CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2002

INTERNATIONAL GCSE

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

1 a   height of stairs/number and height of each stair   B1

     time   B1
     weight/mass (x g)   B1
     any attempt at repeat and average for time only   B1   4

   b   work = force or weight x distance   B1
     power = work/time   B1   2

   c(i) potential   B1
    (ii) any 2: kinetic energy (to move)/heat(and sound)/energy to move arms etc   B2   3
     QT   9

2 a(i) acceleration/increasing speed   B1

   a(ii) deceleration/decreasing speed   B1
     acceleration in (i) and deceleration in (ii) both stated as constant/uniform   B1   3

   b   overall fall in speed/bouncing/change in direction/ball squashed/
     time very small/sudden/instantaneous at bounce   any 2   B2   2

   c(i) 1.5 (m/s)   A1
    (ii) 17.5 (m/s)   A1   2

   d   speed scalar and velocity vector/ velocity has direction   B1
     direction does not affect speed change   B1
     direction affects velocity change/ has + and - effect etc   B1 M2

   e   any use of area of triangle/use of average speed x time   C1
     3.0 m / 3.4 m range   A1   2

   f   use of change in speed/time or 8/.8   M1
     10 m/s/s   A1   2

     QT 13

3 a   vapour mols higher (total) energies than liquid mols/ correct ref. to k.e./p.e. B1
     only most energetic molecules can leave liquid   B1   2

   b   increased temp(of liquid)/increase surface area/blow air over surface, any 2 B2   2

   c   overcome attractive forces in liquid   B1
     separate molecules to (much) greater distances apart   B1   2
     QT   6

4 a   p.v. is a constant, (so p.l. is a constant), however expressed   C1
        80 x 1 = I x 3.8, however expressed   C1
          I = 21 mm   A1 3

   b(i) put in (melting) ice and put in steam (over boiling water)   M1
         mark piston position for one or both fixed points   A1
         Any reference to wait for equilibrium, however expressed   A1
         Divide length between fixed points into 100 or other suitable calibration   A1 M3

     (ii) immerse cylinder in water (so that water covers at least the air column)   M1
        leave for long time however expressed   A1
        read length, use scale to give temp.   A1 M2
                                    QT 8

5 a   angle i = angle r   B1 ·
        ray to right-hand end of mirror from P, correctly reflected (judged by eye)   M1
        part shaded, beyond candidates reflected ray from end of mirror only   A1 3

   b   any construction which attempts to use angle i = angle r   C1
        1.6 m =+/- 0.2 m   A1 ..2

   c   virtual/upright/ same size or distance as object/laterally inverted, any 2   B2 2
        (real/ inverted/ magnified/ diminished each disqualifies one correct answer) QT 7

6 a   use of frequency = velocity/wavelength   C1
        = 6 x 10^{14}Hz   A1 2

   b(i) 340 x 3.6   C1
        = 1224 m   A1
    (ii) value so big time is negligible however expressed   B1 3

   c   refraction and dispersion at first face   B1
        refraction and dispersion at second face   B1
        colours correct   B1 M2
                                    QT 7

7 a   electrons rubbed off one sphere, becomes positive   B1
        electrons deposited on other sphere, becomes negative   B1 2

   b   any reasonable attempt showing lines from one sphere to the other   B1
        field correct with arrows from + to -,at least 2, none wrong   B1 2

   c(i) (2 x 10^{10} x 1.6 x 10^{-19})
        = 3.2 x 10^{-9}(C)   A1
    (ii) 3.2 x 10^{-9}or answer to (i) / 1.0 x 10^{-3} C1
        = 3.2 x 10^{-6}A   A1 3
                                  QT 7

8 a 240/15 or 15/240 or primary volts/sec volts or sec volts/primary volts   C1
     = 16 or 0.0625   A1   2

   b   any d.c. shown regardless of shape or position   C1
     half wave rectified shown   A1   2

   c   diode only conducts in one direction   B1
     conducts on one half cycle of a.c. but not on opposite half cycle   B1   2
   d   battery in correct place, correct polarity   B1   1

   e(i)   power = VI or power = 12 x 2   C1
     = 24 W   A1
   (ii)   energy = VIt where t is in secs or energy = $12 \times 2 \times 1.08 \times 10^5/0.024 \times 30$ C1
     =2.6×10^6J / 0.72 kWh (allow e.c.f. from (i))   A1   4
     QT 11

9 a   connect terminals of 1V supply to Y's, note scale reading (up/down as 1V)   B1
     measure equal intervals up(and down) scale to give voltage scale   B1   2

   b   C connected to one Y terminal   B1
     ~~D connected to other Y terminal~~   ~~B1~~   ~~2~~

   c   p.d. A to F = p.d. (B to C + C to D + D to E)   B2   2
     QT 6

1 a   source and detector above liquid surface   C1
     set-up correct for detecting alpha radiation with suitably placed absorber   A1   2

   b   take reading with no absorber and through cardboard/paper   B1
     subtract readings to give alpha estimate   B1   2

   c   any "distance" precaution   B1
     any shielding precaution   B1
     any other, but must be related to this situation   B1 M2
     QT 6

                 PAPER TOTAL   80