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

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

Mark Schemes

Q1.

(a) (i) Ammonia

If reagent is missing or incorrect cannot score M3

1

Starts as a pink (solution)

1

Changes to a yellow/straw (solution)

Allow pale brown

Do not allow reference to a precipitate

1

(ii) (dark) brown

Do not allow pale/straw/yellow-brown (i.e. these and other shades except for dark brown)

1

(b) (i) Ruby/red-blue/purple/violet/green

Do not allow red or blue

If ppt mentioned contradiction/CE =0

1

Green

If ppt mentioned contradiction/CE =0

1

$[Cr(H_2O)_6]^{3+} + 6OH^- \rightarrow [Cr(OH)_6]^{3-} + 6H_2O$

1

Formula of product

Can score this mark in (b) (ii)

1

(ii) $H_2O_2 + 2e^- \rightarrow 2OH^-$

1

$2[Cr(OH)_6]^{3-} + 3H_2O_2 \rightarrow 2CrO_4^{2-} + 8H_2O + 2OH^-$

Allow 1 mark out of 2 for a balanced half-equation such as Cr(III) → Cr(VI) + 3e⁻

or $Cr^{3+} + 4H_2O \rightarrow CrO_4^{2-} + 8H^+ + 3e^-$ etc

also for $2Cr(III) + 3H_2O_2 \rightarrow 2CrO_4^{2-}$ (unbalanced)

2

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Yellow

Do not allow orange

1

(c) $2MnO_4^- + 6H^+ + 5H_2O_2 \rightarrow 2Mn^{2+} + 8H_2O + 5O_2$

if no equation and uses given ratio can score M2, M3, M4 & M5

1

Moles MnO_4^- = (24.35/1000) × 0.0187 = $\underline{4.55 \times 10^{-4}}$

Note value must be quoted to at least 3 sig. figs.

M2 is for 4.55×10^{-4}

1

Moles H_2O_2 = $(4.55 \times 10^{-4}) \underline{\times 5/2} = 1.138 \times 10^{-3}$

M3 is for × 5/2 (or 7/3)

Mark consequential on molar ratio from candidate's equation

1

Moles H_2O_2 in 5 cm^3 original

M4 is for × 10

1

= $(1.138 \times 10^{-3}) \underline{\times 10} = 0.01138$

Original $[H_2O_2]$ = 0.01138 $\underline{\times (1000/5)}$ = 2.28 mol dm^{-3}

(allow 2.25-2.30)

M5 is for consequentially correct answer from (answer to mark 4) × (1000/5)

Note an answer of between 2.25 and 2.30 is worth 4 marks)

If candidate uses given ratio 3/7 max 4 marks:

***M1**: Moles of MnO_4^- = $\underline{4.55 \times 10^{-4}}$*

***M2**: Moles $H_2O_2 = (4.55 \times 10^{-4}) \underline{\times 7/3} = 1.0617 \times 10^{-3}$*

***M3**: Moles H_2O_2 in 5 cm^3 original*

= $(1.0617 \times 10^{-3}) \times 10 = 0.01062$

M4: Original $[H_2O_2] = 0.01062 \times (1000/5) = 2.12$ mol dm^{-3}

(allow 2.10 to 2.15)

1

[17]

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