

M1. (a)

Particle	Relative charge	Relative mass	
Proton	+1 or 1+	1	(1)
Neutron	0 or no charge/neutral/zero	1 (<u>not</u> – 1)	(1)
Electron	–1 or 1–	1/1800 to 1/2000	(1)

or negligible

or zero

or 5.0×10^{-4} to 5.6×10^{-4}

*if 'g' in mass column - wrong
penalise once*

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(b) ${}_{18}^{38}\text{Ar}$ **(1)(1)**

Allow numbers before or after Ar

2

(c) S: $1s^2 2s^2 2p^6 3s^2 3p^4$ **(1)**

Allow upper case letters

S^{2-} : $1s^2 2s^2 2p^6 3s^2 3p^6$ **(1)**

If use subscript penalise once

2

(d) *Block:* p **(1)**

Explanation: Highest energy or outer orbital is (3) p

OR outer electron, valency electron in (3) p

NOT 2p etc.

2

(e) (i) *Bonding in Na₂S:* ionic **(1)**

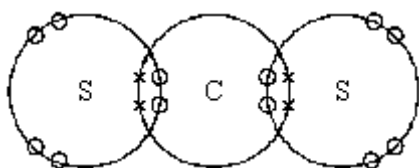
Bonding in CS₂: covalent **(1)**

ignore other words such as dative / polar / co-ordinate

- (ii) Clear indication of electron transfer from Na to S (1)
 1 e⁻ from each (of 2) Na atoms or 2 e⁻ from 2 Na atoms (1)

QoL correct English

(iii)



Correct covalent bonds (1)
 All correct including lone pairs (1)

Allow all •s or all ×s

M2 tied to M1

NOT separate e⁻s in S^{••} - 2 l p

- (iv) $\text{CS}_2 + 2\text{H}_2\text{O} \rightarrow \text{CO}_2 + 2\text{H}_2\text{S}$ (1)

Ignore state symbols even if wrong

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- M2.** (a) Elements in the p block have their outer electron(s) in p orbital(s) or levels or sub-shells (1)
 example of element (1)
 correct electronic configuration (1)

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- (b) Pattern in the change in the properties of a row of elements (1)
OR Trend in the properties of elements across a period

Repeated in the next row (1)

OR element underneath (or in same group) has similar properties

atomic radius

decreases across the row (1)

CE if trend is wrong

number of protons increases (1) (or nuclear charge increases)
more attraction for electrons in the same shell (1)

electronegativity

increases across the row (1)

number of protons increases (1) (or nuclear charge)

atomic radius decreases (1) (or shielding remains the same or electrons
in the same shell) more attraction for bonding or shared electrons (1)

conductivity

decreases row (1)

OR significant drop from Al to Si

Na–Al metals (1)

OR metallic bonding or description of metallic bonding

Two of Si - Ar non metals (1)

OR molecular or covalent

EITHER electrons free to move (or delocalised) in metals

OR electrons unable to move in non-metals (1)

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