

Section A

1. Describe what happens when large hydrocarbon molecules are cracked.

2. Choose which of these is an alkene.

Tick () **one** box.

A. Ethane

B. Ethene

C. Propane

3. Give one difference between alkanes and alkenes.

4. What type of reaction is cracking?

Tick () **one** box.

A. Combustion

B. Neutralisation

C. Decomposition

5. The chemical equations below show some of the reactants and products of different cracking reactions.

- a. Determine the formula of the missing product in each case.



- b. Highlight all alkanes in one colour and all alkenes in another colour.

Section B

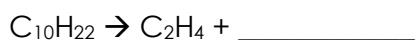


6. Crude oil is fractionally distilled. Fractions with larger molecules can then be cracked.

Describe two differences between fractional distillation and cracking.

7. Decane ($C_{10}H_{22}$) is commonly cracked.

- a. Determine the formula of the other product formed when decane is cracked.



- b. Name the product with the formula C_2H_4 .

- c. C_2H_4 is an alkene. Explain how this could be tested.

- d. Give two conditions used for cracking decane.

8. The table below gives some information about fractions of crude oil.

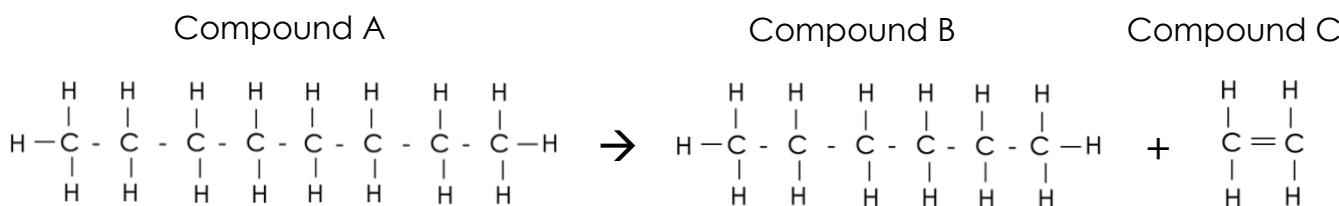
| Fraction | Approximate % of crude oil | Approximate % of total demand |
|----------------|----------------------------|-------------------------------|
| LPG | 4 | 6 |
| Petrol | 10 | 25 |
| Kerosene | 16 | 14 |
| Diesel | 20 | 20 |
| Heavy fuel oil | | 18 |
| | 28 | 17 |

- a. What does LPG stand for?



- b. Complete the table by naming the missing fraction and calculating the approximate percentage of crude oil that is made up of heavy fuel oil.
- c. Identify which of these fractions is the most flammable.
- d. Use the information in the table to explain why it is useful to crack hydrocarbons.

9. The diagram below shows a chemical reaction.



- a. Compounds A, B and C are all what type of compound?

- b. What type of chemical reaction is shown by this diagram?

- c. Suggest one use for Compound B.

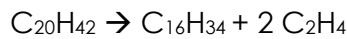
- d. Suggest one use for Compound C.

Section C

10. Cracking is used to break long hydrocarbon chains into smaller hydrocarbon chains.



- a. Cracking takes place under high temperatures. Explain whether cracking is an exothermic or endothermic reaction.
- b. (HT) C₂₀H₄₂ can be cracked. The equation for the reaction is:



Calculate the mass of C₂₀H₄₂ needed to produce 40 kg of ethene.

Relative atomic masses:

C=12

H=1

