MARK SCHEME for the October/November 2009 question paper

for the guidance of teachers

0625 PHYSICS

0625/02   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 must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2009 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

NOTES ABOUT MARK SCHEME SYMBOLS AND 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 $\geqslant 2$, except if specified otherwise, or if only 1 sig. fig. is appropriate.

Units   It is expected that all final answers will have correct units. Deduct one unit penalty for each incorrect or missing unit, maximum 1 per question. No unit penalty if unit is missing from final answer but is shown correctly in the working.

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.

Work which has been crossed out, but not replaced, should be marked as if it had not been crossed out.

1 (a) (i) 20 (cm³)   )

    (ii) 25 (cm³)±0.5   ) both   B1   [1]

(b) 5 (cm³) e.c.f.   B1   [1]

(c) 5/200 e.c.f.   C1
0.025 (cm³) e.c.f.   A1   [2]

                                                           [Total: 4]

2 (a) kinetic or K.E. or motion   B1   [1]

(b) strain or elastic   B1   [1]

(c) gravitational or P.E. or G.P.E. or potential   B1   [1]

(d) weight /mass (of athlete) AND height/distance (of bar)   B1   [1]

                                                            [Total: 4]

3 (a) (i) 1. increasing   M1
               steady or uniform   A1
               2. constant   B1   [3]

    (ii) horizontal straight line between A & B   B1   [1]

(b) (i) line on axis between B & C   B1   [1]

    (ii) horizontal straight line between C & D   M1
               lower than that for AB   A1   [2]

(c) zero distance or equiv.   B1   [1]

                                                             [Total: 8]

4 (a) (i) moves to the left   C1
               accelerates to the left   A1   [2]

    (ii) arrow to the right   B1
               9 N   B1   [2]

    (iii) blob on diagram clearly indicated as the C of M   B1   [1]

(b) (i) rises   B1   [1]

(ii) less stable   B1   [1]

[Total: 7]

5 (a) (i) 1. cooling   OR   energy/heat lost seen anywhere in **(i)**   B1
         2. solidifying   or   temperature constant   B1
         3. cooling   B1   [3]

(ii) first and last both ticked   B1
      middle ticked   B1   [2]

(iii) solid   accept   ice/frozen   B1   [1]

(b) rising <u>curve</u> of some sort   C1
    idea of mirror image of Fig. 6.1   A1   [2]

[Total: 8]

6 (a) same   B1
    greater at B   B1
    greater at B   B1   [3]

(b) box 1 ticked   )   B1
) use ✓ + × =0 for extras
    box 3 ticked   )   B1   [2]

[Total: 5]

7 (a) q   B1   [1]

(b) F marked close to point of image/object   B1   [1]

(c) [mark in pairs, use ✓ + × =0]
    inverted   B1
    real   B1   [2]

(d) same   B1   [1]

(e) (i) nothing   C1   [1]

(ii) image blurs   A1   [1]

[Total: 7]

8 (a) one sound direct   B1
one sound after reflection/echo   B1   [2]

(b) first   M1
second one suffers absorption,dispersion   A1   [2]

(c) (i) $s = vt$ in any form   (seen somewhere in **(c)**)   B1
time to hear 1st sound = 990/330   or   3 (s)   B1   [2]

(ii) time to hear 2nd sound = (3 × 330)/330   or   9 (s)   B1   [1]

(iii) interval = 6 (s)   e.c.f.   B1   [1]

[Total: 8]

9 (a) L.H. circuit – series   AND   R.H. circuit – parallel   B1   [1]

(b) (i) 280 + 200   C1
480 (Ω)   A1   [2]

(ii) $I = V/R$ in any form   C1
12/his **(i)** seen   or   12/480   need not be seen   C1
0.025 or 25 or 1/40 c.a.o.   A1
A or mA as appropriate   B1   [4]

(iii) his **(ii)** × 200   or   proportion   or   potential divider calculation   C1
5 (V) e.c.f.   A1   [2]

(iv) connect voltmeter)   M1
) (could be shown on diag)
between A and B)   A1   [2]

[Total: 11]

10 (a) (i) core correctly labelled   B1   [1]

(ii) iron   B1   [1]

(iii) idea of magnetic linkage   B1   [1]

(b) $V_1/V_2 = N_1/N_2$ in any form   C1
correct substitution   C1
120 (V)   A1   [3]

[Total: 6]

11 no exposed wires   )
)
    no worn insulation   )
)
    no loose wires/connections   )
)
    no short circuits   )
) any 3
    plug correctly wired   )
)
    any idea about continuity check   )
)
    no sharp bends in cable   )   B1 x 3   **[3]**

                                                                                  [Total: 3]

12 (a) 5 points correctly plotted (–1 e.e.o.o.)   B2
        reasonable curve through his points   B1   **[3]**

    (b) (i) between 30 and 35 or his correct value ± 5   B1   **[1]**

        (ii) 2 (minutes) or his correct value ± 0.02   B1   **[1]**

    (c) 2 (minutes) or his **(b) (ii)**   B1   **[1]**

    (d) (i) half-life too short   B1   **[1]**

        (ii) mark any correct 2, ignore the rest

            long half life   )
)
            gamma-emitter   )
)
            good penetration   ) any 2
)
            similar particle size   )
)
            similar density   )   B1+B1   **[2]**

                                                                                    [Total: 9]