

Name of the Student: _____

Max. Marks : 15 Marks

Time : 15 Minutes

Mark Schemes

Q1.

(a) (i) Deductions:

Ionic **(1)**

Ions not free to move in the solid state **(1)**

Ions free to move when molten or in aqueous solution **(1)**

Identity of **P**: Na₂O or sodium oxide **(1)**

N.B. If a formula given this must be correct

Equation: Na₂O + H₂O → 2 NaOH **(1)**

5

(ii) Deductions:

Covalent

Intermolecular forces are weak or van der Waals forces,
or dipole-dipole

N.B. Any answer including a reference to hydrogen bonding is incorrect

Identity of **Q**: SO₂ or sulphur dioxide **(1)**

Equation: SO₂ + H₂O → H₂ SO₃ **(1)**

NB Allow max one for SO₃

4

(b) (i) Amphoteric **(1)**

(ii) Equation with NaOH

Al(OH)₃ + NaOH → NaAl(OH)₄

OR Al(OH)₃(H₂O)₃ + OH⁻ → [Al(OH)₄(H₂O)₂]⁻ + H₂O

OR Al(OH)₃ + OH⁻ → [Al(OH)₄]⁻

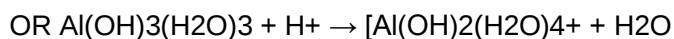
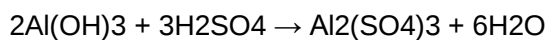
R identified as Al(OH)₃ or Al(OH)₃(H₂O)₃ **(1)**

A balanced equation **(1)**

N.B. Allow equation with six co-ordinate Aluminium and up to six OH– ligands

N.B. Allow equation mark if M(OH)3 given in a balanced equation

Equation with H2SO4



NB Allow equations with six co-ordinate Aluminium and up to six H2O

ligands NB Allow equation mark if M(OH)3 given in a balanced equation

Correct Al species as product **(1)**

A balanced equation **(1)**

(iii) Large lattice energy

or strong covalent bonds

or ΔH_{soln} is very positive

or ΔG is positive

or sum of hydration energies less than covalent bond energies **(1)**