How Bond + Structure Relate to Props

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.2 Bonding Structure + Props Matter
Sub-Topic	How Bond + Structure Relate to Props
Difficulty Level	Bronze Level
Booklet	Mark Scheme 1

Time Allowed: **60 minutes**

Score: **/57**

Percentage: **/100**

Grade Boundaries:

M1.(a) LiOH (aq)

this order

1

H_2 (g)

1

(b) **C**

1

(c) **A** and **D**

1

(d) point x at −10 °C

1

point ● at +150 °C

1

(e) substance **B** will not reach its boiling point of 190 °C

1

because the boiling point of water is only 100 °C

1

(f) there is too much substance **B** to melt instantly.

allow answers based on thermal conductivity or temperature gradient from the wall of the test tube to the thermometer

1

[9]

M2.(a) Flask

1

(b) Fractional distillation

1

(c) **A** – boiling

in this order

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

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]

M3.(a) Carbon and hydrogen only

1

(b) Methane has the lowest boiling point and decane has the highest melting point

1

Octane is liquid over a larger temperature range than methane

1

(c) heat / steam

1

catalyst

1

(d) **Level 3 (5–6 marks):**
A detailed and coherent evaluation is provided that considers a range of relevant points, quotes relevant data from the table and comes to a conclusion consistent with the reasoning.

Level 2 (3–4 marks):
An attempt to describe relevant points which comes to a conclusion. The logic and use
of data may be inconsistent at times but builds towards a coherent argument.

Level 1 (1–2 marks):
Discrete, relevant points made. The logic may be unclear and the conclusion, if present, may not be consistent with the reasoning.

0 marks:
No relevant content.

Indicative content

- conclusion as to which bag is more environmentally friendly

Points that may be used in argument

- Paper bags are made from a renewable resource (wood)
- Paper bags more sustainable
- Paper bags are biodegradable
- Plastic bags are made from a finite resource (oil or gas)
- Plastic bags not sustainable
- Paper bags require more energy to manufacture (1.7 MJ compared with 1.5 MJ)
- Paper bags produce more waste (50 g compared with 14 g)
- Paper bags create less CO_2 than plastic bags
- So manufacture of plastic bags has more effect on global warming / climate change / environmental effects
- Plastic bags can be recycled
- Recycling reduces use of energy sources in manufacture
- justified

6

[11]

M4.(a) (i) C

1

(ii) B

1

(iii) A

1

(iv) D

1

(b) (i) SO_2

1

(ii) shared

1

(iii) covalent

1

[7]

M5.(a) any **one** from:

- protection / improve lifespan
- improve appearance.

1

(b) (i) Bleach

1

(ii) Hydrogen is less reactive than sodium

1

(iii) 1 bonding pair of electrons 6 unbonded electrons on Cl

accept dot, cross or e or − or any combination

1

(iv) Covalent

1

(v) Hydrogen chloride has a low boiling point.

1

Hydrogen chloride is made of simple molecules.

1

(c) (i) oxygen

accept carbon dioxide

1

(ii) aluminium ions are positive

1

so are attracted (to the negative electrode)

allow opposites attract

1

(iii) Reduction

1

(iv) slide

allow move

1

(d) (i) C

1

(ii) strong covalent bonds

1

[14]

M6. (a) (i) C

1

(ii) C **or** D

1

(iii) A

1

(b) covalent

1

(c) layers

1

can slide / move over each other

accept are weakly bonded (owtte)
allow no bonds between layers
ignore slip / rub

1

[6]