

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2003

INTERNATIONAL GCSE

MARKING SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT: 0652/01

PHYSICAL SCIENCE
Paper 1 (Multiple Choice)



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

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

TOTAL 40

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

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)

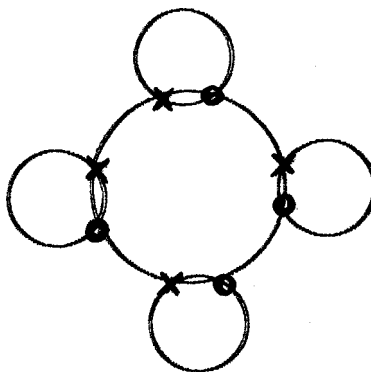
Total 3

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)
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(b) (i)	CH_3OH (CH_4O or similar = 1 compensation)	2	
(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)
			Total 5	
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)		Ethane		
		$ \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	
		Ethene		
		$ \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)
			Total 6	
6. (a)	(i)	mercury or alcohol	1	
	(ii)	35 ± 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)
			Total 6	

Page 3	Mark Scheme	Syllabus	Paper
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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)
		Total 4	
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)
		Total 5	
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)
		Total 6	
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)
		Total 6	

Page 4	Mark Scheme	Syllabus	Paper
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11. (a) hydrogen loses electron 1
in the formation of H₂O molecule 1 (2)
- (b) Energy given out on combustion 1 (1)
- (c) On combustion the only product is water 2 (2)
(OR no products of combustion/pollutants 1
except water 1)

Total 5

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MARKING SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0652/03

**PHYSICAL SCIENCE
Paper 3 (Extended)**



Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	3

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

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

- (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 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]
- 1st peak lower [1]
- rate of flux cutting less [1]
- 1st 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]

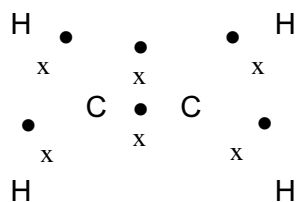
Page 4	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0652	3

- 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 cm³ contains 1 mole [1]
 ∴ 50 cm³ contains 0.050 moles
- (ii) 1 mole CuCO₃ → 2 moles acid [1]
 ∴ 0.025 moles CuCO₃ → 0.050 moles acid
- (iii) 64 + 12 + 3 x (16) [1] = 124 [1] [2]
- (iv) Mass = Moles x M_r 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 10⁻² 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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MARKING SCHEME

MAXIMUM MARK: 30

SYLLABUS/COMPONENT: 0652/05

PHYSICAL SCIENCE
Practical



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

1 (a) (iii)	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)	axes labelled correctly sensible scale plotting correctly best line drawn goes through or would go through origin	4
(c)	extension read correctly or calculated	1
(d)	proportional (2) allow one if says extension increases by fixed amount for fixed force	2
(e)	line correctly drawn and labelled	1
(f)	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

2 (a)	each metal correct as –ve three values of p.d. to be within 0.2V of SV	1 3
(c)	magnesium with a suitable explanation	2
(d)	correct order Mg, Zn, Cu	1
(e)	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
(f)	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
(do not allow 28g) | 3 |
| object B – 64.2 g | | | |
| object C – 28.0g | | | |
- (b)** Volumes:
- | | | | |
|------------------------------|---|--------------|---|
| object A – 27cm ³ | } | No tolerance | 3 |
| object B – 12cm ³ | | | |
| object C – 56cm ³ | | | |
- (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/cm³ (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

2 (a)	Magnesium copper [1]	pd = 2.0 [1] (do NOT allow 2)	2
	Zinc copper [1]	pd = 1.1 [1]	2
(b)	most negative = magnesium		1
	most positive = copper		1
(c)	magnesium, zinc, copper		1
(d)	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 ± 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
	IGCSE EXAMINATIONS – JUNE 2003	0652	6

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

Total 8

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

Total 10

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

6 (a)	Mass of beaker = 43.4g	1
	Mass of beaker + water = 93.6g	1
	Mass of beaker + sodium chloride solution = 108.6g	1
(b) (i)	Mass of sodium chloride solution = $108.6 - 43.4 = 65.2\text{g}$ (allow ecf from (a))	1
(ii)	Mass of sodium chloride crystals = $108.6 - 93.6 = 15.\underline{0}\text{g}$ (allow ecf from (a)) (do NOT allow 15g)	1
(c)	Volume = 55 cm^3	1
(d)	(b) (i) and (c) (both required for mark) (accept values quoted (allow ecf)) (allow calculated value of density e.g. $65.2/55$ or 1.19g/cm^3 (allow ecf from candidate's values))	1
(e)	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.