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

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Name of the Student:_____
Max. Marks : 27 Marks **Time : 27 Minutes**

Mark Schemes

Q1.

(a) White powder / solid / ash / smoke
Ignore ppt / fumes
1

Bright / white light / flame
Allow glows white / glows bright
1

$Mg + H_2O \rightarrow MgO + H_2$
Ignore state symbols
Ignore reference to effervescence or gas produced
1

(b) Mg^{2+} / magnesium ion has higher charge than Na^+
Allow Mg^{2+} ions smaller / greater charge density than Na^+ ions
Allow Mg atoms smaller than Na (atoms)
Allow magnesium has more delocalised electrons
Must be a comparison
Ignore reference to nuclear charge
1

Attracts delocalised / free / sea of electrons more strongly / metal–metal bonding stronger / metallic bonding stronger
Wrong type of bonding (vdW, imf), mention of molecules CE = 0
1

(c) **Structure:** Macromolecular / giant molecule / giant covalent
Mark independently
1

Bonding: Covalent / giant covalent
1

Physical Properties:

Any **two** from: Hard/
Brittle / not malleable
Insoluble
Non conductor
Ignore correct chemical properties
Ignore strong, high boiling point, rigid
2

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(d) **Formula:** P_4O_{10}

Mention of ionic or metallic, can score M1 only

1

Structure: Molecular

If macromolecular, can score M1 & M3 only

1

Bonding: Covalent / shared electron pair

1

van der Waals' / dipole–dipole forces between molecules

Allow vdW, imf and dipole–dipole imf but do not allow imf alone

1

(e) $SO_2 + H_2O \rightarrow H^+ + HSO_3^-$

Products must be ions

Allow $SO_2 + H_2O \rightarrow 2H^+ + SO_3^{2-}$

Allow two equations showing intermediate formation of H_2SO_3 *that ends up as ions*

Ignore state symbols

Allow multiples

1

(f) $P_4O_{10} + 6MgO \rightarrow 2Mg_3(PO_4)_2$

OR $P_4O_{10} + 6MgO \rightarrow 6Mg^{2+} + {}_4PO_4^{3-}$

OR $P_2O_5 + 3MgO \rightarrow Mg_3(PO_4)_2$ etc

Ignore state symbols

Allow multiples

1

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Q2.

(a) MgO is ionic

If not ionic, CE = 0

1

Melt it

If solution mentioned, cannot score M2 or M3

1

(Molten oxide) conducts electricity

Allow acts as an electrolyte.

Cannot score M3 unless M2 is correct.

1

(b) Macromolecular

CE = 0 if ionic, metallic or molecular.

Allow giant molecule.

1

Covalent bonding

Giant covalent scores M1 and M2

1

Water cannot (supply enough energy to) break the covalent bonds / lattice

Hydration enthalpy < bond enthalpy.

1

(c) (Phosphorus pentoxide's melting point is) lower

If M1 is incorrect, can only score M2

1

Molecular with covalent bonding

M2 can be awarded if molecular mentioned in M3

1

Weak / easily broken / not much energy to break intermolecular forces
OR weak vdW / dipole-dipole forces of attraction between molecules

Intermolecular / IMF means same as between molecules.

1

(d) Reagent (water or acid)

Can be awarded in the equation.

1

Equation eg $MgO + 2HCl \rightarrow MgCl_2 + H_2O$

$MgO + H_2O \rightarrow Mg(OH)_2$

Equations can be ionic but must show all of the reagent eg $H^+ + Cl^-$

Simplified ionic equation without full reagent can score M2 only.

Allow $6MgO + P_4O_{10} \rightarrow 2Mg_3(PO_4)_2$

1

(e) $P_4O_{10} + 12NaOH \rightarrow 4Na_3PO_4 + 6H_2O$

Allow P_2O_5 and acid salts.

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Must be NaOH not just hydroxide ions.

1

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