CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 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.

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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. For example, 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.
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.
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”.
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.
AND	indicates that both answers are required to score the mark.
Spelling	Be generous with spelling and use of English. However, do not allow ambiguities e.g. spelling which suggests confusion between reflection/refraction/diffraction or thermistor/transistor/transformer.
Sig. figs.	On this paper, answers are generally acceptable to any number of significant figures ≥2, except where the mark scheme specifies otherwise or gives an answer to only 1 significant figure.
Units	On this paper, incorrect units are not penalised, except where specified. More commonly, marks are awarded for specific units.
Fractions	Fractions are only acceptable where specified.

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Extras	If a candidate gives more answers than required, irrelevant extras are ignored; for extras which contradict an otherwise correct response, or are forbidden by the mark scheme, use right plus wrong = 0.
Ignore	indicates that something which is not correct is disregarded and does not cause a right plus wrong penalty.
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.

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1 **(a)** volume = length × cross-sectional area words, symbols or numbers C1

8.0 accept 8 (cm^3) A1

(b) time of burning: 2 hours 15 minutes B1

2.25 hours, accept 2¼ hours B1

(c) (speed =) distance ÷ time in any form: symbols, words, numbers, ecf from **(b)** C1

0.8(0) cm / hour, ecf from **(b)** A1

(d) correct deduction from candidate's **(c)** B1

correct reasoning from candidate's **(c)**
e.g. 24 cm candle would burn for 30 h **OR** 19.2 cm will burn in 24 h B1

[Total: 8]

2 **(a)** **(i)** rule(r) A1

(ii) balance A1

(b) **(i)** (density =) mass ÷ volume in any form: symbols, words, numbers C1

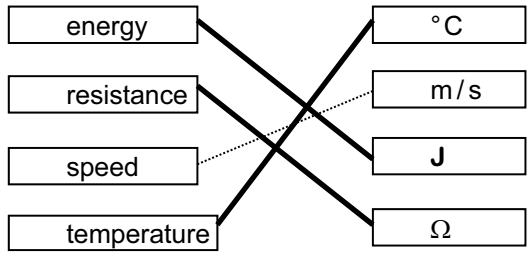
15.2 ÷ 1.36 C1

11.2 (g / cm^3) accept 11 A1

(ii) lead, ecf from **(b) (i)** B1

[Total: 6]

3



max. B2

note: 1 mark for 1 or 2 lines correct, 2 marks for all 3 lines correct

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4 **(a)** 4 (N) B1
up the slope B1

(b) idea of changes speed C1
reduces speed / slows down / decelerates / retardation A1

[Total: 4]

5 **(a)** 1100 (m) ± 20 B1

(b) stationary / not moving / at rest B1

(c) **(i)** C **AND** D B1

(ii) D **AND** E B1

(d) (speed=) distance ÷ time, in any form: symbols, words, numbers, ecf from **(a)** C1

use of 300 s **OR** conversion of time to s **OR** ÷ 60 C1

3.7 **OR** 3.67 (m / s) A1

[Total: 7]

6 **(a)** line from fossil fuel to coal-fired B1

line from hot rocks underground to geothermal B1

line from uranium fuel rods to nuclear B1

(b) D, C, B, A max. B3

note: all correct order = 3 marks, 2 or 3 correct = 2 marks, 1 correct = 1 mark

[Total: 6]

7 **(a)** melting evaporating / boiling max. B3
freezing / solidification condensing

note: 3 marks for all 4 correct, 2 marks for 3 correct, 1 mark for 2 correct

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(b) tick in first box (particles move randomly) B1

tick in third box (particles are much further apart...) B1

tick in sixth box (particles move faster...) B1

(c) any three from: max. B3
- nail varnish remover evaporates
- energy needed to evaporate / most energetic particles escape
- energy is transferred from student / heat flow gives sensation of cold
- remaining liquid colder / average KE is less

[Total: 9]

8 (a) arrow from candle to mirror **OR** from mirror to eye B1
NOT contradictions

(b) candle flame image drawn at same height as flame B1

candle flame image drawn same distance behind mirror as flame is in front B1

(c) (i) further away (from mirror / eye) B1

(ii) same (size) / nothing / does not change B1

[Total: 5]

9 (a) (i) 1. amplitude B1

2. D B1

(ii) any named example of electromagnetic wave **OR** seismic 'S' wave B1

(iii) speed = distance÷time **OR** 7.5 × 4.0 **OR** speed × time C1

30 (cm) A1

(b) (i) at least one straight line in shallow water and at different angle,
accept refracted wrong way B1

line(s) show wave refraction away from normal B1

at least 3 lines drawn showing refracted wave of constant wavelength, different from incident wavelength, and continuous with incident wavefronts B1

(ii) refraction B1

[Total: 9]

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10 (i) **1.** negative B1

2. electrons B1

(ii) (both) strips have same (type of) charge B1

(and so) repel (each other) B1

(iii) (idea of) shirt gaining / losing (electric) charge **OR** becomes charged **OR** charge transferred between shirt and body B1

unlike charges attract B1

[Total: 6]

11 (a) A: warm ticked B1

B: off ticked B1

C: hot ticked B1

(b) $V = I \times R$ in any form **OR** $V \div I$ C1

(R =) 10 ÷ 6.0 C1

1.7 OR 1.67 (Ω) A1
accept 1.66 1.6 scores 2 marks

(c) lamp B1

to indicate heater is on / working B1

(d) any two from: max. B2
- fuse identified as the relevant component
- the fuse will melt / blow / break
- (this) breaks circuit / stops current

[Total: 10]

12 (a) **(i)** proton B1

(ii) electron B1

(b) nucleon number = 14 B1

proton number = 7 B1

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(c) evidence of halving 20 000 C1

idea of three half lives C1

3 × 5800 allow ecf for candidate's no. of ½ lives C1

17 400 (years) A1

[Total: 8]

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