MARK SCHEME for the May/June 2014 series

0625 PHYSICS

0625/23   Paper 2 (Core Theory), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

NOTES ABOUT MARK SCHEME SYMBOLS & OTHER MATTERS

B marks   are independent marks, which do not depend on any other marks. For a B mark to be scored, the point to which it refers must actually be seen in the candidate's answer.

M marks   are method marks upon which accuracy marks (A marks) later depend. For an M mark to be scored, the point to which it refers **must** be seen in a candidate's answer. If a candidate fails to score a particular M mark, then none of the dependent A marks can be scored.

C marks   are compensatory method marks which can be scored even if the points to which they refer are not written down by the candidate, provided subsequent working gives evidence that they must have known it, e.g. if an equation carries a C mark and the candidate does not write down the actual equation but does correct working which shows he knew the equation, then the C mark is scored.

A marks   are accuracy or answer marks which either depend on an M mark, or which are one of the ways which allow a C mark to be scored.

c.a.o.   means "correct answer only".

e.c.f.   means "error carried forward". This indicates that if a candidate has made an earlier mistake and has carried his incorrect value forward to subsequent stages of working, he may be given marks indicated by e.c.f. provided his subsequent working is correct, bearing in mind his earlier mistake. This prevents a candidate being penalised more than once for a particular mistake, but **only** applies to marks annotated "e.c.f."

e.e.o.o.   means "each error or omission".

Brackets ( ) around words or units in the mark scheme are intended to indicate wording used to clarify the mark scheme, but the marks do not depend on seeing the words or units in brackets, e.g. 10 (J) means that the mark is scored for 10, regardless of the unit given.

Underlining   indicates that this must be seen in the answer offered, or something very similar.

OR/or   indicates alternative answers, any one of which is satisfactory for scoring the marks.

Spelling   Be generous about spelling and use of English. If an answer can be understood to mean what we want, give credit.

Significant figures
             Answers are acceptable to any number of significant figures ≥ 2, except if specified otherwise, or if only 1 sig. fig. is appropriate.

Units   Incorrect units are not penalised, except where specified. More commonly, marks are allocated for specific units.

Fractions   These are only acceptable where specified.

Extras   Ignore extras in answers if they are irrelevant; if they contradict an otherwise correct response or are forbidden by mark scheme, use right + wrong = 0.

Ignore   indicates that something which is not correct is disregarded and does not cause a right plus wrong penalty.

Not/NOT   indicates that an incorrect answer is not to be disregarded, but cancels another otherwise correct alternative offered by the candidate, i.e. right plus wrong penalty applies.

1 **(a)** horizontal first section   B1

   short lower section, roughly in middle   B1

   horizontal after middle section   M1

   same height as first section   A1

   final deceleration to rest   B1

   (b) **(i)** speed = distance/time OR distance / speed in words, symbols or numbers   C1

   1850 / 15   C1

   120 (s) or 123 (s), accept any number of sig. figs. ≥ 2   A1

   (ii) top box ticked, greater than   B1

   (c) distance travelled = area under graph   C1

   areas calculated   C1

   areas added or subtracted or trapezium equation correct, as appropriate   C1

   400 (m)   A1

   [Total: 13]

2 **(a)** (take) values off rule   C1

   of X and Y   C1

   subtract X from Y   A1

   (b) line between X and top RH corner (accept straight or curved)   B1

   [Total: 4]

3 **(a)** **(i)** decreases, accept transferred to KE (and heat)   B1

   (ii) increases   B1

   (iii) nothing / constant   B1

   (iv) increases   B1

   (b) transferred into the surroundings (as an increase in internal energy)
   OR transferred to thermal energy / sound
   accept decreases / becomes zero   B1

(c) decreases, accept becomes thermal energy, accept unchanged   B1

[Total: 6]

