**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**Cambridge International General Certificate of Secondary Education**

# MARK SCHEME for the October/November 2015 series

## 0625 PHYSICS

**0625/22** 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.

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## 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. 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 or she 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 or she may be given marks indicated by e.c.f. provided his or her subsequent working is correct, bearing in mind his or her 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".

owtte means “or words to that effect”

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

OR indicates alternative answers, any one of which is satisfactory for scoring the mark.

AND indicates that both answers are required to score the mark.

Spelling Be generous about spelling and use of English. However, do not allow ambiguities, e.g. spelling which suggests confusion between reflection / refraction / diffraction or thermistor / transistor / transformer.

Significant figures Answers are generally acceptable to any number of significant figures ≥ 2, except where the mark scheme specifies otherwise.

Units On this paper, incorrect units are not penalised, except where specified. More commonly, marks are allocated for specific units.

Fractions These are only acceptable where specified.

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)** any **two** from: B2
wire not starting at 0 cm
wire not straight
wire away from / not close to rule

**(b)** **(i)** 0.65 (cm) B1

**(ii)** candidate's **(b)(i)** / 8 C1
0.8125 OR 0.813 OR e.c.f. C1
0.81 A1

**[Total: 6]**

**2** **(a)** **(i)** 10 (m / s) B1

**(ii)** distance = speed × time OR 10 × 20 C1
200 (m) A1

**(iii)** 7 (s) B1

**(b)** **(i)** 50 (N) B1
forwards B1

**(ii)** (cyclist is) accelerating / speed increases B1

**(iii)** move more slowly / speed decreases / decelerates B1

**[Total: 8]**

**3** **(a)** decreases B1

**(b)** increases B1

**(c)** increases B1

**(d)** increases B1
does not change B1
decreases B1

**[Total: 6]**

**4** **(a)** **(i)** joule / J / kJ B1

**(ii)** kinetic B1

**(iii)** heat / thermal B2
sound

**(iv)** more efficient. B1

**(b)** greater area (of tyres in contact with ground) B1
less pressure B1
weight / force spread out OR $p = F / A$ B1

**[Total: 8]**

**5** **(a)** strip bent upwards B1

**(b)** **(i)** two fixed points marked B1
ice or steam point stated B1
positions divided by difference in temperature OR the more it bends the higher the temperature B1

**(ii)** plausible suggestion, e.g. inaccurate, too large, difficult to calibrate B1

**[Total: 5]**

**6** **(a)** **(i)** at least two arrows pointing in correct direction B1

**(ii)** convection B1

**(b)** hot water expands / water molecules further apart B1
hot water less dense B1
hot water rises B1
cool water falls / takes place of hot water B1

**[Total: 6]**

**7** **(a)** **(i)** sound travels slowly B1
sound travels slower than light or reverse argument B1

**(ii)** reflection of the sound from the cliff B1

**(b)** evidence of average found / 1.56 OR 1.6 B1
speed = distance / time in any form: words, symbols, numbers C1
500 / 1.6 OR 500 / candidate's time C1
321 OR e.c.f. A1

**[Total: 7]**

**8 (a) (i)** $F_2$ correctly positioned and labelled B1

**(ii)** ray through centre C of the lens correctly drawn B1

**(iii)** second ray correctly drawn through either principal focus and horizontal section, correct to better than ± 1 small square B1

**(iv)** position of inverted image shown B1

**(b)** diminished
inverted
real B3

**[Total: 7]**

**9 (a) (i)** a.c. waveform drawn B1

**(b) (i)** (step-down) transformer B1

**(ii)** $V_1 / V_2 = N_1 / N_2$ B1
4800 / (120 / 10) OR correct substitution C1
400 A1

**[Total: 5]**

**10 (a) (i)** iron core becomes an electromagnet B1
(bar magnet is) repelled B1

**(ii)** steel B1

**(b)** move pivoted magnet to new position B1
mark direction of arrow OR mark direction N pole points B1
repeat for other positions around magnet B1

**[Total: 6]**

**11 (a)** motor / blower and heater B3
motor / blower only
nothing / none OR left blank
nothing / none OR left blank

Any three correct for 2 marks.
Any two correct for 2 marks.

**(b)** $V = IR$ B1

**(c)** 250 / 2 C1
125 (Ω) A1

**(d) (i)** fuse symbol correct and placed correctly B1

**(ii)** (fuse) wire melts B1
circuit breaks / incomplete B1

**[Total: 9]**

**12 (a)** nature: helium nucleus owttte, (e.g. 2p + 2n) B1
charge: minus 1 / –1 / 1– / negative B1

**(b) (i)** (α particles) produce more ions (/ cm) B1
(α particles) collide with / are stopped by smoke B1

**(ii)** 100 years B1

**(c)** 237 B1
93 B1

**[Total: 7]**