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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-for-backpacking/

- (a) (i) Draw the structural formula of butane.

Butane	
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- (ii) What type of bonding is present within molecules of propane and butane?

Explain your answer.

- (b) The fuel canisters carry the following warning label on them.
The warning indicates carbon monoxide is a hazard.



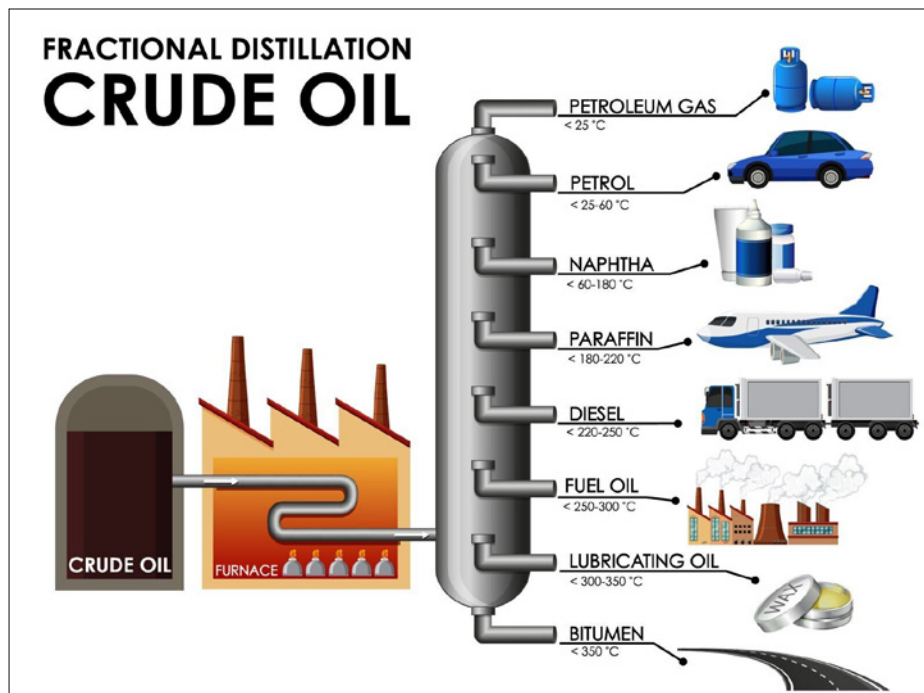
- (i) Give two properties of carbon monoxide that make it difficult to know that it is present in air.

- (ii) Write a word equation and a balanced symbol equation to show the production of carbon monoxide and water when propane burns.

Word equation:

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

(i) State the meaning of the term “hydrocarbon”.

(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
- 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.

(b) Ethene 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.

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