

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2002

INTERNATIONAL GCSE

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| MARK SCHEME |
| MAXIMUM MARK : 60 |
| SYLLABUS/COMPONENT : 0652/6 PHYSICAL SCIENCE (ALTERNATIVE TO PRACTICAL) |

| Q. No. | Marking Scheme Details | Ma |
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| 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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| 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 NOT 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) $M_1 = 38.2\text{g}$ [1] (no tolerance)</p> <p>$M_2 = 41.7\text{g}$ [1] (no tolerance)</p> <p>$M_3 = 3.5\text{g}$ [1] (no tolerance)</p> <p>$T_1 = 25.5^\circ\text{C}$ [1] (no tolerance)</p> <p>$T_2 = 16.8^\circ\text{C}$ [1] (allow 16.75 to 16.85)</p> | 5 |
| | (b) Temperature change = -8.7°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. 0.0382kg | 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 = 1136 J (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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| Q. No. | Marking Scheme Details | Part Mark |
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| 4. | <p>(a) Any THREE 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 SEVEN points from:</p> <p>dissolve the <i>weighed</i> [1] crystals</p> <p>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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| Q. No. | Marking Scheme Details | Ma |
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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 & 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 data-bbox="347 936 1244 1579" data-label="Diagram"> </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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| Q. No. | Marking Scheme Details | Pa Mark |
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| 6. | (a) Conclusion – (Gas was) carbon dioxide / (CO ₂) [1] | Liquid is sulphuric acid/A [1] 2 |
| | (b) Conclusion – (the pH was) alkali(ne) [1] or greater than 7 or writes number 8 - 14 | Liquid is calcium hydroxide/B [1] 2 |
| | (c) ----- | Liquid is (purified) water/C [1] 1 |
| | (d) Conclusion –Precipitate was barium sulphate/ a sulphate (SO₄²⁻) (ions) [1] | Liquid is sulphuric acid/A [1] 2 |
| | (e) ----- | Liquid is calcium hydroxide/B [1] 1 |
| | | Accept <i>correct</i> chemical formulae for answers above. |

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| Q. No. | Marking Scheme Details | M |
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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>ANY SIX 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] |