

Mark scheme paper 3 chemistry trial exam 2010

QUESTION	RUBRIC	SCORE																
1 (a)	Able to record all the readings accurately to two decimal points with units . <u>Sample answer:</u> Activity I : 26.05 cm ³ , 26.90 cm ³ , 30.05 cm ³ Activity II : 13.30 cm ³ , 25.85 cm ³ , 38.45 cm ³	3																
	Able to record all the readings correctly without decimal point but with unit // Able to record all the readings correctly without unit but with decimal point // Able to record any 5 readings correctly with units	2																
	Able to state at least three readings correctly without units or decimal point *Accept bottom burette readings	1																
	No response or wrong response	0																
1(b)	Able to construct a table containing the following information: 1. Headings in the table 2. Transfer all data from 1(a) correctly 3. With units <u>Sample answer:</u> <table border="1" data-bbox="391 1299 1069 1568"> <thead> <tr> <th>Titration number</th> <th>Initial burette reading / cm³</th> <th>Final burette reading / cm³</th> <th>Volume of acid / cm³</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.80</td> <td>13.30</td> <td>12.50</td> </tr> <tr> <td>2</td> <td>13.40</td> <td>25.85</td> <td>12.45</td> </tr> <tr> <td>3</td> <td>25.90</td> <td>38.45</td> <td>12.55</td> </tr> </tbody> </table>	Titration number	Initial burette reading / cm ³	Final burette reading / cm ³	Volume of acid / cm ³	1	0.80	13.30	12.50	2	13.40	25.85	12.45	3	25.90	38.45	12.55	3
Titration number	Initial burette reading / cm ³	Final burette reading / cm ³	Volume of acid / cm ³															
1	0.80	13.30	12.50															
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	Able to construct a table containing the following information: 1. Headings in the table 2. Transfer all data from 1(a) correctly. 3. Without units	2																
	Able to construct a table that contains the following information: 1. Headings in the table 2. Columns with data from 1(a)	1																
	No response or wrong response	0																

1(c)	Able to show all the steps to calculate the concentration of sulphuric acid correctly. <u>Sample answer:</u> Step 1: Write the chemical equation: $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ Step 2: Calculating the number of moles of sodium hydroxide Number of mol of NaOH : $\frac{0.1 \times 25}{1000}$ // 0.0025 Step 3: Calculating the concentration of sulphuric acid Concentration of H_2SO_4 : $\left(\frac{0.0025 \times 1000}{12.50 \times 2}\right)$ // 0.1 mol/dm ³	3
	Able to show incomplete steps. <u>Sample answer:</u> Step 2 and 3	2
	Able to give any one step.	1
	No response or wrong response	0
1(d)	Able to state the colour change <u>Sample answer:</u> Activity I : Pink change to colourless Activity II : Yellow change to orange	3
	Able to state the colour change of activity I or activity II	2
	Able to write the final colour of activity I and II	1
	No response or wrong response	0
1(e)	Able to state the correct type of acid in activity I and II and give the correct reason. <u>Sample answer:</u> Type of acid : Activity I use monoprotic acid. Activity II use diprotic acid. Reason : The volume of acid used in activity I is twice with the volume of acid used in activity II.	3
	Able to state the correct type of acid or the correct reason. <u>Sample answer:</u> Type of acid : Activity I use monoprotic acid. Activity II use diprotic acid.	2
	Able to state some idea	1
	No response or wrong response	0

1(f)	Able to state the colour change <u>Sample answer:</u> Yellow change to orange and finally change to red	3
	Able to state the colour change <u>Sample answer:</u> Yellow change to red	2
	Able to state the colour change <u>Sample answer:</u> Change to red	1
	No response or wrong response	0
1(g)	Able to predict the volume with the unit <u>Sample answer:</u> More than 25.00 cm ³ // 25.05 – 50.00 cm ³	3
	Able to predict the volume without the unit <u>Sample answer:</u> More than 25.00 // 25.05 – 50.00	2
	Able to write any other volume more than 50 cm ³	1
	No response or wrong response	0
1(h)	Able to state all the variable correctly (i) MV: Type of acid uses // type of indicator (ii) RV: Volume of acid to neutralize 25.0 cm ³ of 1.0 mol dm ⁻³ sodium hydroxide solution.// Change in the colour of the indicator. (iii) CV: Concentration and volume of sodium hydroxide solution.	3
	Able to state any two variable correctly	2
	Able to state any one variable correctly	1
	No response or wrong response	0
1(i)	Able to state the hypothesis (relate the manipulated variable with the responding variable) correctly. <u>Sample answer:</u> If use different type of acid to neutralize 25.0 cm ³ of 1.0 mol dm ⁻³ sodium hydroxide solution, the volume of acid use also different// Different indicator used in the titration create different colour.	3
	Able to state the hypothesis (relate the manipulated variable with the responding variable) less correct. <u>Sample answer:</u> If use different type of acid to neutralize sodium hydroxide solution, the volume of acid use also different.	2
	Able to give some idea	1
	No response or wrong response	0

