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

Mark Schemes

Q1.

(a) Na_2O is an ionic <u>lattice</u> / giant ionic / ionic crystal
CE= 0 if molecules, atoms, metallic mentioned
Mention of electronegativity max 1 out of 2
1

With strong forces of attraction between ions
Allow strong ionic bonds / lots of energy to separate ions
1

(b) SO_3 is a larger molecule than SO_2
Allow greater M_r / surface area
1

So <u>van der Waals</u>' forces <u>between molecules</u> are stronger
Any mention of ions, CE= 0
1

(c) Ionic
Do not allow ionic with covalent character
1

Contains <u>O^{2-}</u> ions / oxide ions
Equations of the form $O^{2-} + H^+ \rightarrow OH^-$ / $O^{2-} + 2H^+ \rightarrow H_2O$ / $O^{2-} + H_2O \rightarrow 2OH^-$ score M2 and M3
1

These / O^{2-} ions (accept protons to) form OH^- / hydroxide / water (must score M2 to gain M3)
1

(d) (i) $SO_2 + H_2O \rightarrow H^+ + HSO_3^-$
Allow $2H^+ + SO_3^{2-}$ but no ions, no mark
Only score (d)(ii) if (d)(i) correct
1

(ii) Reaction is an equilibrium / reversible reaction displaced mainly to the left / partially ionised / dissociated
Allow reaction does not go to completion
1

(e) SiO_2 reacts with bases / NaOH / CaO / $CaCO_3$
Ignore incorrect formulae for silicate
1

[10]

Downloaded from www.merit-minds.com

Q2.

(a) To prevent it coming into contact/reacting with oxygen/air

Allow because it reacts with air/oxygen

And because with air/oxygen it forms an oxide. (Oxide, if identified, must be correct :- P_4O_{10}, P_2O_5, P_4O_6, P_2O_6)

1

(b) One molecule contains 4P and 10O/the molecular formula is P_4O_{10}

Allow exists as P_4O_{10}

Do not allow reference to combination of two P_2O_5 molecules

Ignore any reference to stability

1

(c) P_4O_{10} is a bigger molecule (than SO_3)/greater M_r/more electrons/ greater surface area

Penalise SO_2 for one mark (max 1)

CE = 0 if mention of hydrogen bonding/ionic/ giant molecule/breaking of covalent bonds

1

Van der Waals / vdW forces between molecules are stronger/require more energy to break

Do not allow just more vdW forces

Ignore any reference to dipole-dipole forces

1

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

Allow correct ionic equations

Ignore state symbols

1

pH must be in the range –1 to +2

Allow –1 to +2

Mark independently

1

(e) (i) $3MgO + 2H_3PO_4 \rightarrow Mg_3(PO_4)_2 + 3H_2O$
OR $MgO + 2H_3PO_4 \rightarrow Mg(H_2PO_4)_2 + H_2O$
OR $MgO + H_3PO_4 \rightarrow MgHPO_4 + H_2O$

Allow $MgO + 2H^+ \rightarrow Mg^{2+} + H_2O$

Allow magnesium phosphates shown as ions and ionic equations

Ignore state symbols

1

(ii) MgO is sparingly soluble/insoluble/weakly alkaline

Excess/unreacted MgO can be filtered off/separated

1

(iii) An excess of NaOH would make the lake alkaline/toxic/kill wildlife

Allow pH increases

1

[9]

Downloaded from www.merit-minds.com