

# MARK SCHEME

# GCSE

## CHEMISTRY

## AQA - COMBINED SCIENCE

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C7 - TEST 6

ORGANIC CHEMISTRY

Advanced

## Mark schemes

1.

(a) (i)  $C_5H_{12}$

*ignore attempts at balancing*

1

(ii) (pentane has higher boiling point as) it condenses  
*accept ethene does not condense*

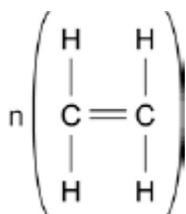
**or**

(as) it collects as a liquid

*accept pentane is a liquid **and** ethene is a gas*

1

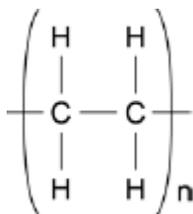
(b) (ethene)



(polyethene)

1

carbon-carbon single bond **and** 4 carbon-hydrogen single bonds



1

lines correctly drawn to outside of brackets

*do **not** allow additional atoms / elements added*

1

[5]

2.

(a) (i) (as number of carbon atoms increase)

*ignore figures*

*accept converse statement*

the boiling point increases

*do **not** allow the boiling point range increases*

1

(the fuels) ignite at higher temperatures

*accept flammability decreases*

*allow flash point increases*

*allow harder to catch fire*

1

(ii) diesel

*no marks awarded if incorrect fuel given*

1

as viscosity increases with increasing size of molecules

*allow has largest molecules / longest (hydrocarbon) chain*

*allow has most carbon atoms*

1

(b) (i)  $(2C_8H_{18}) + 25(O_2)$

*accept correct multiples when applied throughout the equation*

1

$16(CO_2) + 18(H_2O)$

*if no other marks obtained*

*allow for 1 mark either  $16CO_2$  or  $18H_2O$*

1

(ii) (because octane) contains only hydrogen and carbon atoms

*do not allow a mixture*

1

(and) formula fits the general formula for alkanes /  $C_nH_{2n+2}$

*ignore references to bonding and saturation*

1

[8]

3.

(a) (i) 344 – 350(°C)

1

(ii) 216(°C)

1

(iii) the vapours / gases cool as they rise up the fractionating column

1

which causes the vapours / gases to condense

1

at different temperatures or into fractions that have different boiling points

1

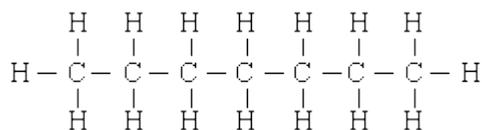
- (b) (i)  $10 \longrightarrow 6 + 8$  1
- $7 \longrightarrow 6 + 8$  1
- (ii) first reaction is complete combustion  
*accept first reaction has excess/enough oxygen* 1
- second reaction is incomplete combustion  
*accept second reaction has limited oxygen* 1

[9]

4.

- (a) hydrogen and carbon  
*for 1 mark* 1
- (b) (i) the oil is evaporated / boiled / liquid converted to gas / vaporised  
 oil is condensed/changed back to liquid/cooled below boiling point (not just cooled)  
 liquids of different boiling points condense at different levels /  
 fractions with lower boiling points form near the top /  
 boiling point linked to chain length or Mr  
*each for 1 mark* 3
- (ii) Assume they mean naphtha unless they say otherwise.  
 smaller molecules  
 /contains less atoms  
 /lower boiling point  
 /more volatile  
 /less bonds to break  
 /lower activation energy  
 If the answer is given the opposite way around then diesel must  
 be specified.  
*any one for 1 mark* 1

(iii)



correct number of atoms = 1

correct number of bonds (attached to correct atoms) = 1

Accept diagrams which show electrons correctly.

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 = 1$

*for 2 marks*

2

[7]

5.

(a) (i) demand (for petrol) is greater than supply  
*ignore reference to figures unless qualified*

1

(ii) kerosene

1

(iii) supply (of kerosene) is greater than demand

1

contains larger molecules (which can be split into smaller molecules)

1

(b) heat to vaporise (hydrocarbons)

1

(then pass the vapours over a) hot catalyst

*allow zeolites / aluminium oxide for catalyst*

*accept as an alternative approach:*

*mix (the vapours) with steam (1 mark)*

*(then) heat to a (very) high temperature. (1 mark)*

1

[6]