

**CAMBRIDGE**  
INTERNATIONAL EXAMINATIONS

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**JUNE 2003**

**INTERNATIONAL GCSE**

**MARKING SCHEME**

**MAXIMUM MARK: 40**

**SYLLABUS/COMPONENT: 0652/01**

**PHYSICAL SCIENCE**  
**Paper 1 (Multiple Choice)**



<b>Page 1</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE EXAMINATIONS – JUNE 2003</b>	<b>0652</b>	<b>1</b>

<i>Question Number</i>	<i>Key</i>	<i>Question Number</i>	<i>Key</i>
1	<b>C</b>	21	<b>A</b>
2	<b>B</b>	22	<b>C</b>
3	<b>B</b>	23	<b>D</b>
4	<b>C</b>	24	<b>C</b>
5	<b>C</b>	25	<b>D</b>
6	<b>A</b>	26	<b>B</b>
7	<b>D</b>	27	<b>A</b>
8	<b>B</b>	28	<b>A</b>
9	<b>B</b>	29	<b>D</b>
10	<b>C</b>	30	<b>D</b>
11	<b>D</b>	31	<b>B</b>
12	<b>A</b>	32	<b>A</b>
13	<b>D</b>	33	<b>A</b>
14	<b>D</b>	34	<b>B</b>
15	<b>B</b>	35	<b>D</b>
16	<b>D</b>	36	<b>D</b>
17	<b>B</b>	37	<b>A</b>
18	<b>B</b>	38	<b>B</b>
19	<b>C</b>	39	<b>A</b>
20	<b>A</b>	40	<b>D</b>

**TOTAL 40**

**CAMBRIDGE**  
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**JUNE 2003**

INTERNATIONAL GCSE

**MARKING SCHEME**

**MAXIMUM MARK: 60**

**SYLLABUS/COMPONENT: 0652/02**

**PHYSICAL SCIENCE  
Paper 2 (Core)**



Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	2

1.	15	1	
	14	1	
	2, 8, 4	1	(3)

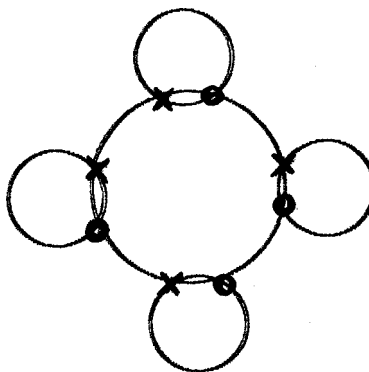
**Total 3**

2. (a) (i)	Any three of: circuit complete current in coil core magnetised armature attracted to the core	1 + 1 + 1 (3 max)	
(ii)	soft iron loses its magnetism easily EITHER steel retains its magnetism OR so that contacts re-open when S is opened	1 1	(2)

(b)	EITHER use of $R = V/I$ (in any form) OR $R = 12/4$ (in any form) $R = 3$ Ohm	1 1 1	(3)
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**Total 8**

3. (a) (i)



2

(ii)	covalent	1	(3)
------	----------	---	-----

(b) (i)	$\text{CH}_3\text{OH}$ ( $\text{CH}_4\text{O}$ or similar = 1 compensation)	2	
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(ii)	$12 + 4 + 16 = 32$ (ignore units)	1	(3)
------	-----------------------------------	---	-----

**Total 6**

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	2

4. (a)	(i)	Evidence of both outer rays converging after leaving lens and central ray straight	1	
		all three rays pass through a single point on central ray	+1	
	(ii)	focal length correctly marked	+1	(3)
(b)	(i)	$i$ correctly marked	1	
	(ii)	ray reflected so that $i = r$	1	(2)
			<b>Total 5</b>	
5. (a)		Bromine atom takes electron from iodide ion EITHER to become bromide ion	1	
		OR and replaces iodide/forms potassium bromide	1	(2)
(b)	<b>Ethane</b>			
	$  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  \text{H} - \text{C} - \text{C} - \text{H} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $		1	
	No change in colour		1	
	<b>Ethene</b>			
	$  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  \text{C} = \text{C} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $		1	
	goes colourless (or correct formula)		1	(4)
			<b>Total 6</b>	
6. (a)	(i)	mercury or alcohol	1	
	(ii)	$35 \pm 1$	1	
	(iii)	Make Hg move further/increase sensitivity	1	(3)
(b)	(i)	cools liquid contracts	1 1	
	(ii)	correct position at 0	1	(3)
			<b>Total 6</b>	

