

**CAMBRIDGE**  
INTERNATIONAL EXAMINATIONS

**NOVEMBER 2002**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK : 60**

**SYLLABUS/COMPONENT : 0652/6**

**PHYSICAL SCIENCE  
(ALTERNATIVE TO PRACTICAL)**



Page 1	Mark Scheme	Syllabus	Paper
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Q. No.	Marking Scheme Details	Part Mark
1.	<p>(a) Readings : 39s, 22s, 13s, 7s (No tolerance) (4 correct 2 marks, 2/3 correct 1 mark, 1/0 correct zero)</p> <p>(b) Suitable labeled axes (at least ½ grid) [1] (time must be vertical or mark lost)  All points plotted correctly [2] (one mark lost for each incorrectly plotted point to minimum 0)  <u>Smooth</u> curve drawn [1] (tramlines = 0; straight line = 0) (allow ecf from plotted points).</p> <p>(c) the higher the temperature the shorter the time (OWTTE) (allow converse) allow 'the higher the temperature the faster the (rate of the) reaction'</p> <p>(d) value depends upon candidate's graph (allow ecf from plotted points)</p> <p>(e) plot graph of <i>1/time</i> against temperature (or determine gradients from curve)</p> <p>(f) surround the flask with ice do <u>NOT</u> allow – 'put in fridge/freezer' or 'cool'</p>	<p>2</p> <p>4</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>

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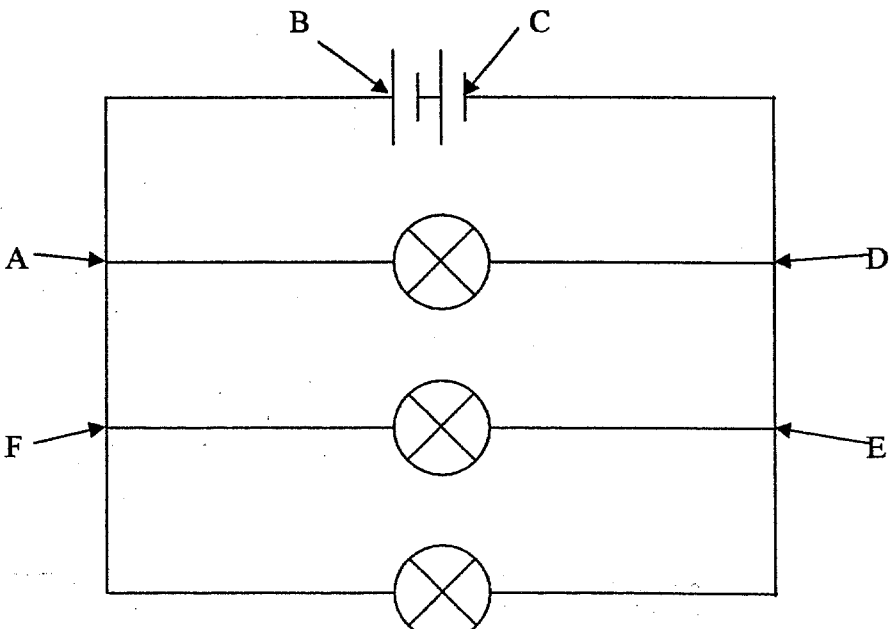
Q. No.	Marking Scheme Details	Part Mark
2.	<p>(a) Counts/minute: 775, 352, 128, 67, 17, 9</p> <p>5 or 6 correct 2 marks; 3 or 4 correct 1 mark; 1 or 2 correct 0 mark</p>	2
	(b) As a control/ to measure background radiation only	1
	(c)(i) Gamma radiation (allow symbol for gamma)	1
	(c)(ii) Alpha and Beta radiation (allow answers in either order) (allow symbols)	2
	(c)(iii) Alpha radiation (allow symbol)	1
	<p>(d) Any suitable safety procedure related to the use of radioactive materials</p> <p>answer should indicate use of shield (lead), teacher not handling materials directly (i.e. use of tweezers etc), pupils/teacher as far from source as possible, not pointing source at anyone etc.</p> <p>do <b>NOT</b> allow vague references to use of protective clothing or goggles</p>	1
	<p>(e) Inside locked [1], lead-lined [1] safe (marks independent)</p> <p>ignore references to radioactive warning signs</p>	2

