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)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

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.

<u>Underlining</u> — 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: greater AND Thickness of rule OR overlap at ends / OR: smaller AND thread stretched when on rule OR worn rule ends	F	B1 2
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	B1 5
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
			EITHER: $\frac{460}{515}$ / OR: $\frac{0.46}{515}$ / OR: $\frac{0.46}{515 \times 10^{-6}}$ e.c.f.	C	C1
			0.8932… / $8.932\ldots \times 10^{-4}$ / 893.2…No e.c.f. (any number of significant figures)	C	C1
			0.89 / 8.9×10^{-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	B1 9

4	**(a)**		idea of air molecules moving (allow vibrating) (N.B. 'collide' = 'moving')	F	C1	
			idea of air molecules striking something (condone themselves)	F	C1	
			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 (per unit time) (e.c.f.) OR $P \propto \frac{1}{V}$ — must follow from (i)	C	A1	6
5	**(a)**		line starting at 0 °C	F	B1	mark along-side graph
			reasonably horizontal line at any temp for ⩾ half the time	C	M1	
			horizontal from zero time as far as dotted line (ignore anything to R. of line)	C	A1	
	(b)	**(i)**	water boils OR heat loss = heat supplied (NOT evaporates/ turns to gas) — mark (i) and (ii) together	C	B1	
		(ii)	gives water/molecules energy to escape OR break bonds OR change state OR heat loss from sides/surface/to air	C	B1	5
6	**(a)**	**(i)**	normal correct, by eye	F	B1	mark along-side diagram
		(ii)	reflected ray correct, by eye (ignore normal; ignore any arrow)	F	B1	
		(iii)	both *i* and *r* correctly marked (condone sloppy normal and sloppy refracted ray)	F	B1	
	(b)		parallel to ray striking mirror 1 (allow incident ray) OR same direction (NOT equal/same as) (N.B. sentence must be completed, i.e. no inference from line on diagram)	C	B1	4

7	**(a)**		680 1020 1360 1700	F	B1	
	(b)		5 points plotted $\pm \frac{1}{2}$ small square (-1 e.e.o.o.) ignore 0,0 (e.c.f.)	F	B2	
			reasonable line through his points – drawn with rule/thickness reasonable	F	B1	
	(c)	**(i)**	flash	F	B1	
			light travels quickly OR sound travels slowly (accept figure)	F	C1	
			light travels faster than sound (accept figure)	F	C1	
			light travels much faster than sound (accept figures)	C	A1	
		(iii)	1400 - 1450 OR correct value from his graph $\pm \frac{1}{2}$ square	F	B1	
			clear and correct indication on graph of how obtained (minimum: dot at appropriate point)	F	B1 10	
8	**(a)**		Charge(s) OR energy (NOT electricity (condone as extra), charged particles (condone as extra), current, electrons (condone as extra), voltage)	C	B1	
	(b)	**(i)**	0	C	B1	
		(ii)	mention of 6V	F	B1	
			mention of rising OR not instantaneous (NOT 'reads')	C	B1	
		(iii)	any realistic example of something turned on/off after a time lapse, e.g. electronic egg timer, turn-off bedside radio	F	B1 6	
9	**(a)**	**(i)**	wire shown curved between A and B	F	C1	mark along-side diagram
			wire displaced all along between A and B, and reasonably smooth	C	A1	
		(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	B1 6 (mark along-side diagram)
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	B1 11
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 his calculated current	all 3	C	B1
			A OR amp OR ampere somewhere in (ii)		F	B1
		(iii)	voltmeter shown correctly connected (any recognisable symbol; allow re-drawn circuit)		C	B1 10 mark along-side diagram
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. sounds	any 1	C	B1 7
			Mark first correct answer, condone extras			

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0625/03

PHYSICS
Paper 3 (Extended)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

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 proportion	**C1** **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, one cold	**B1**	
			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
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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 ($\pm$1)	1
	angle 40 ($\pm$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

UNIVERSITY of CAMBRIDGE
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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^{o} ($\pm 1^{o}$)		1
	(b)		Refracted ray drawn		1
			22^{o} ($\pm 1^{o}$)		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

		(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.