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

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Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

(a) $1s^2\ 2s^2\ 2p^6$

Allow [He] $2s^2 2p^6$

1

(b) $Al_2(SO_4)_3 + 12\ H_2O \rightarrow 2\ [Al(H_2O)_6]^{3+} + 3\ SO_4^{2-}$

Allow $[Al(H_2O)_6]_2(SO_4)_3$

1

(c) **M1** Al^{3+} has a high charge **and** small size

OR

Al^{3+} has a high charge density

M2 Al^{3+} weakens the O-H bond (in water ligands and donates H^+ to water or forms H_3O^+ ions with water)

M2 *Al^{3+} attracts electrons from the O-H bond (in the ligand and releases H^+ or H_3O^+ ions)*

OR

Al^{3+} polarises the O-H bond/water molecule

2

(d) Colourless (solution)

Allow no d-d transitions (as there are no d electrons)

OR

Doesn't absorb visible light

1

(e) $[Al(H_2O)_6]^{3+} + 3\ NH_3 \rightarrow Al(H_2O)_3(OH)_3 + 3\ NH_4^+$

White ppt or white solid

*Do **not** accept effervescence*

*Do **not** accept white ppt dissolves in excess NH_3*

Ignore state symbols

2

(f) $[Al(H_2O)_6]^{3+}$

1

(g) A circle around one or more N

A circle around one or more O^-

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(h) M1 n ($EDTA^{4-}$) added = $\underline{5 \times 10^{-4}}$ mol

alternative methods will be allowed

M2 n (Zn^{2+}) = $\underline{1.89 \times 10^{-4}}$ mol

M3 n ($EDTA^{4-}$) reacted with the 25 cm^3 sample of Al^{3+} = $5 \times 10^{-4} - 1.89 \times 10^{-4} = 3.11 \times 10^{-4}$ mol

M3 = M1 − M2

M4 n $EDTA^{4-}$ reacted with the 250 cm^3 sample of Al^{3+} = 3.11×10^{-4} **x 10** = 3.11×10^{-3} mol

$$M4 = \frac{M3 \times 250}{25}$$

M5 n $Al_2(SO_4)_3\ xH_2O = 3.11 \times 10^{-3}$ **÷ 2** = 1.555×10^{-3} mol

M5 = M4 ÷ 2

M6 M_r $Al_2(SO_4)_3\ xH_2O = 1.036 \div 1.555 \times 10^{-3} = 666.2$

M6 = 1.036 ÷ M5

M7 342.3 + 18 *x* = 666(.2) so *x* = 18

$$M7 = \frac{M6 - 342.3}{18}$$ *and answer as integer*

7

[17]

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