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	2

7. (a)	Increase the potential energy of the molecules OR do work in separating the molecules against intermolecular forces/bonds	1 1	(2)
(b)	Molecules are moving around randomly spread in all directions	1 1	(2)
		<b>Total 4</b>	
8. (a)	(i) refraction	1	
	(ii) arrow drawn at right angles to the refracted waves	1	(2)
(b)	(i) less	1	
	(ii) the same	1	
	(iii) less	1	(3)
		<b>Total 5</b>	
9. (a)	Hydrochloric	1	(1)
(b)	(i) Carbon dioxide	1	(1)
	(ii) Bubble through limewater goes cloudy/milky	+1 +1	(2)
(c)	Filter Evaporate (to dryness)	1 +1	(2)
		<b>Total 6</b>	
10. (a)	Example 2 because force moves (max 1 if box/boy moves) whereas in 1 the force is stationary	1 1	(2)
(Note: there is no credit for correct answer without some form of explanation)			
(b)	18 N	1 1	(2)
(c)	accelerates uniformly/constantly/(steadily?)	1 +1	(2)
		<b>Total 6</b>	

<b>Page 4</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE EXAMINATIONS – JUNE 2003</b>	<b>0652</b>	<b>2</b>

- |   |         |     |
|---|---------|-----|
| <b>11. (a)</b> hydrogen loses electron<br>in the formation of H <sub>2</sub> O molecule                               | 1<br>1  | (2) |
| <b>(b)</b> Energy given out on combustion   | 1       | (1) |
| <b>(c)</b> On combustion the <u>only</u> product is water<br>(OR no products of combustion/pollutants<br>except water | 1<br>1) | (2) |

**Total 5**





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**JUNE 2003**

**INTERNATIONAL GCSE**

**MARKING SCHEME**

**MAXIMUM MARK: 80**

**SYLLABUS/COMPONENT: 0652/03**

**PHYSICAL SCIENCE  
Paper 3 (Extended)**



<b>Page 1</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE EXAMINATIONS – JUNE 2003</b>	<b>0652</b>	<b>3</b>

<b>1</b>	<b>(a)</b>	Covalent molecules (N <sub>2</sub> ); weak forces between (non-polar) molecules; ∴ low B. Pt. → gas at room temperature  <i>Marks can be in either (i) or (ii)</i>	<b>[3]</b>
	<b>(b)</b>	Amphoteric; mid-way between basic and acidic oxides	<b>[2]</b>
	<b>(c)</b>	Ions have same charge in same Group; but smaller ions attract electrons more strongly	<b>[2]</b>
	<b>(d)</b>	PCl <sub>3</sub> <u>OR</u> PCl <sub>5</sub>	<b>[1]</b>
		<b>Question</b>	<b>Total [8]</b>
<b>2</b>	<b>(a)</b>	equation  correct substitution  36.7 m/s <sup>2</sup>	<b>[1]</b>  <b>[1]</b>  <b>[1]</b>
	<b>(b)</b>	k.e. equation  working  4.5(4) J	<b>[1]</b>  <b>[1]</b>  <b>[1]</b>
	<b>(c)</b>	g.p.e. equation  working  2.0(3) J	<b>[1]</b>  <b>[1]</b>  <b>[1]</b>
	<b>(d)</b>	<b>(i)</b> loose but correct idea of how well something is done  clear statement of idea of ratio of input to effective output work/energy/power	<b>[C1]</b>  <b>[2]</b>

