

Crude oil is formed by the decomposition of _____.

Tick (✓) **one** box.

[1]

A. Plankton

☐

B. Fish

☐

C. Rocks

☐

2. Choose the correct word to complete the sentence:

Crude oil is a _____ of different substances.

Tick (✓) **one** box.

[1]

A. Compound

☐

B. Mixture

☐

C. Molecule

☐

3. A group of hydrocarbons found in crude oil are the alkanes. What is the name of the alkane that contains 3 carbon atoms?

Tick (✓) **one** box.

[1]

A. Ethane

☐

B. Propane

☐

C. Butane

☐

4. The general formula for the alkanes is C_nH_{2n+2} . How many hydrogen atoms would there be in a molecule of an alkane with 14 carbon atoms?

Tick (✓) **one** box.

[1]

A. 28

☐

B. 30

☐

C. 32

☐

5. Which type of bonding is found in the alkanes?

Tick (✓) **one** box.

[1]

A. Covalent

☐

B. Ionic

☐

C. Metallic

☐

6. Decane is an alkane that is cracked to produce two products, as shown by the reaction below.



What is the formula of the other product?

Tick (✓) **one** box.

[1]

A. $C_{12}H_{26}$

☐

B. C_8H_{16}

☐

C. C_8H_{18}

☐

7. Which statement best explains why large hydrocarbons are cracked?

Tick (✓) **one** box.

[1]

- A. There is greater demand for shorter hydrocarbon chains ☐
- B. Large hydrocarbon chains have low boiling points so are easy to break down ☐
- C. To make equal numbers of long and short chain hydrocarbons ☐

8. One of the products of the cracking of decane is C_2H_4 , which is an alkene. What test and result would indicate the presence of an alkene?

Tick (✓) **one** box.

[1]

- A. Limewater would turn cloudy ☐
- B. Limewater would turn colourless ☐
- C. Bromine water would turn cloudy ☐
- D. Bromine water would turn colourless ☐

9. Fractional distillation is used to separate the different substances found in crude oil. There are three stages involved in this process:

Stage X: Hydrocarbons evaporate

Stage Y: Crude oil is heated

Stage Z: Vapours condense

Which option shows the correct order of these stages?

Tick (✓) **one** box.

[1]

- A. X, Y, Z ☐
- B. Z, Y, X ☐
- C. Y, X, Z ☐



10. Choose the correct option to complete the sentence:

Fractional distillation separates substances based on their _____.

Tick (✓) **one** box.

[1]

A. Boiling points

☐

B. Melting points

☐

C. Temperature

☐

11. Choose the products of the complete combustion of propane.

Tick (✓) **one** box.

[1]

A. Water and oxygen

☐

B. Water and carbon dioxide

☐

C. Oxygen and carbon dioxide

☐

12. Incomplete combustion of propane also produces another product, carbon monoxide. Which explains why combustion may be incomplete?

Tick (✓) **one** box.

[1]

A. There is not enough propane

☐

B. There is not enough oxygen

☐

C. There is more oxygen than propane

☐

13. What type of reaction is the combustion of propane?

Tick (✓) **one** box.

[1]

A. Exothermic, as it transfers energy to the surroundings

☐

B. Exothermic, as it takes in energy from the surroundings

☐

C. Endothermic, as it transfers energy to the surroundings

☐

D. Endothermic, as it takes in energy from the surroundings

☐

14. Which monomer is used to produce poly(ethene)?

Tick (✓) **one** box.

[1]

A. Ethane

☐

B. Ethene

☐

C. Alkene

☐

15. Petrol used in fuels should be treated to remove sulfur. Which correctly explains why?

Tick (✓) **one** box.

[1]

A. It would cause incomplete combustion

☐

B. It would burn to produce sulfur dioxide, leading to acid rain

☐

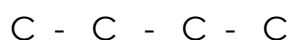
C. It would burn to produce carbon dioxide, leading to global warming

☐



Section B

1. Butane is an alkane.
 - a. Complete the structural formula for butane. [2]



- b. Give the chemical formula for butane. [1]

2. The table below shows the melting points and boiling points of methane (CH₄) and hexane (C₆H₁₄).

	Melting Point (°C)	Boiling Point (°C)
Methane	-183	-162
Hexane	-95	69

- a. Identify the state of matter that each would be at room temperature (20 °C). [2]

Methane: _____

Hexane: _____

- b. Compare the structure and properties of methane and hexane. [4]

- c. Explain the trend in the boiling points of the alkanes. [2]



- d. Complete the dot and cross diagram to show the bonding in methane (CH_4). [2]

