

0 5

This question is about crude oil and alkanes.

0 5 . 1

Describe how crude oil is formed.

[3 marks]

0 5 . 2

Describe how crude oil is separated into fractions by fractional distillation.

[4 marks]



Table 2 shows the boiling points of three alkanes.

Table 2

Alkanes	Boiling point in °C
C ₅ H ₁₂	36
C ₁₀ H ₂₂	174
C ₁₅ H ₃₂	271

0 5 . 3 What is the general formula for alkanes?

[1 mark]

0 5 . 4 Explain the trend in the boiling points of the alkanes.

[3 marks]

Question 5 continues on the next page

Turn over ►



0 5 . 5

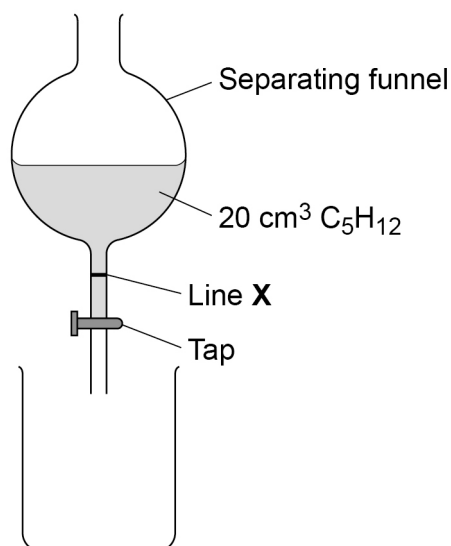
A student investigated one property of the alkanes C_5H_{12} , $C_{10}H_{22}$ and $C_{15}H_{32}$

This is the method used.

1. Pour 20 cm^3 of C_5H_{12} into a separating funnel.
2. Open the tap of the separating funnel and start a timer.
3. Stop the timer when the level of C_5H_{12} reaches line **X**.
4. Repeat steps 1 to 3 with $C_{10}H_{22}$ and $C_{15}H_{32}$

Figure 5 shows the apparatus used.

Figure 5



The level of C_5H_{12} takes 6.4 seconds to reach line **X**.

Predict the trend in times for the other two alkanes.

Give **one** reason for your answer.

[2 marks]

Trend _____

Reason _____

13



Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	plankton	allow biomass allow (marine) animals / organisms ignore plants	1	AO1 5.7.1.1
	buried in mud	allow compressed under mud allow compressed in sedimentary rock ignore fossilised	1	
	over a long period of time or over millions of years		1	
05.2	crude oil heated		1	AO1 5.7.1.2
	(hydrocarbons / liquids) evaporate	allow (hydrocarbons / liquids) vaporise / boil	1	
	vapours / gases condense		1	
	fractions have different boiling points or fractions collect at different levels depending upon boiling point		1	
05.3	C_nH_{2n+2}		1	AO1 5.7.1.1

05.4	the boiling point increases as the number of (carbon) atoms increases	max 2 marks for incorrect reference to particles / bonds	1	AO1
	(because the weak) intermolecular forces increase or (because the weak) forces between the molecules increase	allow converse	1	AO2 AO3
	(and these intermolecular forces increase) as the size of the molecules increases		1	5.2.2.4 5.7.1.3
05.5	(as number of carbon atoms increase) the time increases	MP2 dependent on correct response in MP1	1	AO3 5.7.1.3
	(because) the viscosity increases		1	
Total			13	