

90932



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### **Level 1 Chemistry 2022**

# 90932 Demonstrate understanding of aspects of carbon chemistry

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of aspects of carbon chemistry.	Demonstrate in-depth understanding of aspects of carbon chemistry.	Demonstrate comprehensive understanding of aspects of carbon chemistry.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

#### You should attempt ALL the questions in this booklet.

A periodic table and other reference material are provided in the Resource Booklet L1–CHEMR.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–11 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (
). This area may be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

#### QUESTION ONE: THE CAMPING TRIP

A student visits a camping store to purchase a fuel canister for the cooker that will be used to boil water on a camping trip.

The two types of fuels available contain the hydrocarbons propane or butane.



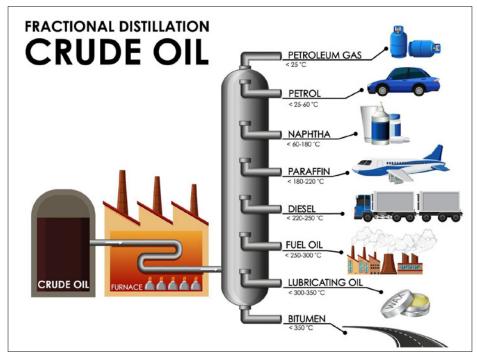
Source: www.clad.com/ best-camping-stoves-forbackpacking/

ı) (i	i)	Draw the structural	formula of butane.	backpacking/
		Butane		
(i	ii)	What type of bonding	ng is present within molecules of propand	e and butane?
		Explain your answer	-	
			e following warning label on them. bon monoxide is a hazard.	EXPLOSION HAZARD CONTENTS UNDER
(i	i)	Give two properties difficult to know tha	of carbon monoxide that make it t it is present in air.	PRESSURE-CARBON MONOXIDE HAZARD
(i	ii)		on and a balanced symbol equation to showhen propane burns.	now the production of carbon
		Word equation:		

Co	mpare and contrast the complete and incomplete combustion of propane.
	your answer:
•	include the conditions for complete and incomplete combustion of propane, and n the products formed
•	link the appearance of the flame, for both the complete and incomplete combustio propane, to the products formed
•	include a balanced symbol equation for the complete combustion of propane.

#### QUESTION TWO: PRODUCTION OF HYDROCARBONS

The diagram below shows the fractional distillation of crude oil. The values given are the boiling point range for each of the fractions.



Source: www.weather-research.com/articles/how-embarrassing--the-climate-has-not-changed-in-cornwall-for-g7

(a)	a) The crude oil used in fractional distillation contains a mixture	of hydrocarbon molecules of different
	sizes.	

(ii)	Fractional distillation can be used to produce fractions of petrol and bitumen from crude oil.
	Compare and contrast the production of petrol and bitumen by fractional distillation.
	In your answer:
	• explain why crude oil must be fractionally distilled before it can be used

• describe the process of fractional distillation

State the meaning of the term "hydrocarbon".

(i)

• use the physical properties and chemical structure of the hydrocarbons in petrol and bitumen to explain why bitumen is removed lower in the tower than petrol.

- )	E4le o	
)	Etne	ene is a hydrocarbon that can be used as a monomer to produce polythene (polyethene).
	(i)	Draw at least TWO repeating units of polythene.
	(ii)	Explain why ethane cannot be used to produce polythene, while ethene can.

#### QUESTION THREE: PROPERTIES OF ORGANIC COMPOUNDS

(a) The table below lists the boiling points of the first five alkanes.

Name	<b>Boiling point (°C)</b>	State at room temperature (25°C)
Methane	-161	Gas
Ethane –89		
Propane	-42	
Butane	-1	
Pentane	36	Liquid

- (i) Complete the table to show the state of each alkane at room temperature (25 °C).
- (ii) Use the information to analyse the trend in boiling points of the first five alkanes. In your answer:
  - define the term boiling point
  - describe the trend

•	explain why this trend occurs.

(b) Hexane and ethanol are both colourless liquids at room temperature.

Explain how a student could distinguish samples of hexane and ethanol using only water.

In your answer:

- refer to the chemical structure of hexane and ethanol
- describe observations of the physical test

•	use your	knowledge	of solubilit	ty to exp	olain these	e observations.

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