CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2013 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 October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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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”.

o.w.t.t.e. means “or words to that effect”.

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 significant figure 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)** 2.4 and 15.6 used C1
13.2 (cm) A1

(b) R.H. end at {candidate's **(a)** + 1.0 (cm)} B1

(c) 4.4 (cm) OR candidate's **(a)** / 3 correctly evaluated C1
division by 4 C1
1.1 (cm) e.c.f. A1

[Total: 6]

2 **(a)** **(i)** chemical B1

(ii) GPE / gravitational potential energy (allow gravitational / potential / thermal) B1

(b) all stated quantities are appropriate for calculating power, expect weight/mass and height and time
–1 for each error or omission (minimum zero) B2

(c) athlete/he/she is heavier o.w.t.t.e. B1

[Total: 5]

3 **(a)** **(i)** any statement that indicates that sound travels slower than light B1
("sound travels slowly", on its own, gets zero)

(ii) speed = distance/time in any form C1
1700/5 C1
340 A1
m/s B1

(b) **(i)** 2nd box ticked / before the girl B1

(ii) bottom box ticked / louder B1

[Total: 7]

4 **(a)** thermometer B1

(b) temperature B1

(c) mercury / Hg / alcohol B1

(d) put it in ice M1
melting A1

(e) liquid/Hg/alcohol expands/moves along tube/gets hotter B1

[Total: 6]

5 **(a)** **(i)** cross same distance from mirror, B1
line joining cross and object would be perpendicular to mirror, B1

(ii) reflected ray going down to left B1

EITHER line of reflected ray, goes through candidate's dot
OR angles of incidence and reflection are equal, by eye
} B1

(iii) normal shown correctly drawn, B1
i and *r* correctly marked B1

(b) same size
behind mirror
same distance from mirror
virtual
same height above ground, o.w.t.t.e.
upright
allow idea of side to side swap / laterally inverted
} any 2 B1+B1

(c) light reflected at each surface / both sides B1

[Total: 9]

6 **(a)** **(i)** further apart at bottom / 2nd box ticked M1

(ii) like charges repel / positive charges repel other positive charges A1

(b) **(i)** closer together at bottom / bottom box ticked M1

(ii) unlike/opposite/different charges/ + and – / attract A1

(c) moves to L OR moves towards rod OR attracted by rod B1
moves to R OR moves away from rod OR repelled by rod B1

[Total: 6]

7 **(a)** conduction B1

(b) convection B1

(c) conduction B1
convection B1

[Total: 4]

8 **(a)** (radio)
infra-red
visible
ultra-violet
X-rays
gamma B2

note: all 5 correct gains B2, any 3 consecutive in correct order, even if shifted in list, gains B1

(b) between radio and infra-red B1

(c) idea that microwaves can be hazardous B1

(d) communications
GPS/satellite navigation
satellite TV
mobile/cell phones
} any 1 B1

[Total: 5]

9 **(a)** **(i)** 0.3 (A) B1

(ii) 0.3 (A) B1

(b) $R = V/I$ in any form OR IR C1
0.3 × 10 C1
3 (V) OR 3.0 (V) A1

(c) **(i)** variable resistor / variable resistance / rheostat B1

(ii) zero OR 0 (Ω) OR "nothing" stated B1

(iii) decreases B1

[Total: 8]

10 **(a)** **(i)** 4th box ticked B1

(ii) p.d. / 12 V / voltage is shared between two resistors B1
LDR more than half / greater share of 12 V B1

(b) **(i)** any 3 from:
current in coil
coil becomes electromagnet
magnetic field (generated) around coil
coil attracts / closes switch B3

(ii) lights up o.w.t.t.e. B1

(c) **(i)** in darkness B1

(ii) 1st box ticked B1

[Total: 9]

11 (a) (i) plastic absorbs alpha / alpha will not penetrate plastic / will not be detected B1

(ii) more particles reach detector when closer B1

(iii) idea of short half-life will cause inaccuracy over time or will need replacing B1

(b) (i) 88 B1

(ii) 226 – 88 / i.e. candidate's **(b)(i)** C1
138 / e.c.f. A1

(iii) 226 – 222 = 4 OR 88 – 86 = 2 C1
α-particle A1

[Total: 8]

12 (a) (i) iron B1

(ii) copper B1

(b) $V_1/V_2 = N_1/N_2$ in any form C1
correct substitution C1
12 (V) A1

(c) 3 lamps all in parallel, connected correctly to Fig. 12.1 output terminals B1
correct symbol for all 3 lamps B1

[Total: 7]