Carbon Compounds as Fuels & Feedstock

Total mark – 18

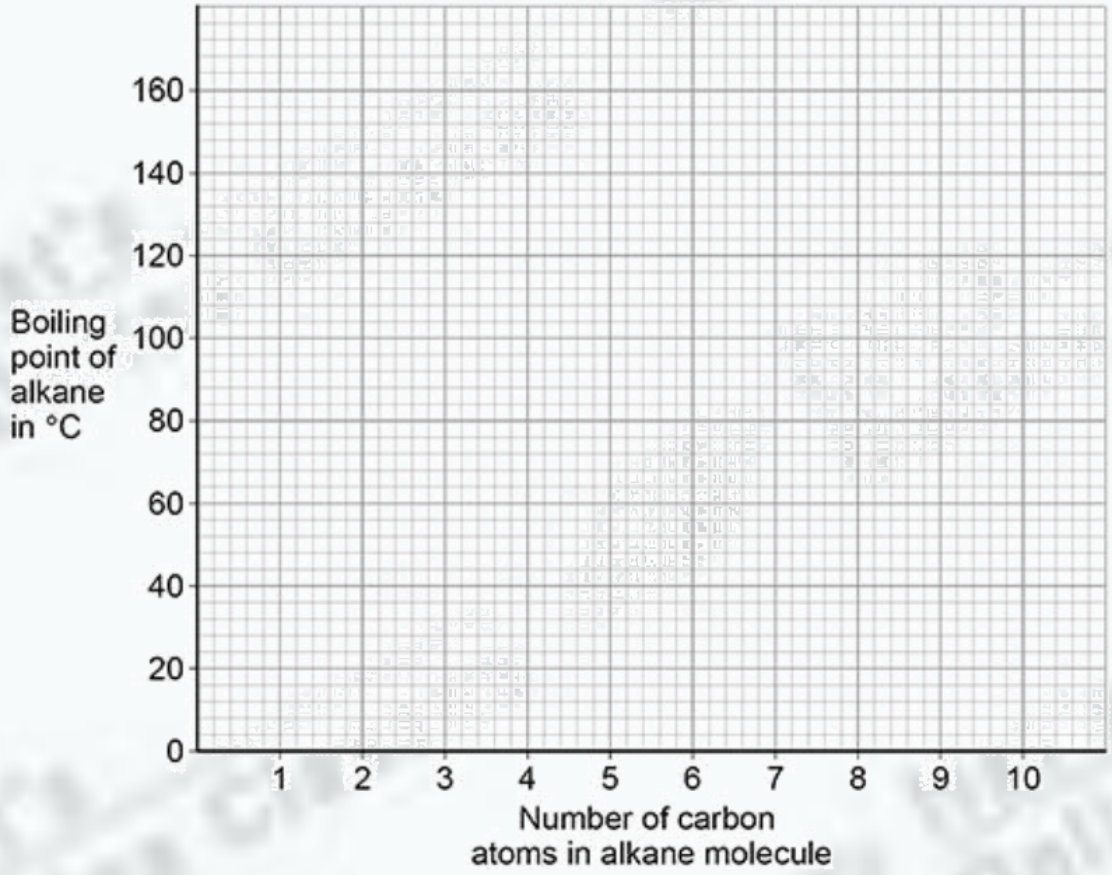
Q1.

This question is about alkanes.

The table below shows information about some alkanes.

Number of carbon atoms in alkane molecule	Boiling point of alkane in °C
4	0
5	36
6	69
7	**X**
8	126
9	151

(a) Plot the data from the table above on the graph below.



(2)

(b) Predict the boiling point **X** of the alkane with seven carbon atoms in a molecule.

Use the table and the graph.

X = _____ °C

(1)

(c) The graph above is **not** suitable to show the boiling point of the alkane with three carbon atoms in a molecule.

Suggest **one** reason why.

_____

_____

(1)

(d) What is the state at 20 °C of the alkane with four carbon atoms in a molecule?

Use the table above.

_____

(1)

The table in part (a) is repeated below.

Number of carbon atoms in alkane molecule	Boiling point of alkane in °C
4	0
5	36
6	69
7	**X**
8	126
9	151

The alkane with nine carbon atoms in a molecule is called nonane.

(e) Complete the formula of nonane.

C_9H___

(1)

(f) Nonane will condense lower in a fractionating column during fractional distillation than the other alkanes in the table above.

Explain why.

You should refer to the temperature gradient in the fractionating column.

_____

_____

(2)

Q2.

This question is about hydrocarbons.

Hexane and hexene are hydrocarbons containing six carbon atoms in each molecule.

Hexane is an alkane and hexene is an alkene.

(a) Draw **one** line from each hydrocarbon to the formula of that hydrocarbon.

Hydrocarbon	Formula
	C_6H_8
Hexane	C_6H_{10}
	C_6H_{12}
Hexene	C_6H_{14}
	C_6H_{16}

(2)

(b) Bromine water is added to hexane and to hexene.

What would be observed when bromine water is added to hexane and to hexene?

Hexane _____

_____

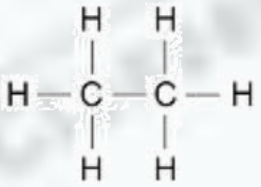
Hexene _____

_____

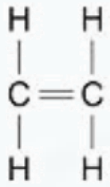
(2)

(c) Ethane is an alkane and ethene is an alkene.

The diagram below shows the displayed structural formulae of ethane and of ethene.



Ethane



Ethene

Compare ethane with ethene.

Compare ethane with ethene.

You should refer to:

- their structure and bonding
- their reactions.

(6)