Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Inorganic 2

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Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) The number of protons increases (across the period) / nuclear charge increases

1

Therefore, the attraction between the nucleus and electrons increases

Can only score M2 if M1 is correct

1

(b) S_8 molecules are bigger than P_4 molecules

Allow sulfur molecules have bigger surface area and sulfur molecules have bigger M_r

1

Therefore, van der Waals / dispersion / London forces between molecules are stronger in sulfur

1

(c) Sodium oxide contains O^{2-} ions

1

These O^{2-} ions react with water forming OH^- ions

$O^{2-} + H_2O \longrightarrow 2OH^-$ scores M1 and M2

1

(d) $P_4O_{10} + 12OH^- \longrightarrow 4PO_4^{3-} + 6H_2O$

1

[7]

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Q2.

(a) (i) <u>Covalent</u>

Ignore simple / molecular

Do not allow macromolecular/giant covalent/dative/dipole-dipole/Hydrogen bonds

Ignore VdW

1

(ii) P / phosphorus / P_4

1

(iii) $P_4O_{10} + 6H_2O \longrightarrow 4H_3PO_4$

*Mark independently of **(a)(ii)***

Accept multiples/fractions

Ignore state symbols

Allow ions on the RHS ($\longrightarrow 12H^+ + 4PO_4^{3-}$)

Allow correct equations from P_4O_6, P_2O_3 and P_2O_5

$P_4O_6 + 6H_2O \longrightarrow 4H_3PO_3$

$P_2O_3 + 3H_2O \longrightarrow 2H_3PO_3$

$P_2O_5 + 3H_2O \longrightarrow 2H_3PO_4$

1

(b) (i) <u>Ionic</u>

Ignore giant / lattice

1

(ii) Na / Sodium

1

(iii) $2Na + 2H_2O \longrightarrow 2Na^+ + 2OH^- + H_2$

Allow equation to form 2NaOH

Accept multiples/fractions

Ignore state symbols

1

(iv) $Na_2O + 2HCl \longrightarrow 2NaCl + H_2O$

Accept multiples/fractions

Ignore state symbols

Allow ions, but do not allow H+ only for the acid

1

(c) (i) <u>Ionic</u>

Allow ionic and covalent / ionic with covalent character

1

(ii) Al_2O_3

Ignore state symbols

1

(iii) Reacts with acids and bases

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Allow reacts with acids and alkalis / acts as both an acid and a base / shows acidic and basic properties

1

(iv) $Al_2O_3 + 6HCl \longrightarrow 2Al^{3+} + 6Cl^- + 3H_2O$

$Al_2O_3 + 6H^+ \longrightarrow 2Al^{3+} + 3H_2O$

Allow equation to form $2AlCl_3$ (but not Al_2Cl_6)

Allow equations with other acids

1

$Al_2O_3 + 2NaOH + 3H_2O \longrightarrow 2Na^+ + 2[Al(OH)_4]^-$

$Al_2O_3 + 2OH^- + 3H_2O \longrightarrow 2[Al(OH)_4]^-$

$Al_2O_3 + 2NaOH + 7H_2O \longrightarrow 2Na^+ + 2[Al(OH)_4\ (H_2O)_2]^-$

$Al_2O_3 + 2OH^- + 7H_2O \longrightarrow 2[Al(OH)_4\ (H_2O)_2]^-$

Allow equations to form $2Na[Al(OH)_4]$ or $2Na[Al(OH)_4(H_2O)_2]$

Allow equations with other alkalis

Allow correct equations which form $[Al(OH)_6]^{3-}$

Allow equations to form $[Al(OH)_x(H_2O)_{6-x}]^{3-x}$ etc

Ignore state symbols

1

[12]

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