CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 80

SYLLABUS/COMPONENT : 0625/3

PHYSICS
(EXTENDED)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Accept D & E marked on time axis

No labels -1

1 a	BD correct, (straight line i.e. constant acceleration)		B1		
	DE correct, (constant speed or slightly reducing speed only)		B1		
	EF correct, (speed reduced to zero, gradient steeper than BD)	3	B1	3	
b(i)	force = 2 (N)		C1		
	work = (2 x 0.6) = 1.2 J*	2	A1		
(ii)	k.e. = $0.5mv^2$		C1		
	= 0.5 x 0.2 x 2.5 x2.5		C1		
	= 0.625 J*	3	A1	5	
c	velocity - vector, speed scalar		B1		
	direction changes so velocity changes	2	B1	2	
d	work done against friction		B1		
	(more) friction on EF		B1		
	(k)e. changed to heat		B1		
	less k.e. changed to p.e.	3	B1	M3*	
			QT	13	
2 a(i)	outline, ruler pivoted (at centre), mass one side, rock other side		C1		
	quality set-up, each mass at (marked) point + labels	2	A1		
(ii)	~~rod must be balanced before readings can be taken or record mass as 100 g~~		~~B1~~		
	distances to pivot from rock ~~and mass~~ B1 distance pivot to mass B1		B2		
	mass or 100 x distance to pivot = mass of rock x distance rock to pivot	3	B1	5	
b	put water in cylinder, read value		B1		
	insert rock until covered, read value		B1		
	difference in values is volume of rock	2	B1	M2*	
c	density = mass/volume or 88/24		C1		
	= 3.7 g/cm^3* (accept $3\frac{2}{3}$ g/cm^3) (accept 3.6)	2	A1	2	
			QT	9	
3 a	junction of two metals, other ends to meter/alternative arrangements		C1		
	two metals named, meter labelled	2	A1	2	
b(i)	meter calibrated in degrees or read value and use calibration chart		B1		
(ii)	change in temp. causes change in voltage/current	2	B1	2	
c	high/low temperatures		B1		
	rapidly changing temperatures (or low thermal capacity)		B1		
	any valid physical reason e.g. distance reading needed, small site etc	2	B1	M2*	
			QT	6	
4 a(i)	$L = VIt/(m_1 - m_2)$ accept for 2 eq. $VIt = (m_1 - m_2)L$ only 1 or $m_2 - m_1$	2	C1, A1		
(ii)	= 12 x 2 x 3750 / 40		C1		
	= 2250 J/g * or 2.25×10^6 J/Kg	2	A1	4	
b	(large) (intermolecular) forces in liquid / bonds		B1		
	(great) energy needed to separate molecules of liquid	2	B1	2	
			QT	6	

5 a(i)	C marked vertically under/at any peak (including on axis)	B1	
	R marked on NEXT trough (either way)	1 B1	
(ii)	half a wavelength	1 B1	3
b	f = v/w or 340/1.3	C1	
	= 260 Hz*	2 A1	2
		QT	5
6 a(i)	43° ± 1°	1 A1	
(ii)	angle r for this ray is 90°	B1	
or marked c →	angle c is angle i (in denser medium) ~~(giving angle r = 90°)~~	2 B1	3
b(i)	3×10^8 m/s*	1 A1	
(ii)	speed in air/speed in medium	M1	
	= 1.5 (no up to °)	2 A1	
(iii)	angle i = 0°/ along normal / at 90° to surface	1 B1	
(iv)	increased/more/larger	1 B1	5
		QT	8
7 a(i)	steel	1 A1	
(ii)	insert bar in coil (switch on,leave,switch off)	1 B1	
(iii)	to control/measure current or stop circuit/coil overheating	1 B1	3
b(i)	R = 12/4	C1	
	= 3 ohms*	2 A1	
(ii)	P = 12 x 4	C1	
	= 48 W*	2 A1	
(iii)	E = 48 x 5	C1	
	=240 J*	2 A1	6
c(i)	5 (V)	1 A1	
(ii)	sum of p.d.'s = circuit supply p.d.	C1	
	above + detail eg across each component/ in closed circuit etc	2 A1	3
		QT	12
8 a	(magnetic field) from left to right/ N to S	1 B1	1
b(i)	movement at right angles/between poles, up or down	C1	
	(vertically) down,stated or reference to arrow on diagram or label	2 A1	
(ii)	mention of Fleming's L.H.R. or interacting fields	C1	
	full explanation ~~leading to correct direction~~ e.g what fingers show	2 A1	4
c	use coil instead of single wire	B1	
	mount coil on bearings	B1	
	arrange suitable contacts e.g slip/slit rings and commutator	2 B1	M2
		QT	7

9	a(i) curve upwards between plates		C1	
	curve upwards between plates + straight line	2	A1	
	(ii) top +, bottom -	1	B1	
	(iii) to left, arrow and C marking any point on the beam between X and P	1	B1	4
	b cathode/heater, labelled		B1	
	anode labelled		B1	
	correct arrangement of cathode with anode cylinder		B1	
	suitable power supplies to heater/ anode-cathode (either to score)	4	B1	4
			QT	8
10	a half-life 4 days*	1	A1	1
	b at least two points worked out		M1*	
	suitable curve completed	2	A1	2
	c by 20 days little radioactivity left, after 1 day about 85% left	1	B1	1
	d $^{A}_{Z}X \rightarrow ^{0}_{-1}e + ^{A}_{Z+1}Y$ top line, A1/ bottom line A1	2	A2	2
			QT	6

mark on diag

or $^{0}_{-1}\beta$ (not e or β alone)

PAPER TOTAL **80**

$^{A}_{Z}X \rightarrow e/\beta + ^{A}_{Z+1}Y$ (C1)