<b>Page 2</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE EXAMINATIONS – JUNE 2003</b>	<b>0652</b>	<b>3</b>

- (ii) not efficient [1]  
clear statement of reason why not [1]  
first incorrect or missing unit only incurs penalty of -1

**Question Total [13]**

- 3 (a) Light can cause  $\text{Ag}^+$  ions  $\rightarrow$  Ag atoms; bottle keeps out light rays [2]  
(b) Na reacts violently with air and water; paraffin is inert and covers surface [2]  
(c) Easily picks up water vapour  $\rightarrow$  blue hydrate; desiccator keeps air dry [2]  
(d) Volatile so kept cold; poisonous vapour so in fume cupboard [2]

**Question Total [8]**

- 4 (a) correct order: image, object, lens, focus (or reversed) [1]  
either ray refracted correctly [1]  
correct construction [1]  
(b) virtual [1]  
magnified or correctly measured height } Any 3 [1]  
correct measurement of candidate's distance from lens, upright } [1]  
(c) magnifying glass/lens to correct long sight etc. [1]

**Question Total [7]**

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	3

- 5 (a) Mobile electrons (sea of electrons) NOT free electrons [1]
- (b) Unequal sizes of ions in alloy; give uneven (lumpy) layers; which cannot slide past each other easily; hence alloy is less malleable [4]
- (c) (i) Ca, Sr, Ba OR Ra [1]
- (ii) Fizzing  
Gradually dissolve  
Allow: Alkaline solution
- } Any 2
- [2]

**Question Total [8]**

- 6 (a) max voltage = 0.4 V [1]
- min voltage = 0.5 V [1]
- (b) mention of electromagnetic induction [1]
- idea of flux cutting or similar [1]
- (c) positive and negative peak [1]
- flux cuts coil in opposite directions [1]
- 1<sup>st</sup> peak lower [1]
- rate of flux cutting less [1]
- 1<sup>st</sup> peak wider
- magnet moving slower – time longer
- flat middle section
- zero rate of flux cutting
- } Any two **pairs** of answers, i.e. statement and consistent explanation

**Question Total [8]**

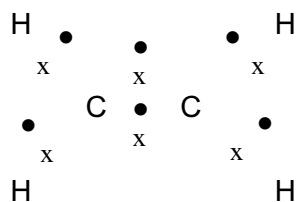
Page 4	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	3

- 7 (a) (i) Charge on ion is +2 (oxidation number +2) [1]  
 Allow: - Valency is 2
- (ii) Calcium has only one possible oxidation number (valency) [1]
- (b) (i) 1000 cm<sup>3</sup> contains 1 mole [1]  
 ∴ 50 cm<sup>3</sup> contains 0.050 moles
- (ii) 1 mole CuCO<sub>3</sub> → 2 moles acid [1]  
 ∴ 0.025 moles CuCO<sub>3</sub> → 0.050 moles acid
- (iii) 64 + 12 + 3 x (16) [1] = 124 [1] [2]
- (iv) Mass = Moles x M<sub>r</sub> OR Mass = 0.025 x 124 [1] = 3.1 g [1] [2]
- Question Total [8]**

- 8 (a) idea of voltage [C1]  
 max terminal p.d./open circuit p.d. or other definition [2]
- (b) idea of high resistance implies low current [C1]  
 idea that voltmeter must drop vast majority of voltage [2]
- (c) (i) equation [1]  
 102 Ω used [1]  
 1.47 x 10<sup>-2</sup> A [1]
- (ii) use of current in (i) and 100 Ω [1]  
 1.47 V (e.c.f.) [1]
- (iii) larger resistance voltmeter [1]  
 smaller current [1]  
 less voltage dropped across internal resistance [1]  
 first incorrect or missing unit only incurs penalty of -1
- Question Total 12**

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	3

9 (a) ([1] for C=C, [1] for filled shells) [2]



(b) Alkenes have C=C bond; needs at least 2 carbon atoms [2]

(c) (i)  $C_4H_{10} \rightarrow 2C_2H_4 + H_2$  ([1] for formulae, [1] for balance) [2]