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3.	<p>(a) <math>M_1 = 38.2\text{g}</math> [1] (no tolerance)</p> <p><math>M_2 = 41.7\text{g}</math> [1] (no tolerance)</p> <p><math>M_3 = 3.5\text{g}</math> [1] (no tolerance)</p> <p><math>T_1 = 25.5^\circ\text{C}</math> [1] (no tolerance)</p> <p><math>T_2 = 16.8^\circ\text{C}</math> [1] (allow 16.75 to 16.85)</p>	5
	(b) Temperature change = $-8.7^\circ\text{C}$ (negative sign NOT required for mark) allow ecf from Candidate's answers for $T_1$ and $T_2$	1
	(c)(i) Correct division by 1000 from candidate's answer for $M_1$ i.e. <b>0.0382kg</b>	1
	(c)(ii) Heat energy stored = $670 \times \text{(c)(i)} = \mathbf{25.594}$ joules (allow ecf from candidate's answer to (c)(i)) (allow correct answer to 2 dp)	1
	(d) Total heat change = <b>1136 J</b> (allow ecf from candidate's answers to (b) and (c)(ii))	1
	(e) Endothermic <i>because</i> temperature falls (explanation required for mark) (allow 'endothermic because heat is lost')	1

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4.	<p>(a) Any <b>THREE</b> points from:</p> <p>Filter the juice [1]</p> <p>boil the filtrate [1] (allow <i>heat</i> the filtrate)</p> <p>to partly evaporate [1]</p> <p>leave to cool/crystallise [1]</p> <p>(b) Any <b>SEVEN</b> points from:</p> <p>dissolve the <i>weighed</i> [1] crystals  in a <i>measured volume</i> of water [1] } allow dissolve crystals in water for 1 mk</p> <p>take a measured volume [1] and add indicator[1]</p> <p>add sodium hydroxide from a burette [1]</p> <p>record volume needed to change colour of indicator [1]</p> <p>repeat and average volume of sodium hydroxide required [1]</p> <p>repeat <i>without</i> the indicator using same volumes [1]</p> <p>evaporate solution [1]</p> <p>allow to cool / crystallise [1]</p>	<p>3</p> <p>7</p>

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5.	<p>(a) Correct symbol for switch</p> <p>(b) (i) Switch drawn somewhere on the circuit between points A-B <i>or</i> C-D</p> <p>(b) (ii) Switch drawn somewhere on the circuit between points A &amp; D</p> <p>(b) (iii) Switch drawn somewhere on the circuit between points A-F <i>or</i> D-E</p> <p>Ecf from (a) – if incorrect / no symbol drawn allow correct positions to score but must be labeled as required i.e. S1, S2, S3</p> <div style="text-align: center;">  <p>The diagram shows a rectangular circuit. At the top is a battery symbol with two cells. Below it are three parallel horizontal branches, each containing a lamp symbol (a circle with an 'X'). The left vertical wire has points A and F marked. The right vertical wire has points D and E marked. The top horizontal wire has points B and C marked. Arrows point from the labels to their respective positions on the circuit.</p> </div> <p>(c) Correct symbol for voltmeter [1]</p> <p>Drawn in correct place parallel to battery [1]</p> <p>These marks independent of each other e.g. incorrect symbol in correct place still scores one mark and vice versa.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p>

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6.	(a) Conclusion – (Gas was) <b>carbon dioxide</b> / (CO <sub>2</sub> ) [1]	Liquid is <b>sulphuric acid/A</b> [1]	2
	(b) Conclusion – (the pH was) <b>alkali(ne)</b> [1] or <b>greater than 7</b> or writes number <b>8 - 14</b>	Liquid is <b>calcium hydroxide/B</b> [1]	2
	(c) -----	Liquid is (purified) <b>water/C</b> [1]	1
	(d) Conclusion –Precipitate was <b>barium sulphate/</b> <b>a sulphate (SO<sub>4</sub><sup>2-</sup>) (ions)</b> [1]	Liquid is <b>sulphuric acid/A</b> [1]	2
	(e) -----	Liquid is <b>calcium hydroxide/B</b> [1]	1
		Accept <i>correct</i> chemical formulae for answers above.	

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7.	<p>Indicates pencil/ruler used to draw line on paper [1]</p> <p>Teat pipettes used to put spots of M and all dyes on the paper [1], just above or on the line [1]</p> <p>Spots are separated by small distances [1]</p> <p>Paper is coiled (and held with paper clip) [1] / dipped into beaker containing water ('solvent' or named solvent e.g. ethanol)[1] (accept paper suspended in water using paper clip to hold it)</p> <p>Water/solvent level is below pencil line [1]</p> <p>Water/solvent is allowed to soak up paper to separate dyes [1]</p> <p>Spots / colours are compared to see which ones are present in M [1]</p> <p><b>ANY SIX</b> points from the above indicated by description or clearly identified by diagrams.</p> <p>Clearly labelled and accurate diagrams may gain all marks with little explanation.</p> <p>The sequence should generally be in the above order but allow minor deviations as long as the experiment would work</p>	[6]