0 1 . 1

Crude oil is a mixture of hydrocarbons which can be separated into fractions.

What is a mixture?

[2 marks]

Two or more elements or compounds [1]

Not chemically combined or joined together [1]

0 1 . 2

What is a hydrocarbon?

[2 marks]

A compound or molecule made up of hydrogen [1]

and carbon only. [1]

0 2

The table below gives some information on the hydrocarbon fractions found in crude oil.

Fraction	Boiling point °C	Relative % in crude oil	Carbon chain length	Demand
Naptha	125	10	5 to 10	high
Kerosene	160	15	10 to 15	high
Diesel	250	20	15 to 20	medium
Fuel oil	300	45	30 to 70	low

0 2 . 1

Naphtha has a lower boiling point than diesel.

Explain why.

[2 marks]

Naptha (or it) contains short or shorter chains/hydrocarbons or smaller molecules or contains fewer carbons. [1]

Naptha (or it) has weaker / smaller intermolecular forces or smaller forces between the molecules. [1]

0 2 . 2

Kerosene is more expensive than fuel oil.

Suggest reasons why.

[2 marks]

Kerosene (or it) is in higher or high demand. [1]

It is in short supply. [1]

WARNING:
Answers using the word 'it' will be given credit only if it is clear that the 'it' refers to the correct subject. So be careful with the use of the word 'it'!

0 3 Crude oil is a mixture of mainly alkanes. Alkanes are a group of chemicals which contain carbon and hydrogen atoms, the smallest of which is methane.

0 3 . 1 Describe how a mixture of alkanes can be separated using fractional distillation.

[3 marks]

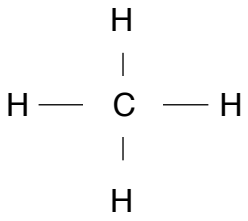
Heat or evaporate the crude oil to make it into a vapour [1]

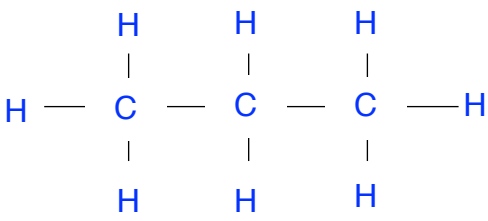
Cool or condense the hydrocarbons or the fractions [1]
or small molecules at top and / or large molecules at bottom

At different temperatures or boiling points [1]

NOTE:
Examiners report how lots of people get this process wrong. It's one that is easy to understand but not as easy to write down. These are the important points written in the correct way.

The alkane methane has the following displayed formula.





0 3 . 2 Draw the displayed formula of propane in the box above.

[2 marks]

(Total 13 marks)

End