(ii) High temp; high Pressure OR catalyst [2]

Question Total [8]

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**INTERNATIONAL GCSE**

**MARKING SCHEME**

**MAXIMUM MARK: 30**

**SYLLABUS/COMPONENT: 0652/05**

**PHYSICAL SCIENCE**  
**Practical**



Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	5

<b>1 (a) (iii)</b>	a reading for $h_0$ 5 readings taken (-1 if not in g) force calculated correctly extension calculated (deduct 1 if not in mm)	4
<b>(b)</b>	axes labelled correctly sensible scale plotting correctly best line drawn goes through or would go through origin	4
<b>(c)</b>	extension read correctly or calculated	1
<b>(d)</b>	proportional (2) allow one if says extension increases by fixed amount for fixed force	2
<b>(e)</b>	line correctly drawn and labelled	1
<b>(f)</b>	read extension use graph calculate in g or kg using correct number, i.e. /10 to kg or x 100 to g	3

**Total 15**

<b>2 (a)</b>	each metal correct as –ve three values of p.d. to be within 0.2V of SV	1 3
<b>(c)</b>	magnesium with a suitable explanation	2
<b>(d)</b>	correct order Mg, Zn, Cu	1
<b>(e)</b>	bubbling, colour fades, black/brown deposit, magnesium disappears or other suitable observation	3
	magnesium is displacing copper ion (some reference to electron movement or ion changes is essential to score both marks)	2
<b>(f)</b>	test with each metal note polarity compare this polarity with the other three	3

**Total 15**



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**MARKING SCHEME**

**MAXIMUM MARK: 60**

**SYLLABUS/COMPONENT: 0652/06**

**PHYSICAL SCIENCE**  
**Alternative to Practical**



Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	6

- 1 (a)** Masses:
- |                   |   |                                    |   |
|-------------------|---|------------------------------------|---|
| object A – 41.4g  | } | No tolerance<br>(do not allow 28g) | 3 |
| object B – 64.2 g |   |                                    |   |
| object C – 28.0g  |   |                                    |   |
- (b)** Volumes:
- |                              |   |              |   |
|------------------------------|---|--------------|---|
| object A – 27cm <sup>3</sup> | } | No tolerance | 3 |
| object B – 12cm <sup>3</sup> |   |              |   |
| object C – 56cm <sup>3</sup> |   |              |   |
- (c)** Density of object C =  $28/56 = 0.5$  (allow 1 mark for correct substitution but incorrect answer) (allow ecf from (a) and (b)) 2
- unit g/cm<sup>3</sup> (mark is independent of answer to calculation) 1
- (d)** object C would **float** [1]
- because it is less dense than water (OWTTE) [1] (explanation must relate to relative densities of object C and water) 2
- do NOT allow independent answers, i.e. correct explanation MUST be given to score first mark.
- (allow converse answer if candidate's value for part (c) is >1)
- (e)** some water would be left in the beaker when transferring to the measuring cylinder 1
- do NOT allow 'the experiment/results is/are not accurate'

**Total 12**

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	6

<b>2 (a)</b>	Magnesium copper [1]	pd = 2.0 [1] (do NOT allow 2)	2
	Zinc copper [1]	pd = 1.1 [1]	2
<b>(b)</b>	most negative = magnesium		1
	most positive = copper		1
<b>(c)</b>	magnesium, zinc, copper		1
<b>(d)</b>	find the p.d. with each of the other metals [1]		
	note which metal is positive/negative [1]		
	metal X is positive with a more reactive metal and vice versa [1]		3
	Answers must relate to the experiment used in the question.		

