

Name of the Student: _____

Max. Marks : 25 Marks

Time : 25 Minutes

Mark Schemes

Q1.

- (a) (i) $1s^2 2s^2 2p^6 3s^2 3p^1$ **(1)**

Allow subscripted electron numbers

- (ii) p (block) **(1)**

Allow upper or lower case 's' and 'p' in (a)(i) and (a)(ii)

2

- (b) Lattice of metal / +ve ions/ cations / atoms **(1)**

Not +ve nuclei/centres

Accept regular array/close packed/tightly packed/uniformly arranged

(Surrounded by) delocalised electrons **(1)**

Note: Description as a 'giant ionic lattice' = CE

2

- (c) Greater nuclear or ionic charge or more protons **(1)**

Smaller atoms / ions **(1)**

Accept greater charge density for either M1 or M2

More delocalised electrons / e^- in sea of e^- / free e^- **(1)**

Stronger attraction between ions and delocalised / free electrons etc. **(1)**

Max 3

Note: 'intermolecular attraction/ forces' or covalent molecules = CE

Accept stronger 'electrostatic attraction' if phrase prescribed elsewhere

Ignore references to m/z values

*If Mg or Na compared to Al, rather than to each other, then: **Max 2***

Treat description that is effectively one for Ionisation Energy as a 'contradiction'

3

- (d) (Delocalised) electrons **(1)**

Move / flow in a given direction (idea of moving non-randomly)

or under the influence applied pd QoL mark **(1)**

Allow 'flow through metal'

Not: 'Carry the charge'; 'along the layers'; 'move through the metal'

2

[9]

Q2.

(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*

3

(b) $^{38}_{18}\text{Ar}$ **(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 Na_2S : ionic **(1)**

Bonding in CS_2 : covalent **(1)**

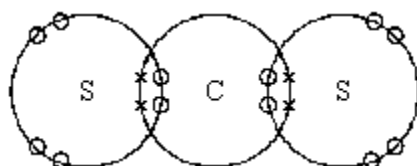
ignore other words such as dative / polar / co-ordinate

(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 x's

M2 tied to M1

NOT separate e^- s in $S^{\bullet-}$ 2 l p

