CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 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.

Cambridge is publishing the mark schemes for the May/June 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

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 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)** **(i)** use of 2.55 (or 1455) and 3.20 (or 1520) C1
25 (mins) A1

(ii) yes/no, compatible with candidate's time B1

(b) (speed =) distance ÷ time in any form C1
6 / 25 OR 6000 / 25 OR 6 / (25 × 60) OR 6000 / 1500 e.c.f. **(a)**
OR 0.24 OR 240 OR 0.004 (no e.c.f. if working not shown) C1
4 (m / s) A1
allow e.c.f. from **(a)** if working shown

[Total: 6]

2 **(a)** **(i)** moment B1
accept torque

(ii) F at/near L.H. edge (ignore not vertical) B1

(b) **(i)** idea of toppling
accept falls (over/onto its side)
ignore slides B1

(ii) above or just beyond edge of box OR outside base of box C1
vertically above edge of box OR above R.H. edge of box A1

(c) might topple accept fall (over/forwards) M1
idea of (vertical through) Centre of Mass being outside base
OR clockwise moment becomes too great A1
special case: accept for 1 mark might jam/catch hand between drawers

[Total: 7]

3 **(a)** ruler vertical OR ruler close B1
accept use a ruler

EITHER
measure length before and after
OR note position of bottom before and after M1
Subtract A1

OR
put ruler zero at bottom of spring M1
note reading of bottom after load applied A1

(b) **(i)** 58 and 297 (both) B1

(ii) (ignore (0, 0) not plotted)
6 points correctly plotted ± half small square –1 e.e.o.o. B2

(iii) 249 (mm) OR 239 (mm) OR 2 (N) OR 49 (mm) B1

(iv) good straight line through points and (0, 0) B1

(v) doubles B1
directly proportional B1
NOT inversely/indirectly proportional

[Total: 10]

4 **(a)** liquid/alcohol/mercury/reading (level) rises/increases/moves along the tube/expands B1
ignore temperature increases

(b) liquid expands OR liquid molecules get further apart B1

(c) arrow indicating 100 °C by eye B1

(d) idea of large movement of thread (for small temperature change) B1
accept it increases sensitivity o.w.t.t.e.

[Total: 4]

5 **(a)** liquid, condone named liquid
gas, condone named gas
solid
any 1 correct B1
other 2 correct B1

(b) **(i)** melting/fusion B1

(ii) condensation B1

(iii) evaporation OR boiling B1

[Total: 5]

6 **(a)** correct idea of focal length C1
focal length accurately shown ± 1 mm A1

(b) **(i)** ray from top of object parallel to axis as far as lens, then down through F_1
(ignore point of refraction, as long as somewhere on lens)
OR M1
ray from top of object, straight through centre of lens
(NOTE: ray need not intersect printed one to score M1)
image drawn perpendicularly between intersection of candidate's rays and axis A1

(ii) diminished o.w.t.t.e. B1
inverted (ignore laterally) OR upside down B1
ignore brightness, ignore direction is changed, accept direction is reversed

[Total: 6]

7 (a)

lamp that is lit	switches closed				
	1	2	3	4	5
lamp A only	✓	✓	✓		
lamp B only	✓	✓		✓	
lamp C only	✓				✓

B1

B2

ignore any additions for lamp A
for C allow B1 only for ✓ ✓ ✓

(b) all of them OR A, B and C B1

(c) (switch) 1 B1

[Total: 5]

8 (a) (i) charge OR charged particles OR electrons B1

(ii) p.d./cell/battery/e.m.f. across it OR move in a magnetic field OR connect to positive AND negative of power supply B1
ignore connect to a battery

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

(b) (i) $R_1 + R_2$ OR 8 + 4 C1
12 Ω A1

(ii) $V = IR$ in any form OR V/R C1
6 / 12 C1
0.5 A A1

(iii) **1.** decreases, ignore numbers B1
2. decreases, ignore numbers B1

[Total: 10]

9 **(a)** **(i)** copper B1

(ii) iron, accept (silicon) steel B1

(b) $V_1 / V_2 = N_1 / N_2$ in any form C1
correct substitution e.g. $240 / 6 = 800 / N_2$ C1
20 A1

(c) **(i)** idea that they would blow/burn out B1
accept blow up

(ii) 2 or more lamps in parallel across AB and none in series B1

[Total: 7]

10 **(a)** **(i)** basic pattern correct, three lines C1
basic pattern correct, five lines or more A1
no lines meeting or crossing, even at magnet ends B1

(ii) direction arrow correct (condone more than one unless any of them wrong) B1

(b) **(i)** basic pattern correct outside coil, four lines or more B1
lines present and continuous and not touching within core B1

(ii) iron / steel B1
ignore magnet/magnetic metal

(iii) solenoid B1

[Total: 8]

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

any 1 correct B1
other 2 correct B1

(b) 2nd statement ticked B1

(c) (i) 24 (s) ± 0.5 B1

(ii) 2 B1

(iii) candidate's **(i)** ÷ candidate's **(ii)**, correctly evaluated B1
(24 ÷ 2 = 12 (s))

[Total: 6]

12 (a) (i) electron B1

(ii) proton and neutron (both, either order) B1

(b) (i) (number of) protons accept proton number B1
NOT no. of protons and electrons

(ii) neutron(s) B1

(iii) **1.** 17, accept 2, 8, 7 B1

2. 17, accept 2, 8, 7 B1

[Total: 6]