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 B1
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) 2 A1 2
QT 9

(accept 3.6)

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) $L = VIt/(m_1 - m_2)$ exact for 2 eg. $VIt = (m_1 - m_2)L$ 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) $43^{\circ} \pm 1^{\circ}$ 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 for °) 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	1	A2	2
				QT	6
		PAPER TOTAL			80

mark on diag

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

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