

**MARK SCHEME for the October/November 2011 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.

Cambridge is publishing the mark schemes for the October/November 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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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".
- 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** Answers are acceptable to any number of significant figures ≥ 2 , except if figures 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.

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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.

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- 1 (a) 25km B1
- (b) (i) accelerating OR increasing speed B1
- (ii) steady/constant speed B1
- (iii) decelerating OR retarding OR slowing down B1
- (c) less than B1 [5]
- 2 (a) Brownian (motion) B1
- (b) bombardment by (water) molecules/particles/atoms random OR from all directions M1 A1 [3]
- 3 (a) strain/elastic/potential B1
- (b) Y OR vertical OR straight down B1
- (c) (i) 1. number of oscillations/vibrations/swings per second/unit time NOT in a certain time M1 A1
2. displacement/distance from mean position maximum M1 A1
(note: XY or YZ score M1A1)
- (ii) decreases or equivalent B1
- (d) Y OR vertical OR straight down B1 [8]
- 4 (a) (i) liquid B1
- (ii) gas/vapour B1
- (iii) liquid B1
- (b) condensation B1
- (c) decreases OR given to the jug/surroundings OR changes to another form B1 [5]
- 5 (a) 30.98 – 30.72 C1
0.26 (g) A1

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	(b) $D = M/V$ in any form candidate's 0.26/200 0.0013 e.c.f. from (a) g/cm^3	C1 C1 A1 B1	[6]
6	(a) (i) reflection OR wave bounces back from large object/sea bed (ii) speed = distance/time in any form 1500×0.8 1200 (m) (iii) 600 (m) OR $\frac{1}{2} \times$ candidate's (ii), correctly evaluated	M1 A1 C1 C1 A1 B1	
	(b) line with positive gradient straight line OR meets horizontal axis to right of graph origin	M1 A1	[8]
7	(a) (i) image behind mirror image same distance from mirror, by eye <u>and</u> image-object line perpendicular to mirror, by eye (ii) (ignore any arrows) reflected ray reaching eye direction of reflected ray coming from image	M1 A1 B1 B1	
	(b) HIS	B1	
	(c) both rays straight on at first surface 30° prism ray refracted down in air at 2 nd surface 45° prism ray reflected down in glass at 2 nd surface 90° reflection, by eye straight on at 3 rd surface	B1 B1 M1 A1 A1	[10]
8	(a) (i) limit/control current OR adjust resistance (ii) ammeter shows a reading (iii) copper <u>and</u> iron ticked –1 e.e.o.o.	B1 B1 B1	
	(b) (i) voltmeter NOT voltameter (ii) voltmeter shown in parallel to heater (condone incorrect symbol if clear it is a voltmeter) NO e.c.f. from (i)	B1 B1	
	(c) (i) top heater and switch correctly connected middle 2 heaters and switch correctly connected	B1 B1	

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	(ii) $R = V/I$ in any form	C1
	250/2.5	C1
	100	A1
	ohm OR Ω	B1
	(iii) smaller ticked	B1 [12]
9	(a) (i) iron OR ferromagnetic	B1
	unmagnetised (before being brought near magnet) NOT non-magnetic	B1
	(ii) magnet	B1
	(b) attracts (at first) NOT goes towards	B1
	repels after touching OR angle of thread increases as XY decreases	B1 [5]
10	(a) (i) deflection (in one direction)	M1
	idea of momentary OR goes back to zero again	A1
	(ii) idea of same as (i) but opposite direction	B1
	(b) larger	B1
	(c) smaller	B1
	(d) nothing OR small oscillations about zero position OR blurred light spot	B1 [6]
11	(a) (i) background contaminated surfaces (any sort) other radioactive material nearby radiation from rocks/soil cosmic rays/radiation from space radon gas from ground	} any 1 B1
	(ii) 136/4 34 (counts/min)	
	(b) (i) alpha OR α	B1
	(ii) 876 – (a figure between 131 and 136, inclusive) division by 4 185 – 186 (counts/min)	C1 C1 A1 [7]
12	(a) (i) 3	B1
	(ii) 3 e.c.f. (i)	B1

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(iii)	4		B1
(iv)	7	OR candidate's (i) + (iii), correctly evaluated	B1
(b)	7 and 3 e.c.f. from (ii) and (iv)		B1 [5]