**Total 10**

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	6

- 3 (a)**  $h_3 = 160$  (mm)       $h_4 = 122$  (mm)       $h_5 = 85$  (mm)  
(tolerance  $\pm 1$ mm)      2
- (2 marks if all three values correct, reduce by one mark for each error to minimum 0)
- (b)** Forces      1.5      2.0      2.5(N)      2  
(1 only if 2 or more incorrect)  
Extensions      110      148      185 (mm)  
(e.c.f. – 1 for each error)
- (c)** Plotting points [2] – 5/6 points plotted correctly – 2 marks  
3/4 points plotted correctly – 1 mark  
1/2 points plotted correctly – 0 marks      2
- Straight line passing through the origin [1]      1
- (d)** (Directly) proportional      1  
(do NOT allow ‘as mass increases, extension increases’)
- (e)** place mass on hanger and record extension [1]  
use graph to find force (or plot new graph if extension greater than values already plotted) [1]  
multiply Force by 100 to find mass of object [1]      (2 of 3)      2

**Total 10**

Page 4	Mark Scheme	Syllabus	Paper
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<b>4 (a) (i)</b>	Blue/Dark green (must be <b>COLOUR</b> i.e. <i>NOT pH number</i> ) (do NOT allow 'purple')	1
	Ammonia/gas is alkali(ne) (allow 'basic/base')	1
<b>(a) (ii)</b>	Red	1
<b>(b)</b>	(Light) Green	1
	Gases <b>neutralise</b> each other ( <b>NOT</b> one gas is acidic and the other is alkaline)	1
<b>(c) (i)</b>	Ammonia moves faster	1
<b>(c) (ii)</b>	Because it has smaller particles (allow converse)	1
<b>(d)</b>	Spreading out of particles (OWTTE)	1

**Total 8**

Page 5	Mark Scheme	Syllabus	Paper
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<b>5 (a) (i)</b>	Crystal dissolved [1] (do NOT allow 'melted')	
	Particles spread out/diffused into the liquid [1]	2
<b>(a) (ii)</b>	Any TWO from:	
	Stir [1]	
	Heat/warm [1]	
	Shake [1]	2
<b>(b)</b>	Alkali(ne)/has pH greater than 7	1
<b>(c) (i)</b>	Mixed with water/water has been added	1
<b>(c) (ii)</b>	Alkali and acid have reacted [1] so the solution is neutral/pH 7 [1]	2
<b>(c) (iii)</b>	Alkali is in excess (OWTTE) (do NOT allow 'the acid has not reached the alkali')	1
<b>(c) (iv)</b>	Calcium Hydroxide + Ethanoic Acid $\longrightarrow$ Calcium Ethanoate + Water	1

**Total 10**

Page 6	Mark Scheme	Syllabus	Paper
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<b>6 (a)</b>	Mass of beaker = 43.4g	1
	Mass of beaker + water = 93.6g	1
	Mass of beaker + sodium chloride solution = 108.6g	1
<b>(b) (i)</b>	Mass of sodium chloride solution = $108.6 - 43.4 = 65.2\text{g}$ (allow ecf from (a))	1
<b>(ii)</b>	Mass of sodium chloride crystals = $108.6 - 93.6 = 15.\underline{0}\text{g}$ (allow ecf from (a)) (do NOT allow 15g)	1
<b>(c)</b>	Volume = $55\text{ cm}^3$	1
<b>(d)</b>	(b) (i) and (c) (both required for mark)  (accept values quoted (allow ecf)) (allow calculated value of density e.g. $65.2/55$ or $1.19\text{g/cm}^3$ (allow ecf from candidate's values))	1
<b>(e)</b>	Place hexane in measuring cylinder to a known volume [1]  Add 15g of sodium chloride to the hexane [1]  Note new volume in measuring cylinder and subtract original volume of hexane [1]	3

**Total 10**

**Grade thresholds** taken for Syllabus 0652 (Physical Science) in the June 2003 examination.

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 1	40	-	27	21	17
Component 2	60	-	32	21	18
Component 3	80	47	29	-	-
Component 5	30	21	17	13	11
Component 6	60	54	43	27	24

The threshold (minimum mark) for B is set halfway between those for Grades A and C.

The threshold (minimum mark) for D is set halfway between those for Grades C and E.

The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.

Grade A\* does not exist at the level of an individual component.