

Carbon Compounds as Fuels + Feedstock

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.7 Organic Chemistry
Sub-Topic	Carbon Compounds as Fuels + Feedstock
Difficulty Level	Bronze Level
Booklet	Mark Scheme 1

Time Allowed: 58 minutes

Score: /57

Percentage: /100

Grade Boundaries:

M1.(a)	Flask	1
(b)	Fractional distillation	1
(c)	A – boiling <i>in this order</i>	1
	B – condensing	1
(d)	Pentane	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 <i>allow crude oil contains a large number of compounds and the fuel contains four</i> 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]

M2.(a) Colourless liquid / condensation / water

1

(b) incomplete combustion of the fuel

1

because not enough oxygen

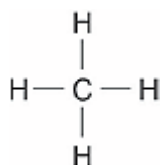
1

(c) Sulfur dioxide

1

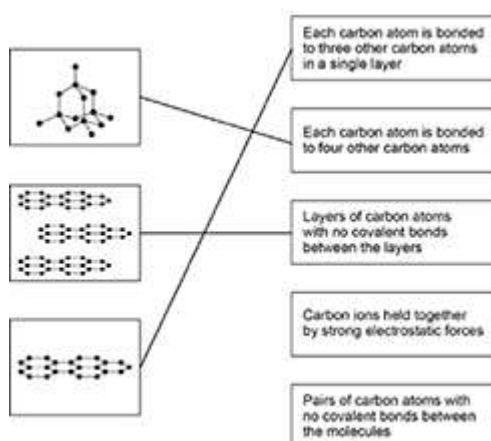
[4]

M3.(a)



1

(b) **Form of carbon** **Bonding and structure**



extra lines from the left negate the mark

3

(c) evaporate

1

condense

1

(d) Engine oil

1

(e) Refinery gas

1

(f) because its boiling point is lower

1

[9]

M4.(a) (i) (conical) flask

1

(ii) measuring cylinder / pipette / burette

1

- (b) (i) any **two** from:
- so anomalous results could be identified / ignored
 - so a mean / average could be taken
 - (to improve) accuracy
- 2
- (ii) 19
- 1
- (iii) increases / gets longer / gets bigger
- 1
- (iv) anomalous / does not agree with other times for C₁₀H₂₂
- 1
- (v) any **one** from:
- shorter hydrocarbon used
 - volume of hydrocarbon too small
 - started timing late
 - stopped timing too early / when liquid left in funnel
- must suggest why the result is **lower** than the others.*
- allow the temperature was higher **or** the students used a wider funnel.*
- 1
- (c) (i) flammable
- 1
- (ii) suitable safety precaution
- 1
- reason that links the safety precaution to the hazard symbols
- eg:
- wear gloves
 - (because) it is hazardous to health / harmful / toxic / irritant
- or**
- do not pour down sink **or** dispose of properly
 - (because) it is harmful to the environment / kills fish
- or**
- wear a mask or do it in the fume cupboard or a well-ventilated area
 - respiratory irritant
- 1
- (d) (i) points plotted correctly (within half small square)
- all six points correct scores **2***
- 3, 4 or 5 points correct scores **1***
- 2

smooth curve of best fit

1

(ii) point at 46 °C circled

allow point furthest from the line as drawn

1

(iii) working shown on graph

1

value read from graph line drawn (within half small square)

1

(iv) the higher the temperature the lower the viscosity

allow the higher the temperature the lower / shorter the time taken for 1 mark

2

non-linear **or** change gets smaller as temperature gets higher

answer relating temperature to time taken can score a maximum of 2 marks.

1

(v) identifying source of the error

1

method of avoiding the error

eg:

- *the temperature will drop*
- *insulate the funnel*

or

- *runs out before all added*
- *put a tap on the funnel*

1

[22]

M5.(a) (i) mixture (of different substances)

1

(ii) boiling (points)

1

(iii) distillation

1

(b) (i) combustion

1

(ii) (reactant)

	oxygen		
	<i>allow correct formulae</i>		1
	(products)		
	<i>products in any order</i>		
	carbon dioxide		
	<i>allow carbon or carbon monoxide</i>		
	and		
	water		
	<i>allow water vapour or steam or hydrogen oxide</i>		1
(iii)	(burning sulfur) produces sulfur dioxide / SO_2		
	<i>allow it / sulfur reacts with oxygen ignore sulfur oxide</i>		1
	causes acid rain		1
(c)	(i) propane is a fuel		1
	(ii) double bond drawn between carbon atoms		
	<i>do not allow any other bonds or symbols</i>		1
	(iii) orange to colourless		1
	(iv) poly(pentene)		
	<i>allow polymer(s)</i>		1
			[12]