CAMBRIDGE
INTERNATIONAL EXAMINATIONS

November 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0625/02

PHYSICS

Paper 2 (Core)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

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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.

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QUESTION			SCHEME	TARGET GRADE	MARK
1	(a)	(i)	G within block, to left of vertical through midpoint or AB	F	B1
		(ii)	Vertical line shown through A	C	B1
	(b)		A	F	M1
			more stable (or equivalent statement) e.g. less likely to topple or "weight within base"	F	A1
	(c)		so it does not topple over (or equivalent)	F	B1
					5
2			reference mark on wheel	*"(use stopwatch to) time…" gets only one of these	
			datum line (could be "top" or "bottom")		
			*start timing/stopwatch as mark passes datum line		
			time a number of rotations (accept 1 here)	5C	B5
			time at least 20 rotations		
			*stop stopwatch		
			divide time by number of rotations		
			repeat		
			make sure stopwatch at zero		5
3			gravitational OR potential OR PE OR GPE	F	B1
			motion OR KE OR kinetic		
			heat/internal/thermal (any order (–1 eeoo))	3F	B3
			sound		
			heat (accept potential)	C	B1
			OR internal/thermal		
			NOT strain potential/NOT chemical potential		
			NOT sound, even as an extra		5
4	(a)		vehicle 2	F	M1
			large(r) area (in contact with ground)	C	A1
			low/less pressure	C	A1
			less likely to sink/get stuck	F	A1
	(b)	(i)	small area	F	C1
			large pressure	F	B1
		(ii)	(weight spread over) large(r) area NOT body area	C	B1
			small/less pressure	C	B1
			reference to weight somewhere in **(b)**	C	B1
					9
5	(a)	(i)	ray perpendicular to surface at A (by eye)	F	B1
		(ii)	normal at B correct (by eye)	F	B1
		(iii)	ray refracted down at B, but NOT along surface	C	B1
		(iv)	normal at D correct (by eye)	F	B1
		(v)	ray refracted up at D, but NOT along surface	C	B1

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	(b)		converging OR will meet OR *one up, one down ALLOW * "opposite"	C	B1 *only if diagram acceptable
			same deviation (or equivalent) OR "angles of refraction same"	C	B1
	(c)		straight on OR split (depending on thickness of "ray") OR no change (indirection) OR not refracted	F	B1 8
6	**(a)**	**(i)**	speed	F	B1
		(ii)	frequency, ALLOW wavelength	C	B1
		(iii)	wavelength	F	B1
	(b)		gamma OR γ OR cosmic	C	B1
			condone x-rays as an extra		4
7	**(a)**		straight line sloping up to right	F	B1
			through origin	F	B1
	(b)	**(i)**	voltmeter OR multimeter on volts range (condone spelling)	F	B1
		(ii)	potential difference OR p.d. OR volts/voltage (**no** e.c.f.)	F	B1
		(iii)	ammeter OR multimeter on current/amps range (condone spelling)	F	B1
		(iv)	current OR intensity OR amps/amperes OR ampage (**no** e.c.f.) NOT A	F	B1
		(v)	evidence of 7.5	F	C1
			evidence of 0.3	F	C1
			7.5/0.3 OR V/I OR volts/current e.c.f. if written down	C	C1
			25 e.c.f. only if V/I used	C	A1
			Ω or ohm	C	B1
		(vi)	hisR/50	F	C1
			0.5 (Ω/m) e.c.f.	C	A1
					13

8	**(a)**		EITHER	OR		
			iron filings	(plotting) compass	F	B1
			NOT "put" sprinkle/spread/pour/scatter	place near end of magnet	F	B1
			tap card	mark end(s) of compass	C	B1
			further detail	further detail	C	B1
	(b)		attraction of compass S pole repulsion of compass N pole attraction of S pole of another magnet repulsion of N pole of another magnet attraction of Earth's N pole repulsion of Earth's S pole	any 1	F	B1 5

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9	**(a)**	**(i)**	decreases	F	M1
			by 2	C	A1
		(ii)	decreases	F	M1
			by 2	C	A1
		(iii)	decreases	C	B1
	(b)		66 (yrs)	F	C1
			evidence of 3 half-lives	C	C1
			fraction 1/8 seen or implied	C	C1
			400	C	A1
					9
10	**(a)**		points plotted correctly $\pm\frac{1}{2}$ small square (–1 eeoo) ignore 0,0 (–1 for very large blobs)	3F	B3
	(b)		45 circled OR 2 circles ACCEPT point circled on graph	F	B1
	(c)		idea of stretching more than before (for same load increase) OR reference to elastic/proportional limit in some way	C	B1
	(d)		EITHER / OR		
			measure unloaded length ALLOW "measure spring" NOT extension / idea of fixed end and free end	F	B1
			measure loaded length NOT extension / note position of free end, no load	F	B1
			subtract / measure movt. free end, loaded	F	B1
					8
11	**(a)**	**(i)**	100	F	B1
		(ii)	0	F	B1
		(iii)	indication to the left of 0°C mark	C	B1
	(b)		expansion of a solid expansion of a gas/pressure of a gas current/pd/e.m.f. of a thermocouple conductivity/resistance of a conductor/wire/thermistor…. any 1 colour of a hot wire melting of a wax NOT expansion of alcohol ACCEPT density of a liquid	C	B1
					4
12	**(a)**		$N_1/N_2 = V_1/V_2$ in any form	F	C1
			$8000/N_2 = 240/6$ or correct substitution into correct equation	F	C1
			200 ALLOW B1 for 20 if 800 used instead of 8000 (working must be shown)	F	A1
	(b)	**(i)**	200 e.c.f. i.e. his **(a)**	F	B1
		(ii)	400 e.c.f. i.e. 2 x his **(a)**, evaluated	C	B1
					5