UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2006 question paper

0625 PHYSICS

0625/03   Paper 3, maximum raw mark 80

These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks. They do not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

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1 (a) point 8,12 identified   B1
straight line joining 0,0 and 8,12   B1
straight line joining 8,12 and 20,12   B1   **3**

(b) acceleration = change in v/change in t or 12/8 etc   C1
= 1.5 m/s^2 A1   **2**

(c) distance = area under graph between t = 20 and t = 25   C1
= 24 m to 28 m   A1   **2**

(d) F = ma or 4000 x 1.2   C1
= 4800 N   A1   **2**

(e) more passengers got on (so mass increased)
driver pressed accelerator less (so force decreased)
more traffic or going uphill   any two lines   B2   **2**
[11]

2 any closed triangle or parallelogram   C1
forces in correct directions relative to each other   C1
correct resultant indicated   C1
resultant 7.7 N to 8.1 N   A1   **4**
scale stated   B1
resultant vertically upwards   B1   **2**
[6]

3 (a) work = force x distance   C1
= force of gravity/weight x (vertical) distance/height   A1   **2**

(b) (i) work = (100 x 8) = 800 J   A1
A1   **2**

(ii) power = (800/5) = 160 W

(iii) increases the k.e. of the water (ignore heat/sound)   B1   **1**
[5]

4 (a) on surface/throughout; no bubbles/bubbles; all temps./b.p.;
s.v.p. < at. pressure; svp = at. pressure   any two   B2   **2**

(b) energy/work to separate molecules   B1
(against) forces of attraction between water molecules   B1   **2**
(to break bonds C1)
The k.e./speed of the molecules does not increase   B1   **1**

(c) Wt = mL or 120 x 1 = 0.05 x L   C1
L = 120/0.05   C1
L = 2400 J/g   A1   **3**

[8]

5 (a) increase surface area of tank ... B...
blow air over surface/put in windy place ... B1

(b) (i) capillary tube longer or liquid with lower expansivity ... B1

(ii) capillary tube thinner/finer or liquid with higher expansivity
or bigger bulb ... B1 **2**

(c) $p_1v_1 = p_2v_2$ or $1 \times 10^5 \times 150 = p_2 \times 50$ ... C1
$p_2 = 3 \times 10^5$ (Pa) ... A1 **2**
[6]

6 (a) red ray refracted away from normal ... B1
violet ray refracted more than red ray in prism ... B1
violet ray further refracted from red ray to screen ... B1 **3**

(b) $1.52 = \sin 40^\circ/\sin r$ ... M1
$\sin r = \sin 40^\circ/ 1.52 \ (= 0.423)$ ... C1
$r = 25^\circ$ ... A1 **3**

(c) (i) 3×10^8 m/s ... A1

(ii) same as **(i)** ... A1 **2**
[8]

7 (a) Longitudinal or pressure waves ... B1 **1**

(b) a correct C marked ... B1
a correct R marked ... B1 **2**

(c) oscillation/vibration/backwards and forwards ... M1
along PY (consider pressure waves as alternative) ... A1 **2**

(d) wavelength = 340/200 ... C1
PX(= λ/2) = 0.85 m ... A1 **2**
[7]

8 (a) I = W/V or 9/6 ... C1
I = 1.5 A ... A1 **2**

(b) (i) 8 ohm ... A1

(ii) 6 V ... A1 **2**

(c) (i) brightness decreases/dimmer ... B1

(ii) resistance of circuit greater ... B1
current through lamp falls ... B1 **3**

(d) (i) 4 ohm ... A1

(ii) 4 ohm ... A1 **2**
[9]

9 (a) primary and secondary coils on iron core labelled   B...
    240 V a.c. to primary, 12 V a.c. to secondary   B1
    turns ratio shown or stated 20:1, stepdown   B1

(b) (i) must be constantly changing magnetic field   B1

     (ii) magnetic field of primary passes through core to secondary   B1
         magnetic field of secondary cuts coil, induces output   B1   **3**

(c) (i) 18 W   A1

     (ii) 540 J   A1   **2**
                                                         [8]

10 (a) bring rod close but not touching plate   M1
    touch metal plate with earth lead   M1
    remove lead and then rod   A1   **3**

(b) (i) Q = 20 (mA) x 15 (s)   C1
          = 0.30 C   A1

     (ii) V = 20 (ma) x 10 (kΩ)   C1
             = 200 V   A1   **M3**
                                                         [6]

11 line1   into paper   B1
          positive or +2   B1
   line 2   out of paper or opposite of line 1   B1
          negative or -1   B1
   line 3   no deflection   B1
          no charge   B1   **6**
                                                         [6]