4 **(a)** **(i)** 80 ± 2 (mm)   B1

     (ii) 170 ± 2 (mm)   B1

   (b) **(i)** greater <u>because</u>
LH level lower **OR** RH level pushed up **OR** attempt at explaining in terms of
greater force on LH column pushes it down more   B1

     (ii) 90 (mm Hg)   e.c.f. **(a)**   B1

   (c) method for averaging answers to **(a)** or 90 / 2   C1

125 (mm) for both   e.c.f. **(a) (b) (ii)**   A1
(allow only one mark if no working but both stated as equal **OR** given equal but
incorrect values)

   (d) water would squirt out / not dense enough / tube would need to be (very) long (so
not practical)
accept not very dense, less dense than mercury   B1

[Total: 7]

5 **(a)** top box ticked   convection   B1

second box ticked   evaporation   –1 e.e.o.o.   B1

   (b) any idea of insulation / lagging
condone any sensible method for keeping drink warmer   B1

[Total: 3]

6 **(a)** less loud / quieter / lower volume / not as loud   B1

   (b) **(i)** louder / greater volume   B1

     (ii) higher pitch   B1

   (c) any two from: B2
compressions and / or rarefactions
waves / vibrations / it vibrates
longitudinal
energy passed from particle to particle / particles vibrate

(d) any value between 10–25 (Hz)   B1

any value between 15 000–25 000 (Hz) or 15–25 k(Hz)   B1

[Total: 7]

7 (a) spectrum   B1
      OR colours
      OR ROYGBIV
      OR red at top / A and violet / blue at bottom

(b) 2nd box ticked   dispersion   B1

bottom box ticked   refraction
 –1 for each extra above 2 ticks   B1

(c) (i) rays crossing / meeting before screen is reached   B1

    (ii) any two from: B2
        spot of light
        blurred / not in focus
        white
        coloured edge
        ignore image

[Total: 6]

8 (a) principal focus   B1
      condone focus / focal point

(b) (i) ray shown parallel to principal axis
        AND
        ray emerges to pass through F   B1

        refraction shown at centre line or at each surface   B1

    (ii) ray from X to P continues straight on   M1
        OR other principal focus correctly positioned and ray drawn
        through this and emerging from lens parallel to principal axis

        image (marked Y) correctly positioned   A1
        condone inverted or indicated where rays cross

[Total: 5]

9 (a) top box ticked, increase or decrease a.c.   B1

(b) (i) core   B1

    (ii) **1.** copper   **B1**

          2. $V_1 / V_2 = N_1 / N_2$ in words, symbols or numbers   **C1**

              correct substitution   **C1**

              200   **A1**

          3. glows less brightly / dimmer **OR** stops glowing   **B1**

                                                         [Total: 7]

10 **(a)** **(i)** friction / rubbing   **M1**

              on / with (dry) cloth / insulator   **A1**

      (ii) moves   **M1**

              to the right / to(wards) / by the rod / closer to (the rod)
              ignore sticks to, accept attracts / attracted for both marks   **A1**

     (iii) unlike / opposite charges attract **OR** positive attracts negative   **B1**

   (b) threads further apart at bottom than top   **M1**

      straight threads **OR** equal angles to vertical   **A1**

                                                           [Total: 7]

11 **(a)** voltmeter   **B1**

   (b) **(i)** ammeter **NOT** ampmeter   **B1**

      (ii) correct symbol for ammeter   **B1**

              ammeter in series with lamp <u>and</u> voltmeter across cell   **B1**
              condone voltmeter connected in parallel

   (c) **(i)** $V = IR$ OR V / R in words, symbols or numbers   **C1**

              1.9 / 0.038   **C1**

              50   **A1**

              Ω OR ohm(s)   **B1**

      (ii) bottom box ticked, no difference   **B1**

                                                           [Total: 9]

12 (a) 400 (counts / min)   B1

   (b) 3rd box ticked   half the number at the start   B1

   (c) 2nd box ticked   same as at the start   B1

   (d) (i) 84   B1

      (ii) 40   B1

      (iii) 44   B1

[Total: 6]