

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)**



| | | | |
|---------------|---------------------------------------|-----------------|--------------|
| 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) |

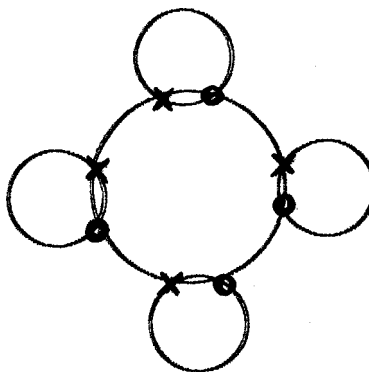
Total 3

| | | | |
|------------|--|-------------------|-----|
| 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) |
|-----|--|-------------|-----|

Total 8

3. (a) (i)



2

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

| | | | |
|---------|--|---|-----|
| (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 |
|--------|--------------------------------|----------|-------|
| | 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) |
| | | 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 |
| | IGCSE EXAMINATIONS – JUNE 2003 | 0652 | 2 |

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

Total 5

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2003

INTERNATIONAL GCSE

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 <i>Marks can be in either (i) or (ii)</i> | [3] |
| | (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 correct substitution 36.7 m/s ² | [1] [1] [1] |
| | (b) | k.e. equation working 4.5(4) J | [1] [1] [1] |
| | (c) | g.p.e. equation working 2.0(3) J | [1] [1] [1] |
| | (d) | (i) loose but correct idea of how well something is done clear statement of idea of ratio of input to effective output work/energy/power | [C1] [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]

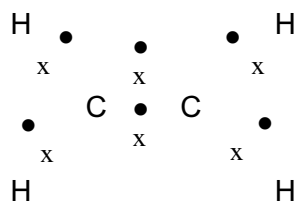
| | | | |
|--------|--------------------------------|----------|-------|
| Page 4 | Mark Scheme | Syllabus | Paper |
| | IGCSE EXAMINATIONS – JUNE 2003 | 0652 | 3 |

- 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]
 \therefore 50 cm³ contains 0.050 moles
- (ii) 1 mole CuCO₃ → 2 moles acid [1]
 \therefore 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]

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2003

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 |

| | | |
|--------------------|--|---|
| 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

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

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INTERNATIONAL GCSE

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 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 |
|--------|--------------------------------|----------|-------|
| | IGCSE EXAMINATIONS – JUNE 2003 | 0652 | 6 |

| | | |
|------------------|--|---|
| 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) | 1 |
| | (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)) | |
| (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.