CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT: 0625/01

PHYSICS
Paper 1 (Multiple Choice)

UNIVERSITY *of* CAMBRIDGE
Local Examinations Syndicate

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

TOTAL 40

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0625/02

PHYSICS

Paper 2 (Core)

NOTES ABOUT MARK SCHEME SYMBOLS

B marks   are independent marks, which do not depend on any other marks. For a B mark to be scored, the point to which it refers must actually be seen in the candidate's answer.

M marks   are method marks upon which accuracy marks (A marks) later depend. For an M mark to be scored, the point to which it refers **must** be seen in the candidate's answer. If a candidate fails to score a particular M mark, then none of the dependent A marks can be scored.

C marks   are compensatory method marks which can be scored even if the points to which they refer are not written down by the candidate, provided subsequent working gives evidence that they have known it, e.g. if an equation carries a C mark and the candidate does not write down the actual equation but does correct working which shows he knew the equation, then the C mark is scored.

A marks   are accuracy or answer marks which either depend on an M mark, or allow a C mark to be scored.

c.a.o.   means 'correct answer only'.

e.c.f.   means 'error carried forward'. This indicates that if a candidate has made an earlier mistake and has carried his incorrect value forward to subsequent stages of working, he may be given marks indicated by e.c.f. provided his subsequent working is correct, bearing in mind his earlier mistake. This prevents a candidate being penalised more than once for a particular mistake, but **only** applied to marks annotated 'e.c.f.'.

e.e.o.o.   means 'each error or omission'.

Brackets ( )   around words or units in the mark scheme are intended to indicate wording used to clarify the mark scheme, but the marks do not depend on seeing the words or units in brackets, e.g. 10 (J) means that the mark is scored for '10', regardless of the unit given.

Underlining   indicates that this **must** be seen in the answer offered, or something very similar.

Un.pen.   means 'unit penalty'. An otherwise correct answer will have one mark deducted if the unit is wrong or missing. This **only** applies where specifically stated in the mark scheme. Elsewhere, incorrect or missing units are condoned.

OR/or   indicates alternative answers, any one of which is satisfactory for scoring the marks.

QUESTION			SCHEME	TARGET GRADE	MARK
1	**(a)**		8	F	B1
	(b)		EITHER OR greater smaller AND AND Thickness of rule thread stretched when on rule OR overlap at ends OR worn rule ends	F	<u>B1</u> <u>2</u>
2	**(a)**	**(i)**	10	F	B1
		(ii)	stretch OR shape (or suitable sketch)	C	B1
	(b)	**(i)**	120	F	B1
		(ii)	up(wards) OR vertical (NOT vertically down) Accept arrow on diagram	F	B1
		(iii)	increase size/area of blocks/larger blocks OR increase number of blocks OR less soil in pot (NOT put pot on harder ground)	F	<u>B1</u> <u>5</u>
3	**(a)**		0.97 – 0.51	F	C1
			0.46	F	A1
	(b)	**(i)**	15	F	B1
		(ii)	515 e.c.f.	C	B1
		(iii)	D = M/V in any form, seen or implied (words/letters/mix)	F	C1

(iii) continued:

EITHER	OR	OR		
$\dfrac{460}{515}$	$\dfrac{0.46}{515}$	$\dfrac{0.46}{515 \times 10^{-6}}$ e.c.f.	C	C1
0.8932…	8.932… $\times 10^{-4}$	893.2…No e.c.f.	C	C1
	(any number of significant figures)			
0.89	8.9 $\times 10^{-4}$	890 (e.c.f. for significant figures)	C	A1
g/cm^3 (0.89 kg/dm^3 is OK)	kg/cm^3 (NOT 8.9^{-04})	kg/m^3	F	<u>B1</u> <u>9</u>

4 **(a)** idea of air molecules moving (allow vibrating)   F   C1
(N.B. 'collide' = 'moving')

idea of air molecules striking something (condone   F   C1
themselves)

idea of air molecules striking walls   C   A1

(b) **(i)** moves down   F   B1

(ii) increases (e.c.f.)   F   M1

idea of more collisions   } must follow   C   <u>A1</u>
(per unit time) (e.c.f.)   from (i)   <u>6</u>
OR $P \propto \frac{1}{V}$

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5 **(a)** line starting at 0 ^oC F   B1 ⎫

reasonably horizontal line at any temp for ⩾ half the   C   M1 ⎬ mark
time   along-
       side
horizontal from zero time as far as dotted line (ignore   C   graph
anything to R. of line)   A1 ⎭

