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Specification



*Rewarding Learning*

**ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
2017**

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## **Chemistry**

**Assessment Unit AS 3**

*assessing*

**Module 3: Basic Practical Chemistry  
Practical Booklet B**

**[SCH32]**

**FRIDAY 9 JUNE, AFTERNOON**

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# **MARK SCHEME**

- 1 (a) (i) Weigh 2.79g of hydrated sodium carbonate in a named suitable container [1]  
 Transfer to a beaker and add 50–100 cm<sup>3</sup>/a suitable amount of deionised water and dissolve/stir until solid dissolves [1]  
 Transfer to a 250.0 cm<sup>3</sup> volumetric flask with washings [1]  
 Add deionised water until the bottom of the meniscus lies upon the mark. Invert to mix [1]

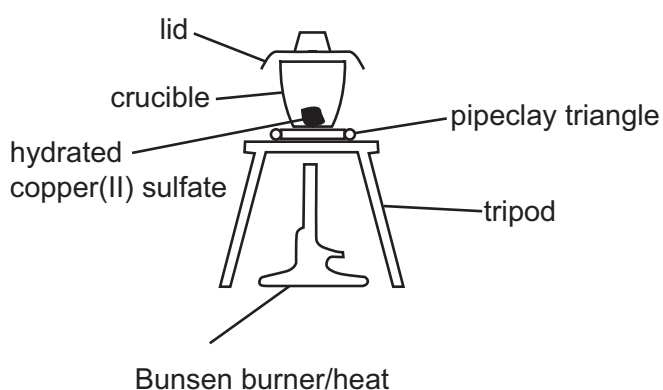
[4]

- (ii) Methyl orange [1]  
 Yellow to red [2]

[3]

- (b)  $0.00225/2.25 \times 10^{-3}$  mol  
 $0.00225/2.25 \times 10^{-3}$  mol  
 $0.0225/2.25 \times 10^{-2}$  mol  
 2.385 g  
 $2.79 - 2.385 = 0.405$  g  
 $0.405/18 = 0.0225$  mol  
 $0.0225/0.0225 = 1$   
 [-1] for each mistake

[5]

- (c) (i)
- 
- Diagram labels: lid, crucible, hydrated copper(II) sulfate, pipeclay triangle, tripod, Bunsen burner/heat

Each mistake [-1]

[3]

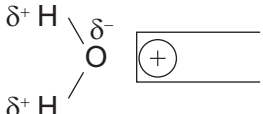
- (ii) Do not touch hot apparatus/allow to cool

[1]

- (iii) Mass of hydrated copper(II) sulfate = 5.0 g  
 Mass of water = 1.67 g  
 Percentage =  $1.67/5 \times 100 = 33.4\%$

[2]

18

		AVAILABLE MARKS	
2	(a) (i) Repeated boiling and condensing of a (reaction) mixture	[1]	11
	(ii) Place the distillate in a conical flask and add the anhydrous sodium sulfate Swirl until the liquid is clear/no longer cloudy Decant/filter off the liquid	[3]	
	(b) mass of propan-2-ol = $11.5 \times 0.79 = 9.085 \text{ g}$ mol of propan-2-ol = $9.085/60 = 0.1514$ 0.1514 mol of propan-2-ol gives 0.154 mol propanone mol of propanone = $7.0/58 = 0.1207$ % yield = $0.1207/0.1514 \times 100 = 79.72/80\%$	[3]	
	(c) Peak between $3200\text{--}3600 \text{ cm}^{-1}$ due to $\text{—OH}$ [1] is absent from spectrum of distillate [1] Peak between $1650\text{--}1800 \text{ cm}^{-1}$ due to $\text{C=O}$ [1] is present	[3]	
(d) Propanoic acid would form	[1]		
3	(a) (i) The enthalpy change when one mole of a substance is completely burnt in oxygen under standard conditions	[2]	10
	(ii) $\text{C}_3\text{H}_8\text{O} + 4.5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$ or $2\text{C}_3\text{H}_8\text{O} + 9\text{O}_2 \rightarrow 6\text{CO}_2 + 8\text{H}_2\text{O}$	[2]	
	(iii) Copper is a good conductor of heat/copper has a low (specific) heat capacity/copper does not absorb much heat/reduce heat loss	[1]	
	(iv) To ensure the heat/energy/heat energy is (evenly) distributed (throughout the water)	[1]	
	(b) (i) $100 \times 4.2 \times 36 = 15120 \text{ J} = 15.12 \text{ kJ}$ $0.60 \text{ g} = 0.60/60 = 0.01 \text{ mol}$ enthalpy of combustion = $-15.12 \times 100 = -1512 \text{ kJ mol}^{-1}$	[3]	
(ii) Heat loss (to surroundings)	[1]		
4	(a) Liquid A is polar, liquid B is non-polar. Polar liquid has dipoles which are attracted to the charged rod	[2]	3
	(b) 	[1]	

5 (a) $\text{NH}_4\text{Cl} + \text{NaOH} \rightarrow \text{NH}_3 + \text{NaCl} + \text{H}_2\text{O}$	[1]	<b>AVAILABLE MARKS</b>
(b) U-tube	[1]	
(c) Removes water	[1]	
(d) (Some of) the copper(II) sulfate turns (from white to) blue [1]	[1]	
(e) Ammonia [1] is an alkali [1]	[2]	
(f) Nitrogen	[1]	
6 Dip nichrome wire into concentrated hydrochloric acid Dip into sample/calcium carbonate and place in the blue Bunsen flame Brick red flame observed/red flame is observed	[3]	7
Place sample/calcium carbonate into dilute hydrochloric acid Bubble gas produced through limewater Limewater turns cloudy/milky	[3]	6
<b>Total</b>		<b>55</b>