

Structure + Bonding Carbon

Mark Scheme 1

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

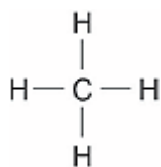
Time Allowed: 57 minutes

Score: /56

Percentage: /100

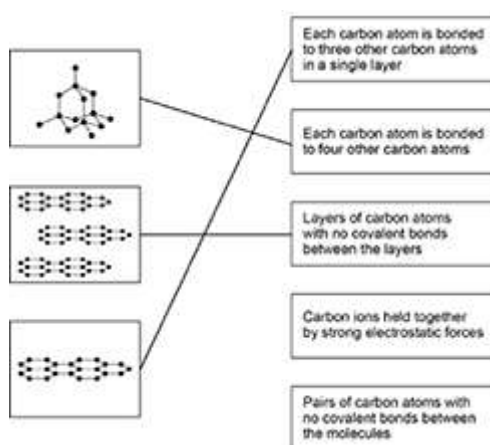
Grade Boundaries:

M1.(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]

M2.(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 CO₂ 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]

M3.(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)	
	<i>allow opposites attract</i>	1
(iii)	Reduction	1
(iv)	slide	
	<i>allow move</i>	1
(d)	(i) C	1
	(ii) strong covalent bonds	1
		[14]

M4.(a) layers

which have weak forces / attractions / bonds between them
second mark must be linked to layers

1

or

which can slide over each other **or** separate
ignore references to rubbing

1

(b)	covalent	1
		[3]

M5. (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]

M6. (a) carbon 1

(b) layers 1

have weak forces / attractions / bonds between them **or** are only held together weakly
second mark must be linked to layers

or

can slide over each other **or** separate (1)

1

(c) covalent

1

[4]

M7. (a) carbon

1

(b) all

1

(c) covalent

1

(d) four

1

(e) hard

1

[5]

M8. (a) reduce wear of metal ie don't get damaged
or other sensible answer

or

stop / reduce friction

accept stop metal heating up

accept move more smoothly

ignore make it slippery / rub more smoothly

or

prevent seizing

accept can move freely

1

(b) (i) carbon

1

(ii) layers (of atoms)

1

can slide / slip over each other

allow slip off

or

weak forces of attraction / weak bonds (between layers)

allow no bonds

accept there are weak forces of attraction for

1 mark even when there is no reference to layers

accept atoms slide over each other (for 1 mark)

*an answer which **only** states there are weak bonds would
gain 0 mark when there is no reference to layers*

weak covalent bonds = 0 marks

1

[4]