(b) **(i)** water boils OR heat loss =   ⎫   C   B1
heat supplied (NOT evaporates/
turns to gas)   mark (i)
        and (ii)   C
(ii) gives water/molecules energy to   together
escape OR break bonds   <u>B1</u>
OR change state OR heat loss   <u>5</u>
from sides/surface/to air   ⎭

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6 **(a)** **(i)** normal correct, by eye   F   B1 ⎫ mark
       along-
(ii) reflected ray correct, by eye (ignore normal;   F   B1 ⎬ side
ignore any arrow)   diagram

(iii) both *i* and *r* correctly marked (condone   F   B1 ⎭
sloppy normal and sloppy refracted ray)

(b) parallel to ray striking mirror 1 (allow incident ray)   C   <u>B1</u>
OR same direction (NOT equal/same as)   <u>4</u>
(N.B. sentence must be completed, i.e. no inference
from line on diagram)

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7 **(a)** 680   1020   1360   1700   F   B1

(b) 5 points plotted $\pm \frac{1}{2}$ small square (-1 e.e.o.o.)   F   B2
ignore 0,0 (e.c.f.)

reasonable line through his points –   F   B1
    drawn with rule/thickness reasonable

(c) **(i)** flash   F   B1

light travels quickly OR sound travels slowly   F   C1
(accept figure)

light travels faster than sound (accept figure)   F   C1

light travels much faster than sound (accept   C   A1
figures)

(iii) 1400 - 1450 OR correct value from his graph   F   B1
$\pm \frac{1}{2}$ square

clear and correct indication on graph of how   F   <u>B1</u>
obtained (minimum: dot at appropriate point)   <u>10</u>

8 **(a)** Charge(s) OR energy (NOT electricity (condone as   C   B1
extra), charged particles (condone as extra), current,
electrons (condone as extra), voltage)

(b) **(i)** 0   C   B1

(ii) mention of 6V   F   B1

mention of rising OR not instantaneous (NOT   C   B1
'reads')

(iii) any realistic example of something turned   F   <u>B1</u>
on/off after a time lapse, e.g. electronic egg   <u>6</u>
timer, turn-off bedside radio

9 **(a)** **(i)** wire shown curved between A and B   F   C1 ⎫ mark
                along-
                side
wire displaced all along between A and B,   C   A1 ⎭ diagram
and reasonably smooth

(ii) idea of force (in any direction)   F   M1

on current/current-carrying conductor   C   A1

when in magnetic field   C   A1

	(b)		line curved in opposite direction	F	<u>B1</u> <u>6</u> } mark along- side diagram

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10	**(a)**	**(i)**	electrons OR cathode rays (NOT beta-particles)	F	B1
			something 'hitting' the screen (NOT 'form a spot')	F	B1
			idea of fluorescence (of the screen, NOT 'the gas')	C	B1
		(ii)	focus	C	B1
		(iii)	time base OR ms/cm	C	B1
		(iv)	electrons/cathode rays deflected (e.c.f. from (i); allow 'attracted' if intention clear)	F	B1
			something deflected horizontally	C	M1
			some idea of repeated sweeps/back and forth	C	A1
	(b)	**(i)**	(y-)input (allow y-plates)	F	B1
		(ii)	1. trace moves horizontally/sideways/left/right	C	B1
			2. trace moves vertically/up/down	C	<u>B1</u> <u>11</u>

11	**(a)**		Connection to either side of cell, but not shorted out	F	B1
			VR in series with lamp, and not shorted out OR correctly connected as a potential divider (condone inclusion of a switch)	F	B1
	(b)	**(i)**	$R_1 + R_2$	F	C1
			12	F	A1
		(ii)	1. Resistance = p.d./current in any form (words/letters/mix)	F	C1
			6/12 e.c.f.	C	C1
			0.5 or $\frac{1}{2}$ e.c.f.	C	A1

		2. his calculated current				
		his calculated current — all 3	C	B1		
		his calculated current				

A OR amp OR ampere somewhere in (ii)   F   B1

(iii) voltmeter shown correctly connected (any recognisable symbol; allow re-drawn circuit)   C   <u>B1</u> <u>10</u> mark alongside diagram

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12 **(a)** his weight   F   B1

(b) distance OR height   F   B1

(c) **(i)** 1000N climber OR heavier OR first   F   B1

(ii) his answer to (i)   F   B1

(d) **(i)** chemical (accept fuel)   C   B1

(ii) food (accept muscles)   C   B1

(iii) maintaining body function
heat loss
K.E.   any 1   C   <u>B1</u> <u>7</u>
sounds

Mark first correct answer, condone extras

June 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0625/03

PHYSICS
Paper 3 (Extended)

