CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2002

INTERNATIONAL GCSE

MARK SCHEME	
MAXIMUM MARK : 80	
SYLLABUS/COMPONENT : 0625/3 **PHYSICS** **(EXTENDED)**	

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
(accept 3.6)   = 3.7 g/cm^3* *(accept 3⅔ g/cm^3)*   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

     Vlow
c   high 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 = Vlt/(m$_1$- m$_2$)   *exact for 2 eg. Vlt =(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 x 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) $43° \pm 1°$ 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) 3×10^9 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

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 **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 $^{A}_{Z}X \longrightarrow ^{0}_{-1}e + ^{A}_{Z+1}Y$ top line, A1/ bottom line A1 — **2** A2 **2**
  QT **6**

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

PAPER TOTAL   **80**

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