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

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Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

(a) Smaller titre will increase (%) uncertainty / error

1

amount $Br_2 = 0.025 \times \frac{30}{1000} = 7.5 \times 10^{-4}$ mol

Or 0.00075

1

(b) Ratio Y :bromine

M1 1 : 5

Alternative calc using supplied answer

M1

M2 n Y in 25 cm^3 oil = $\frac{7.5 \times 10^{-4}}{5} = 1.5 \times 10^{-4}$

n Y in 25 cm^3 oil = $\frac{6.25 \times 10^{-4}}{5} = 1.25 \times 10^{-4}$

If no ratio must state n Y for M2

M2

M3 n Y in 250 cm^3 = M2 × 10 = (1.5×10^{-3})

n Y in 250 $cm^3 = 1.25 \times 10^{-4} \times 10 = (1.25 \times 10^{-3})$

M3

M4 Mass = M3 × 880 = (1.32 g)

Mass = $1.25 \times 10^{-3} \times 880 = (1.1\ g)$

M4

M5 Total mass oil needed = M4 × $\frac{100}{85}$ = 1.55 g

Total mass oil needed = 1.1 × $\frac{100}{85}$ = 1.29g

M5

If wrong ratio used treat as AE and mark ECF

(c) Extra step: Weigh the bottle after oil transfer (and record the mass)

OR Rinse the bottle with solvent after transfer and add the washings (to the volumetric flask)

M1

Justification: Not all of the oil is transferred

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Or so that the mass of oil left in the bottle is accounted for Or find the exact mass of oil used

To ensure all the oil is transferred

M2 is dependent on M1

M2

(d) To ensure the solution is homogeneous

Allow evenly mixed/ distributed OWTTE

Uniform solution

1

(e) $M_r = 345 - 1$

Must show workings in both M1 and M2

M1

M_r ($C_5H_{10}O$) = 86

$\frac{M1}{86}$ = 4 Hence $C_{20}H_{40}O_4$

M2

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Q2.

This question is marked using levels of response. Refer to the Mark Scheme Instructions for Examiners for guidance on how to mark this question.

Level 3 **5-6 marks**	All stages are covered and the explanation of each stage is correct and virtually complete Answer communicates the whole explanation, including equations, coherently and shows a logical progression through all three stages
Level 2 **3-4 marks**	All stages are covered but the explanation of each stage may be incomplete or may contain inaccuracies **OR** two stages covered and the explanations are generally correct and virtually complete Answer is coherent and shows some progression through all three stages. Some steps in each stage may be incomplete
Level 1 **1-2 marks**	Two stages are covered but the explanation of each stage may be incomplete or may contain inaccuracies **OR** only one stage is covered but the explanation is generally correct and virtually complete Answer shows some progression between two stages
Level 0 **0 marks**	Insufficient correct Chemistry to warrant a mark

Indicative Chemistry content

Stage 1 Formula
1a) divides % masses by A_r for each element
(N = 0.221; H = 6.18; Al = 0.221; S = 0.441; O =4.41)
1b) divides throughout by smallest and confirms formula as $NH_{28}AlS_2O_{20}$
Correct formula ticks 1a and 1b irrespective of method
1c) $x = 12$

Stage 2 Ion ID
2a) addition of NaOH/OH^- and warming gives gas that turns (damp) red litmus blue (= ammonia) showing NH_4^+ (water bath = warm)
2b) white ppt with acidified $BaCl_2/Ba^{2+} = SO_4^{2-}$
2c) addition of NaOH/OH^- until in excess gives white ppt that redissolves = Al^{3+} **OR** addition of carbonate giving white ppt and effervescence/fizzing/bubbles/gas formed

Stage 3 Equations (Ignore state symbols)

3a) $NH_4^+ + OH^- \longrightarrow NH_3 + H_2O$
3b) $Ba^{2+} + SO_4^{2-} \longrightarrow BaSO_4$
3c) $Al(H_2O)_6^{3+} + 3\ OH^- \longrightarrow Al(H_2O)_3(OH)_3 + 3\ H_2O$
Allow $Al^{3+} + 3\ OH^- \longrightarrow Al(OH)_3$

3d) $Al(H_2O)_3(OH)_3 + OH^- \longrightarrow Al(H_2O)_2(OH)_4^- + H_2O$
Allow $Al(OH)_3 + OH^- \longrightarrow Al(OH)_4^-$ *etc.*
OR $2Al(H_2O)_6^{3+} + 3CO_3^{2-} \longrightarrow 2Al(H_2O)_3(OH)_3 + 3CO_2 + 3H_2O$
Equation with CO_3^{2-} 'ticks' 3c AND 3d

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