UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

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 must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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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)**	BC OR 40 – 70 OR 2nd section	B1
		(ii)	AB OR 0 – 40 OR 1st section	B1
	(b)	**(i)**	area under graph OR speed × time seen or used	C1
			70–40 OR 30	C1
			8 × 30 e.c.f.	C1
			240 (m)	A1
		(ii)	7 × 10 OR average speed × time OR area of triangle + area of rectangle	C1
			70 (m)	A1
	(c)		line down from D to axis at 110s (need not be straight)	B1
				[Total: 9]
2	**(a)**		76 (cm Hg)	B1
	(b)		60 – 50	C1
			candidate's **(a)** + or – 10 e.c.f.	C1
			86 (cm Hg) c.a.o.	A1
	(c)		L.H. goes up	B1
			R.H. goes down	B1
				[Total: 6]
3	**(a)**		diagonal, top L to bottom R, drawn (accept any part of this diagonal)	B1
	(b)		within range 23 – 27 (°)	B1
	(c)		candidate's **(b)**	B1
	(d)		larger angle before toppling	B1
				[Total: 4]
4	**(a)**	**(i)**	gravitational/potential/GPE/PE	B1
		(ii)	force/mass/weight AND height/distance	C1
			force/mass/weight <u>of (basket) of rocks</u> AND height/distance <u>of cliff</u>	A1
	(b)		chemical/chemical PE NOT just PE	B1
	(c)		time	M1
			to raise basket up cliff	A1
				[Total: 6]

5 **(a)** clear cross/dot at centre of waves — B1

(b) wave approximating to a "sine" wave — M1
equal spacing, by eye
amplitude greater at one end/centre than other } any 1 — A1
waves above and below equilibrium line

(c) **(i)** constant (in any direction) — B1
same in all directions — B1

(ii) concentric circle — M1
same spacing as others, by eye (allow free-hand drawing) — A1

[Total: 7]

6 **(a)** 0 and 100 — B1

(b) **(i)** expands — B1

(ii) moves along the tube/up/to the right — B1
stops at/near 100 mark/100°C/100/temp of boiling water — B1

(c) arrow pointing to somewhere between RH end of bulb & –10 mark — B1

[Total: 5]

7 **(a)** any large surface, stated or example e.g. wall/cliff/mountain — B1

(b) **(i)** when hears bang/sees flash — B1

(ii) when hears echo — B1

(c) **(i)** use of 2.25 (s) — C1
speed = distance/time in any form OR 2×distance/time — C1
720/2.25 OR 360/2.25
allow e.c.f. from time, if working shown — C1
320 (m/s) c.a.o. — A1

(ii) distance from firework
reaction time, however expressed } any 1 — B1
stretching tape
wind

[Total: 8]

8 **(a)** molecules/atoms/particles oscillating/vibrating B1
bigger vibrations/amplitude/spacing when heated B1

(b) **(i)** appropriate situation + problem
e.g. telegraph wires + contract in cold weather M1
description of solution e.g. allowed to sag between poles A1

(ii) appropriate example e.g. fitting metal tyres M1
description of procedure e.g. heat tyres before fitting A1
[Total: 6]

9 **(a)** moves/deflects M1
momentary (or equivalent) OR goes back to zero/centre A1

(b) moves/deflects in other direction B1

(c) e.m.f./electromagnetic force/current/voltage/p.d. B1
induced B1
(allow B1 for magnetic field is changed)
[Total: 5]

10 **(a)** line with negative slope throughout B1
negative intercept on I axis B1

(b) $R = V/I$ in any form C1
2/5 C1
0.4 (A) A1

(c) **(i)** 20 (Ω) B1

(ii) 0.1 (A) B1

(d) idea of current halved, so resistance doubled C1
5 OR 5.0 (Ω) A1

(e) heating and magnetism ticked –1 e.e.o.o. B2
[Total: 11]

11 (a) diagram:
source, solid absorber, detector shown in line — B1

method:
distance between source & detector small/<5cm — B1
take reading with no absorber — B1
insert sheet of paper/aluminium (ignore thickness) — B1
take reading with absorber present — B1

identification:
if no/background reading with paper absorber, then α
OR if still get a reading, then β — B1

(NOTE no mark for identification based on A*l* absorber)

(b) in range 15–20 (mins) — B1

[Total: 7]

12 (a) (i) nucleus — B1

(ii) electron(s) — B1

(b) (i) proton(s) — B1

(ii) 2 — B1

(iii) 4 at top — B1
2 at bottom — B1

[Total: 6]