

MARK SCHEME

GCSE

CHEMISTRY

AQA - COMBINED SCIENCE

C7 - TEST 2

ORGANIC CHEMISTRY

Beginner

Mark schemes

- 1.** (a) (i) fractional distillation
both words required
accept fractionation 1
- (ii) any **one** from
ethane
propane
butane 1
- (b) (i) carbon dioxide 1
water (vapour)
accept steam
do not credit symbols 1
- (ii) carbon monoxide
accept CO
*do not credit soot **or** carbon oxide* 1
- [5]**
- 2.** (a) hydrogen
ignore H 1
carbon
ignore C 1
in either order
- (b) plankton 1
- (c) fractional distillation 1
- (d) to vaporise the hydrocarbons / (crude) oil
allow to evaporate the hydrocarbons / (crude) oil
ignore to boil the hydrocarbons / (crude) oil 1
- (e) fuel oil 1

- (f) lowest boiling point bar correctly plotted (260 °C) 1
- highest boiling point bar correctly plotted (340 °C) 1
- correct label added to axis: diesel (oil) 1
- allow ± ½ a square*

[9]

3.

- (a) 2.38
if answer incorrect, allow 1 mark for 2.37 to full calculator display
or
for $(4.82 + 2.16 + 0.15) / 3$ 2
- (b) different types of biomass / plankton
allow they are mixtures 1
- (c) a molecule 1
- (d) alkanes 1
- (e) **B** 1
- (f) **B** 1
- (g) any **two** from:
 - cracking uses a catalyst, fractional distillation doesn't
 - cracking breaks up molecules, fractional distillation separates them
 - cracking is a chemical process, fractional distillation is a physical process 2
- (h) poly(ethene) 1
- (i) (**A=**) reuse 1
- (**B=**) recycle 1

[12]

4.	<p>(a) any two from:</p> <ul style="list-style-type: none"> • high demand for petrol (compared to petrol supply) • insufficient supply of petrol • surplus kerosene <p style="padding-left: 40px;"><i>allow less demand for kerosene (compared to supply)</i></p> <ul style="list-style-type: none"> • greater demand for petrol than kerosene <p style="padding-left: 40px;"><i>allow petrol is used more (than kerosene)</i></p> <ul style="list-style-type: none"> • (hydrocarbon) molecules in kerosene are bigger (so can be cracked / made smaller). <p style="padding-left: 40px;"><i>allow for 2 marks: more demand for petrol than supply</i></p> <p style="padding-left: 40px;">or</p> <p style="padding-left: 40px;"><i>kerosene more supply than demand</i></p>	2
	<p>(b) cracking</p> <p style="padding-left: 40px;"><i>answers must be in this order</i></p> <p style="padding-left: 40px;">catalyst</p>	1 1
		[4]
5.	<p>(a) (i) distillation</p> <p style="padding-left: 40px;"><i>accept they / fractions / hydrocarbons have different boiling points</i></p> <p style="padding-left: 40px;"><i>ignore melting point / size of molecule</i></p> <p>(b) contains hydrocarbons</p> <p style="padding-left: 40px;">has a high boiling point</p> <p>(c) C₅H₁₂</p>	1 1 1 1
		[5]
6.	<p>(a) substances/chemicals/compounds</p> <p style="padding-left: 40px;"><i>gains 1 mark</i></p> <p style="padding-left: 40px;"><i>but gases (accept vapours)</i></p> <p style="padding-left: 40px;"><i>gains 2 marks</i></p> <p style="padding-left: 40px;">heat (accept light)</p> <p style="padding-left: 40px;"><i>for 1 mark</i></p>	3

- (b) carbon dioxide/ CO_2
 water (vapour)/ H_2O
 sulphur dioxide/ SO_2
 (accept correct formulae)

in any order for 1 mark each

3

[6]

7.

- (a) Flask

1

- (b) Fractional distillation

1

- (c) **A** – boiling

in this order

1

B – condensing

1

- (d) Octane

1

- (e) Formulation

1

- (f) the fuel is a pure compound

1

and crude oil is a mixture

or

the fuel is made up of four hydrocarbons

allow crude oil contains a large number of compounds and the fuel contains four

and crude oil could have many more

1

- (g) $(35 + 37 + 37 / 3) = 36.33$

1

36

1

allow $(35 + 48 + 37 + 37 / 4 =) 39(.25)$ for 1 mark

[10]

8.

- (a) oxygen

must be name

*do **not** accept oxide or dioxide*

1

- (b) (i) 2 x C–C
and
5 x C–H
all single (line) bonds 1
- (ii) C₃ H₈
must be formula
*do **not** accept lower case h* 1
- (iii) water 1
- (c) ethane and butane boil at temperatures less than 20°C 1
- ethene and hexene each have a carbon-carbon double bond 1

[6]

9.

- (a) (i) cracking 1
- (ii) (pentane) condenses
accept (pentane) liquefies / becomes liquid 1
- (iii) heptane
must be in correct order
*do **not** accept heptene* 1
- broken pot 1
- (b) (bromine water) turns from orange
allow brown 1
- to colourless
accept is decolourised ignore clear 1
- (c) poly(ethene)
ignore plastic
allow polyethene
accept polythene
*do **not** allow poly(ethane) or polyethane* 1

[7]

10.

- (a) (i) wood 1
- (ii) 30 (kJ) 1
- (iii) carbon / C
or hydrogen / H
or sulfur / S
or oxygen / O 1
- (iv) 3 / three (g) 1
- (b) (i) releases most energy
accept releases a lot of energy / burns rapidly
ignore references to cost 1
- no harmful gases / no or less pollution formed / no global warming /
no climate change / no greenhouse gas
accept produces water (only) / steam
*accept does **not** produce sulfur dioxide / carbon dioxide / carbon
monoxide / particles / smoke* 1
- (ii) any **one** from:
- expensive
 - difficult to produce
accept large volume needed
 - not available in large quantities
 - explosive / dangerous
 - not a natural fuel / resource
allow will run out / non-renewable
 - made from fossil fuels
 - difficult to store
- 1

[7]