UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

0625 PHYSICS

0625/02 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.

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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. 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 $\geqslant 2$, except if specified otherwise, or if only 1 sig. fig. is appropriate.

Units It is expected that all final answers will have correct units. Deduct one unit penalty for each incorrect or missing unit, maximum 1 per question. No unit penalty if unit is missing from final answer but is shown correctly in the working.

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.

Work which has been crossed out, but not replaced, should be marked as if it had not been crossed out.

1	**(a)**	**(i)**	20 (cm^3))		
		(ii)	25 (cm^3)±0.5) both	B1	[1]
	(b)		5 (cm^3) e.c.f.	B1	[1]
	(c)		5/200 e.c.f. 0.025 (cm^3) e.c.f.	C1 A1	[2]
					[Total: 4]
2	**(a)**		kinetic or K.E. or motion	B1	[1]
	(b)		strain or elastic	B1	[1]
	(c)		gravitational or P.E. or G.P.E. or potential	B1	[1]
	(d)		weight /mass (of athlete) AND height/distance (of bar)	B1	[1]
					[Total: 4]
3	**(a)**	**(i)**	1. increasing steady or uniform 2. constant	M1 A1 B1	[3]
		(ii)	horizontal straight line between A & B	B1	[1]
	(b)	**(i)**	line on axis between B & C	B1	[1]
		(ii)	horizontal straight line between C & D lower than that for AB	M1 A1	[2]
	(c)		zero distance or equiv.	B1	[1]
					[Total: 8]
4	**(a)**	**(i)**	moves to the left accelerates to the left	C1 A1	[2]
		(ii)	arrow to the right 9 N	B1 B1	[2]
		(iii)	blob on diagram clearly indicated as the C of M	B1	[1]

(b) (i) rises B1 [1]

(ii) less stable B1 [1]

[Total: 7]

5 (a) (i) 1. cooling OR energy/heat lost seen anywhere in **(i)** B1
2. solidifying or temperature constant B1
3. cooling B1 [3]

(ii) first and last both ticked B1
middle ticked B1 [2]

(iii) solid accept ice/frozen B1 [1]

(b) rising curve of some sort C1
idea of mirror image of Fig. 6.1 A1 [2]

[Total: 8]

6 (a) same B1
greater at B B1
greater at B B1 [3]

(b) box 1 ticked) B1
) use ✓ + × =0 for extras
box 3 ticked) B1 [2]

[Total: 5]

7 (a) q B1 [1]

(b) F marked close to point of image/object B1 [1]

(c) [mark in pairs, use ✓ + × =0]
inverted B1
real B1 [2]

(d) same B1 [1]

(e) (i) nothing C1 [1]

(ii) image blurs A1 [1]

[Total: 7]

8 **(a)** one sound direct B1
one sound after reflection/echo B1 [2]

(b) first M1
second one suffers absorption,dispersion A1 [2]

(c) **(i)** s = vt in any form (seen somewhere in **(c)**) B1
time to hear 1st sound = 990/330 or 3 (s) B1 [2]

(ii) time to hear 2nd sound = (3 × 330)/330 or 9 (s) B1 [1]

(iii) interval = 6 (s) e.c.f. B1 [1]

[Total: 8]

9 **(a)** L.H. circuit – series AND R.H. circuit – parallel B1 [1]

(b) **(i)** 280 + 200 C1
480 (Ω) A1 [2]

(ii) I = V/R in any form C1
12/his **(i)** seen or 12/480 need not be seen C1
0.025 or 25 or 1/40 c.a.o. A1
A or mA as appropriate B1 [4]

(iii) his **(ii)** × 200 or proportion or potential divider calculation C1
5 (V) e.c.f. A1 [2]

(iv) connect voltmeter) M1
) (could be shown on diag)
between A and B) A1 [2]

[Total: 11]

10 **(a)** **(i)** core correctly labelled B1 [1]

(ii) iron B1 [1]

(iii) idea of magnetic linkage B1 [1]

(b) $V_1/V_2 = N_1/N_2$ in any form C1
correct substitution C1
120 (V) A1 [3]

[Total: 6]

11 no exposed wires)
)
no worn insulation)
)
no loose wires/connections)
)
no short circuits)
) any 3
plug correctly wired)
)
any idea about continuity check)
)
no sharp bends in cable) B1 x 3 [3]

[Total: 3]

12 **(a)** 5 points correctly plotted (–1 e.e.o.o.) B2
reasonable curve through his points B1 [3]

(b) **(i)** between 30 and 35 or his correct value ± 5 B1 [1]

(ii) 2 (minutes) or his correct value ± 0.02 B1 [1]

(c) 2 (minutes) or his **(b) (ii)** B1 [1]

(d) **(i)** half-life too short B1 [1]

(ii) mark any correct 2, ignore the rest

long half life)
)
gamma-emitter)
)
good penetration) any 2
)
similar particle size)
)
similar density) B1+B1 [2]

[Total: 9]