1 **(a)** **(i)** force of gravity acts on masses/weight of masses   **B1**
        (ii) vector has direction/force has direction   **B1**   **2**

   (b) **(i)** spring 1 (more difficult)   **M1**
            any correct relevant pair of values   **A1**
        (ii) P marked at extension 25 mm to 28 mm   **A1**
            explanation in terms of end of proportionality   **B1**
       (iii) each graph read at 15 N, approx. 25 mm, 19 mm   **C1**
            difference correct, 6 mm +/- 1 mm   **A1**   **6**
                 [8]

2 **(a)** change in speed is 1.5 m/s   **C1**
       deceleration = decrease in speed/time or 1.5/12   **C1**
       a = (-/+) 0.125 m/s   **A1**   **3**

   (b) average speed = 1.75 m/s   **C1**
       distance = 21 m   **A1**   **2**
                [5]

3 **(a)** attempt to use triangle or parallelogram of forces   **M1**
       stated scale used   **A1**
       950 N and 1220 N in correct relative directions   **C1**
       correct resultant drawn in   **C1**
       weight = 1785 N [limits 1700 N to 1850 N]   **A1**   **5**

   (b) **(i)** work = force x distance or 1500 x 3.0   **C1**
            work = 4500 J   **A1**
        (ii) power = work/time or 4500/2.5   **C1**
            power = 1800 W   **A1**   **4**
                [9]

4 **(a)** air molecules hit dust particles   **M1**
       hits continuously/unevenly/hits cause movement in all
       directions   **A1**
       air molecules fast moving/high energy   **B1**   **3**

   (b) any attempt to use p x v = constant or correct   **C1**
       proportion   **C1**
       fraction 2 x 80/25 seen   **A1**   **3**
       p = 6.4 x 10 (Pa)
                [6]

5 **(a)** Y is a wire of different metal/not copper   **B1**
       Z is a galvanometer/millivoltmeter/milliammeter   **B1**   **2**

   (b) 2 junctions at different temperatures, accept one hot,   **B1**
       one cold
       temperature difference causes e.m.f./voltage/current   **B1**
       reading of meter changes (with temperature)   **B1**
       1 junction at known temperature/need for calibration   **B1**   **max 3**

   (c) dull or black surface   **B1**   **1**
                [6]

6 **(a)** **(i)** incident ray, refracted ray and normal drawn **C1**

all correct and meeting at a point **A1**

(ii) angle of incidence and refraction correctly identified **B1**

(iii) values correct within agreed limits **B1** **4**

(b) use of sini/sinr **C1**

correct substitution from candidates values **C1**

value correct within agreed limits from candidate's values **A1** **3**

[7]

7 **(a)** value 3 x 10 m/s **A1** **1**

(b) speed of light (much) greater than speed of sound or value for sound **A1** **1**

(c) **(i)** source and receiver arrangement **C1**

with detail and labels **A1**

(ii) distance between source and receiver **B1**

time between flash and bang **B1**

(iii) speed = distance/time **B1** **max 4**

[6]

8 **(a)** **(i)** use of charge = It or I = 90/45 **C1**

current = 2 A **A1**

(ii) resistance = voltage/current or 6/2 **C1**

resistance is 3 ohm **A1**

(iii) energy = Vit or Vq or 6 x 90 **C1**

energy is 540 J **A1** **6**

(b) idea of energy transfer **C1**

is (6) J/C **A1** **2**

[8]

9 **(a)** **(i)** power = VI or 24 X 2 **C1**

power is 48 W **A1**

(ii) voltage = power/current or 48/0.4 **C1**

voltage is 120 V **A1** **4**

(b) **(i)** no/very little energy/power lost or energy/power in = energy/power out **B1**

(ii) any mention of magnetic field **B1**

changing magnetic field **B1**

field passes through core or secondary coil **B1**

induces voltage in secondary coil **B1**

number of turns on secondary determines voltage output **B1** **max 4**

[8]

10	**(a)**	**(i)**	circular line of force around wire through P	**M1**	
			arrow(s) on line anticlockwise - none wrong	**A1**	
		(ii)	arrow through Q to left	**A1**	**3**
	(b)	**(i)**	none/stays same	**B1**	
		(ii)	direction reverses	**B1**	**2**
	(c)		at S - stronger	**B1**	
			at T - same (strength)	**B1**	
			at W - same (strength)	**B1**	**3**
					[8]