1(j)	Able to give the operational definition for the end-point of titration in activity I correctly. <u>Sample answer:</u> The point that when the colour of phenolphthalein change from pink to colourless	3						
	Able to give the operational definition for the end-point of titration in activity I less correct. <u>Sample answer:</u> The point that when the colour of phenolphthalein change to colourless	2						
	Able to give some idea <u>Sample answer:</u> The point that the colour change // The point that the alkali is neutralised with acid	1						
	No response or wrong response	0						
1(k)	Able to classify all the acids into strong acid and weak acid correctly. <u>Sample answer:</u>	3						
	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th style="width: 50%;">Strong acid</th> <th style="width: 50%;">Weak acid</th> </tr> </thead> <tbody> <tr> <td>Nitric acid</td> <td>Ethanoic acid</td> </tr> <tr> <td>Phosphoric acid</td> <td>Ascorbic acid</td> </tr> </tbody> </table>		Strong acid	Weak acid	Nitric acid	Ethanoic acid	Phosphoric acid	Ascorbic acid
	Strong acid		Weak acid					
	Nitric acid	Ethanoic acid						
	Phosphoric acid	Ascorbic acid						
Able to classify three or two acid into strong acid or weak acid	2							
Able to classify one acid into strong acid or weak acid	1							
No response or wrong response	0							
Total mark		33						

QUESTION	SAMPLE ANSWER	SCORE																		
2 (a)	How does the temperature affect (the rate of reaction) / (the time for mark 'X' to disappear from sight)?	3																		
2(b)	Manipulated variable : Temperature of sodium thiosulphate solution. Responding variable : The rate of reaction // the time for mark 'X' to disappear from sight Fixed variable : Volume and concentration of sodium thiosulphate solution // Volume and concentration of sulphuric acid.	3																		
2(c)	When the temperature of sodium thiosulphate solution increases, (the rate of reaction increases) / (the time for mark 'X' to disappear from sight is short)	3																		
2(d)	Substances : 0.2 mol dm^{-3} of sodium thiosulphate solution, 1.0 mol dm^{-3} of sulphuric acid. Apparatus : Thermometer, stopwatch, conical flask, measuring cylinder 50 cm^3 , measuring cylinder 10 cm^3 , tripod stand, wire gauze, bunsen burner, white paper marked 'X'.	3																		
2(e)	Procedures : 1. 50 cm^3 of 0.2 mol dm^{-3} sodium thiosulphate solution is measured by using measuring cylinder and pour into conical flask. 2. 5 cm^3 of 1.0 mol dm^{-3} sulphuric acid is measured by using measuring cylinder. 3. Sodium thiosulphate solution in the conical flask is heated until the temperature is $30 \text{ }^\circ\text{C}$ 4. The conical flask is put on the white paper that have marked 'X'. 5. The sulphuric acid is poured quickly into the conical flask and get the time for mark 'X' disappear from sight. 6. Repeat step 1 until 5 using different temperature.	3																		
2(f)	<table border="1"> <thead> <tr> <th>Experiment</th> <th>Temperature / $^\circ\text{C}$</th> <th>Time for mark 'X' disappear from sight / s</th> </tr> </thead> <tbody> <tr> <td>I</td> <td></td> <td></td> </tr> <tr> <td>II</td> <td></td> <td></td> </tr> <tr> <td>III</td> <td></td> <td></td> </tr> <tr> <td>IV</td> <td></td> <td></td> </tr> <tr> <td>V</td> <td></td> <td></td> </tr> </tbody> </table>	Experiment	Temperature / $^\circ\text{C}$	Time for mark 'X' disappear from sight / s	I			II			III			IV			V			3
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V																				
	Total mark	Maximum 17																		

END OF THE MARKING SCHEME