# CAMBRIDGE
## INTERNATIONAL EXAMINATIONS

**NOVEMBER 2002**
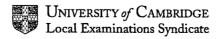
**INTERNATIONAL GCSE**

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**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)    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/cm³)*    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)** $L = VIt/(m_1 - m_2)$ *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 $2.25 \times 10^6 J/kg$*    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)  $3 \times 10^9$ m/s *          **1** A1
  (ii) speed in air/speed in medium          ~~2~~ M1
     = 1.5    *(no up for °)*          **2** ~~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

PMT

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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

*mark on diag*

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 β alone)*

**PAPER TOTAL**     80

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