

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.

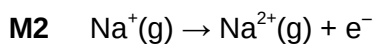
- (a) Cross at 1580

Allow a cross drawn for Si that is between the values for Mg and Al

1

- (b) **M1** Na

1



M2 *Allow* $\text{Q}^+(\text{g}) \rightarrow \text{Q}^{2+}(\text{g}) + \text{e}^-$

State symbols essential

Allow correct equation consequential on their element

1

- (c) The number of protons increases OR nuclear charge increases

1

Shielding is similar/same OR electrons are added to the same shell

Allow same number of shells

1

- (d) Chlorine/Cl

1

- (e) $4\text{P} + 5\text{O}_2 \rightarrow \text{P}_4\text{O}_{10}$ OR $\text{P}_4 + 5\text{O}_2 \rightarrow \text{P}_4\text{O}_{10}$

Allow multiples

Ignore state symbols

Do not allow equations with P_2O_5

1

[7]

Q2.

- (a) Fluoride ion has (two) fewer protons/lower nuclear charge
Do not allow fluorine, but allow fluorine ion.
Any reference to different numbers of electrons in the ions loses M1

1

Weaker attraction between nucleus and (outer) electrons
Allow answers in terms of sodium ion but must be explicit.
Ignore references to atomic radius

1

- (b) (Electrostatic) forces of attraction between oppositely charged ions/ Na^+ and F^-
Mention of IMF, covalent, macromolecular, metallic, electronegativity of ions loses both marks

1

Lots of energy needed to overcome/break forces
Allow strong ionic bonding
Allow strong forces/bonds of attraction (need to be broken)

1

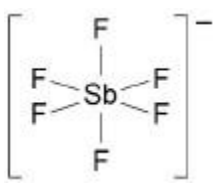
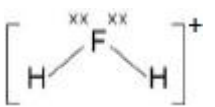
- (c) Type of Bond: Coordinate bond / dative (covalent) bond
If just covalent, then do not award M1 but mark on

1

Explanation: A (lone) pair of electrons is donated from F
Allow both electrons (in the shared pair) come from F

1

(d)

Shape		
Name of shape	Octahedral	Bent / V-shaped / angular

Lone pairs on H_2F^+ are essential (can be shown in lobes)
Ignore missing charges
Mark independently

4

- (e) $\Delta H = \Sigma \Delta H(\text{Bonds broken}) - \Sigma \Delta H(\text{Bonds Formed})$
Allow M1 if 2785 and 1996 seen (or allow M1 if 1961 and 1172 seen)

$$-179 = 2(412) + 837 + 2(562) - [348 + 4(412) + 2(\text{C}-\text{F})]$$

1

$$-179 = 2785 - (1996 + 2(\text{C}-\text{F}))$$

$$2(C-F) = 968$$

*M3 consequential on any M2 if it is clear that M2 is for
2(C-F)*

1

$$C-F = 484$$

-484 scores 2

1

[13]