

**METHODIST GIRLS' SCHOOL**  
**CHEMISTRY PRELIMS 2024**  
**Paper 3**

Question	Skill	Indicative Material	Mark	Total
<b>1(a)</b>	MMO	Conducting the titration experiments		
	PDO	<i>Results Table:</i> Record all burette readings for full set of experiments in the table to nearest 0.05 cm <sup>3</sup>	1	[5]
		Calculate the volume of <b>Q</b> used in each set of experiment correctly	1	
	MMO	Results: A full set of data is recorded showing 2 sets of consistent titration readings of 22.00 cm <sup>3</sup> within 0.20 cm <sup>3</sup> of each other.	1	
			1	
		Volumes of R within 0.20 cm <sup>3</sup> of Supervisor's results  (Note for teachers: solutions to be standardised to obtain 22.00 cm <sup>3</sup> of <b>Q</b> from titration)	1	
<b>1(b)</b>	ACE	Calculate the average volume of <b>Q</b> used correctly based on 2 consistent readings.	1	[1]
<b>1(c)</b>	ACE	Calculate the number of moles of KIO <sub>3</sub> using concentration in mol/dm <sup>3</sup> and 25.0 cm <sup>3</sup> of solution used in titration.	1	[2]
		Calculate the number of moles of I <sub>2</sub> correctly using mole ratio of KIO <sub>3</sub> : I <sub>2</sub> = 1:3	1	
<b>1(d)</b>	ACE	Calculate the number of moles of R correctly using mole ratio of I <sub>2</sub> : R = 1 : 1	1	[1]
<b>1(e)</b>	ACE	Calculate the mol/dm <sup>3</sup> of R from (d) and volume of titre	1	[2]
		Calculate the relative molecular mass of R correctly using g/dm <sup>3</sup> and mol/dm <sup>3</sup> .	1	

Total : [11]

<b>2(a)</b>	PDO	Vertical axis – independent variable Horizontal axis - dependent variable Axis labels + units	1	[4]
		appropriate scale, more than 50% of graph	1	
		Points correctly plotted (allow only 1 error), include point of origin	1	
		Straight line of best fit	1	
<b>2(b)</b>	ACE	Change in temperature/ decrease in temperature increases with number of moles of C.	1	[1]
<b>2(c)</b>	ACE	Value (with unit) from the graph with unit and marking shown on both x and y axes.	1	[1]
<b>2(d)</b>	PDO	Show calculation for number of moles of C Show recording of initial temperature, final temperature temperature change with correct unit.	1	[2]
			1	
<b>2(e)</b>	ACE	Graph shows a trend based on 5 temperature readings (data points)	1	[1]
<b>2(f)</b>	P	Variables to be controlled : volume of solvent, temperature, speed of stirring , dry beaker	1	[5]
		Independent variable : type of solvent	1	
		Dependent variable : maximum mass of the organic acid that has dissolved	1	
		Add a known mass of solid organic C + stir to dissolve completely	1	
		Continue adding until no more of the solid organic acid dissolves	1	

<b>3(a)</b>	NMO	White solid turned yellow / orange when hot	1	[2]
Test 1		white solid when cold	1	
Test 2	NMO	Bubbles of gas formed Gas formed white ppt in lime water. Carbon dioxide evolved.	1	[1]
Test 3	NMO	White ppt	1	[1]
		Ppt dissolves in excess to form colourless solution		

Test 4	NMO	White ppt  Ppt dissolves in excess to form colourless solution	1	[1]
Test 5	NMO	Dirty green ppt,  ppt insoluble in excess,  Upon standing, reddish brown/orange ppt formed on the surface	1  1	[2]
Test 6	NMO	Yellow / light brown solution formed  Bubbles of colourless, odourless gas evolved. Gas relights/ rekindles a glowing splint. Oxygen gas given off.  Reddish brown ppt, Ppt insoluble in excess	1  1  1	[3]
Test 7	NMO	White ppt  Ppt insoluble in acid / ppt remains	1	[1]
Test 8	NMO	Purple solution decolourizes / turns colourless	1	[1]
<b>3(b)</b>	ACE	ZnCO <sub>3</sub>	1	[1]
<b>3(c)</b>	ACE	It acts as a reducing agent.  It reduces the purple KMnO <sub>4</sub> to colourless Mn <sup>2+</sup> .	1  1	[2]

Total : [15]