

**NOVEMBER 2002**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK : 80**

**SYLLABUS/COMPONENT : 0625/3**

**PHYSICS  
(EXTENDED)**



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Accept D & E  
marked on time  
axis

No labels -1

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

(accept 3.6)

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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	
$= 260 \text{ Hz}^*$	2 A1	2
	QT	5

6 a(i) $43 \pm 1^\circ$	1	A1	
(ii) angle r for this ray is $90^\circ$		B1	
or marked c → angle c is angle i (in denser medium) ( <del>giving angle r = <math>90^\circ</math></del> )	2	B1	3
b(i) $3 \times 10^8 \text{ m/s}^*$	1	A1	
(ii) speed in air/speed in medium		<del>M1</del>	
$= 1.5$ (no up for $^\circ$ )	2	<del>A1</del>	
(iii) angle i = $0^\circ$ / along normal / at $90^\circ$ 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	
$= 3 \text{ ohms}^*$	2	A1	
(ii) $P = 12 \times 4$		C1	
$= 48 \text{ W}^*$	2	A1	
(iii) $E = 48 \times 5$		C1	
$= 240 \text{ J}^*$	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

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mark on diag	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
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	$\begin{matrix} A \\ Z \end{matrix} X \rightarrow \begin{matrix} 0 \\ -1 \end{matrix} e + \begin{matrix} A \\ Z+1 \end{matrix} Y$ top line, A1/ bottom line A1	2	A2	2
			QT	6
	or $\begin{matrix} 0 \\ -1 \end{matrix} \beta$ (not e or $\beta$ alone)			
		PAPER TOTAL		80