11	**(a)**	**(i)**	source, detector	**B1**	
			named absorber/air and labels	**B1**	
		(ii)	take detector reading with no source (background)	**B1**	
			detector reading with source, detector and air only	**B1**	
			detector reading with appropriate named absorber (including distance in air)	**B1**	
		(iii)	same reading with absorber(including air) as background	**B1**	
			so all alpha absorbed by cardboard/paper/air, others would get through	**B1**	**max 6**
	(b)		curved path stated or drawn	**B1**	
			path at right angles to magnetic field	**B1**	
			into paper	**B1**	**3**
					[9]

TOTAL 80

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 60

SYLLABUS/COMPONENT: 0625/05

PHYSICS
Practical

UNIVERSITY *of* CAMBRIDGE
Local Examinations Syndicate

1.	two room temp readings (sensible)	1
	table completed, temps rising	1
	evidence of temp to better than 1 deg	1
	all temps to better than 1 deg	1
	time unit	1
	temp unit	1
	Graph
	temp axis labelled	1
	scale suitable	1
	plotting (check one on A)	1
	plotting (check one on B)	1
	line judgement shape	1
	              thickness	1

	Statement	1
	Justification (adequate)	1
	OR good	2

						TOTAL 15

2.	d sensible	1
	unit	1
	diagram blocks parallel and in correct position	1
	          rule position shown	1

	r correct	1
	h sensible with unit	1
	V calculation correct	1
	c stated (sensible)	1
	          at least 5 turns used	1

	calculation of V	1
	average calculated	1
	2/3 sf	1
	unit	1
	sensible G estimate	1
	v correct, 2/3 sf, unit	1

						TOTAL 15

3.	three correct units	3
	both I to at least 1 dp	1
	both V to at least 1 dp	1
	R value (check first) correct	1
	both R to 2/3 sf	1

	correct ratio (as decimal)	1
	no unit	1
	2/3 sf	1
	ratio 1.8 – 2.2	1

Diagram
voltmeter in parallel across the motors   1
ammeter correct   1
variable resistor connected to vary current through one motor   1
correct symbols for all three   1

TOTAL 15

4.   angle 30 (+1)   1
          angle 40 (+1)   1
          pins F and G at least 5cm apart   1

          GF correct and neat   1
          new GF line correct and neat   1

          x line correct position   1
          record of x correct   1
          unit   1

          y line correct position   1
          record of y correct   1
          unit (same as x, stated or not)   1

          correct ratio x/y   1
          no unit   1
          2/3 sf   1
          value   1

TOTAL 15

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARK SCHEME
MAXIMUM MARK: 40
SYLLABUS/COMPONENT: 0625/06 **PHYSICS** Alternative to Practical

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0625	6

1 **(a)** Seven correct values: 0, 2, 3, 6, 9, 10, 12 (-1 each error) 2

  (b) Graph:
  Scales, labelled, suitable size 1
  Axes, right way round 1
  Plots to ½ sq (-1 each error) 2

  (c) Line shape 1
  Line thickness 1

  Triangle greater than ½ line and method used 1
  Correct interpolation to ½ sq 1

  TOTAL **10**

2 **(a)** 36° ($\pm 1^o$) 1

  (b) Refracted ray drawn 1
  22° ($\pm 1^o$) 1
  normal correct (by eye) 1
  neat, thin, correct lines 1

  (c) Correct refracted ray (by eye) with arrow 1

  (d) Separation (LHS) at least 5cm 1
  Separation (RHS) at least 5cm 1

  TOTAL **8**

3 **(a)** **(i)** Voltmeter across lamp 1

   (ii) Variable resistor/rheostat 1

  (b) Correct position 1

  (c) V 1
  A 1
  Ω 1
  correct R at 9.8V = 8.16666 (any sf) 1
  all R to 2/3 sf 1
  consistent 2 sf or consistent 3 sf 1

  TOTAL **9**

4 **(a)** **(i)** 6.8cm (68mm) 1

   (ii) 6.8 1
   unit, mm 1

  (b) **(i)** 3.8/3.77 or 0.38/0.377 1
   mm or cm as appropriate 1

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	(ii)	0.94/0.95 (or evidence of division by 4)		1
	(iii)	0.75094/0.75095		1
(c)		Thickness of string/thickness of marks on string/stretching of string/metre rule measures to 1mm		1
			TOTAL	**8**

5	**(a)**	**(i)**	polystyrene	1
		(ii)	Least steep curve (or numbers suitably quoted)	1
	(b)		Three from: Thickness of insulator Room temp. Starting temp. Mass/vol./amount of water Using same can	3
			TOTAL	**5**

Grade thresholds taken for Syllabus 0625 (Physics) in the June 2003 examination.

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 1	40	-	29	23	19
Component 2	80	-	45	34	26
Component 3	80	53	32	-	-
Component 5	60	42	33	21	13
Component 6	40	34	26	20	15

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.