CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0625 PHYSICS

0625/21 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”.

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 $\geqslant 2$, 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)** (speed =) distance / time in words, symbols or numbers C1

(37.1 – 2.1 =) 35 C1

35 / 7 C1

5(.0) (cm / day) A1

(b) **(i)** 3 points correctly plotted to ½ square B2

(ii) (vertical) spacing not uniform / equal **OR** points not on a straight line **OR** points do not line up **OR** difference in gradients between points B1

[Total: 7]

2 **(a)** increase / change / difference in length **OR** new length – original length **OR** amount / length / distance it stretches B1

(b) **(i)** **1.** 2 seen **OR** used C1

11(.0) (cm) A1

2. 0.8 (cm) B1

(ii) $W = m \times g$ in words, symbols or numbers **OR** correct conversion used, e.g. 1 kg = 10 N C1

200 g / 0.2 kg A1

[Total: 6]

3 **(a)** bright specks **OR** spots / dots **OR** flashes of light B1

moving randomly **OR** jerky movements **OR** zig zag / jiggling B1

(b) line representing a smoke particle moving with a change of direction B1

line is straight with at least 2 changes of direction B1

(c) collisions / bombardment B1

(with) air atoms / molecules / particles B1

(d) Brownian B1

[Total: 7]

4 **(a)** greater pressure from man **OR** man will fall through ice **OR** ice will break / crack B1

(b) idea of increasing area **OR** spreading load M1

any three from: A3
larger (surface) area
load / weight / force more spread out
less pressure
use of $P = F / A$

[Total: 5]

5 **(a)** 74 (°C) B1

(b) any three from: B3
particles move further apart / heating causes expansion
warm air less dense **OR** cold air more dense
hot air rises **OR** cold air falls
convection (current)

(c) moves / goes down (tube) **OR** gives a lower reading B1

contracts / decreases in volume / shrinks B1

(d) any indication between –10 °C and centre of bulb B1

[Total: 7]

6 **(a)** **(i)** *i* and *r* both clearly correct B1

(ii) $i = r$ B1

(iii) seeing over / around an obstacle B1

(iv) image / ray moves / misses eye **OR** viewer can no longer see image / ray / anything **OR** viewer sees inside of tube **OR** angle of incidence / reflection changes B1

(b) **(i)** 2 focal lengths indicated B1

(ii) ray parallel to axis **AND** emergent ray goes through F1 B1

refraction shown at centre line **OR** at each surface B1

(iii) incident ray through principal focus **AND** emergent ray parallel to axis B1

[Total: 8]

7 **(a)** (milli)ammeter **OR** galvanometer **NOT** ampmeter B1

(b) **(i)** nothing / stays the same / half-way B1

(ii) nothing / stays the same / half-way B1

(iii) nothing / stays the same / half-way B1

(iv) it / arrow / pointer moves / goes / flicks **OR** current changes M1

left and right **OR** backwards and forwards A1

(c) generator **OR** dynamo **OR** microphone B1

[Total: 7]

8 **(a)** **(i)** nothing / zero / 0 B1

(ii) $V = IR$ or V / R in words, symbols or numbers C1

6 / 10 C1

0.6 A1

A **OR** amp(s) **OR** ampere(s) B1

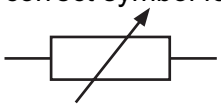
(iii) candidate's **(a)(ii)** B1

(b) **(i)** <u>variable</u> resistor **OR** rheostat

OR potential divider B1

(ii) neat, correct circuit with one added component in series with lamp B1

correct symbol for <u>variable</u> resistor B1



[Total: 9]

9 **(a)** idea of points to north (pole of Earth) M1

when freely suspended / floating on water A1

OR

repels (M1)

a (known) N pole (A1)

(b) (i) repulsive / repel B1

(ii) repulsive / repel B1

(iii) attractive / attract B1

(c) (i)

S	N

B1

(ii) attractive / attract B1

(iii) attractive / attract B1

[Total: 8]

10 (a) iron B1

(b) $V_1 / V_2 = N_1 / N_2$ in words, symbols or numbers C1

correct substitution C1

12 (V) A1

[Total: 4]

11 (a) alpha **OR** α
beta **OR** β
gamma **OR** γ

in any order
if two correct, 1 mark

B2

(b) (i) beta **OR** β B1

(ii) alpha **OR** α B1

(iii) alpha **OR** α B1

(c) (i) 2 B1

(ii) evidence of number of atoms halved twice B1

6×10^{10} B1

(iii) candidate's **(c)(ii)** B1

[Total: 9]

12 (a) 17 B1

(b) 20 B1

(c) 17 B1

[Total: 3]