

## **MARK SCHEME for the October/November 2012 series**

### **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 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 October/November 2012 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 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.
- o.w.t.t.e.** means "or words to that effect".
- 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  $\geq 2$ , except if specified otherwise, or if only 1 significant figure 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

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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.

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- 1 (a) 54 (s) B1
- (b) (Speed =) distance / time in any form C1
- 405 / 54 C1
- 7.5 A1
- m/s B1
- (c) (i) greater than at y B1
- (ii) greater than average speed B1 [7]

2

	shape	molecular arrangement
(a) solid	fixed	fixed position
(b) liquid	fill from bottom	
(c) gas		move around, far apart

3 renewable

any 2 from hydroelectricity, solar, tidal, wind

non-renewable

any two from coal, oil, nuclear

If more than two boxes ticked in a column –1 for each error

[4]

B2

B2 [4]

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4	(a) (i)	34 (cm <sup>3</sup> )	C1	
		42 (cm <sup>3</sup> )	C1	
		8 (cm <sup>3</sup> )	A1	
	(ii)	1. balance (accept spring balance) OR newtonmeter		
		OR scales NOT scale	B1	
		2. $D = M/V$ in any form	C1	
		21.2 / his 8	C1	
		2.65 e.c.f.	A1	
		g/cm <sup>3</sup>	B1	
	(b)	(i) rule(r) OR <u>vernier/digital</u> calipers IGNORE just calipers	B1	
		(ii) measure diameter / radius / c.s.a.	B1	
		use cylinder formula (need not be quoted) to calculate	B1	
		OR		
		measure mass	B1	
		use density from (a) in $V = M/D$	B1	[11]
5	(a) (i)	<u>angle</u> of reflection	B1	
		(ii) 1. 45(°)	B1	
		2. 45(°) with correct ° symbol at least once	B1	
	(iii)	ray shown in correct position, by eye	B1	
	(b)	mirror shown perpendicular to reflected ray, by eye	B1	[5]
6	(a) (i)	conduction	B1	
		(ii) convection	B1	
	(b)	idea of heat lost at same rate as heat supplied	B1	
	(c) (i)	boiling	B1	
		(ii) steam	B1	[5]

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- 7 (a) reflection/sound coming back/sound heard for 2<sup>nd</sup> time off an object M1  
A1
- (b) DIAGRAM  
source of sound and large obstacle B1  
distance shown as  $\geq 150$  m B1  
DESCRIPTION  
make (loud) sound and listen B1
- (c) (i) distance between source of sound and obstacle  
NOT just “distance” B1  
time between making sound and hearing echo  
NOT just “time” B1
- (ii) speed = distance/time B1  
clear that “there and back” has been taken into account B1 [9]
- 8 (a) conventional circuit diagram with two lamps in parallel B1  
switch in correct position alongside power supply B1  
correct symbols for lamps and switch used B1
- (b)  $V = IR$  in any form OR  $V/I$  C1  
12/1.6 C1  
7.5 A1  
ohm(s) OR  $\Omega$  B1
- (c)  $L_2$  has blown, however expressed  
OR  $L_2$  is loose NOT  $L_2$  is missing/stolen/fallen out B1
- (d) (i) blows B1
- (ii) nothing/doesn't light/off  
NOT turns off B1
- (iii) nothing/doesn't light/off  
NOT turns off B1 [11]

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9 (a) N S N B1

(b) (i)

	switch closed	switch open
soft iron	magnetised	loses its magnetism
steel	magnetised	keeps its magnetism

both B1

both B1

(ii) attractive force B1

(iii) the one with the soft iron core OR L.H.one B1

(iv) can be switched on & off OR can be stronger B1 [6]

10 (a) rub/rubbing M1  
with dry cloth A1

(b) (i) negative OR – B1

(ii) opposite charges attract B1

(c) horizontal arrow to L, starting or ending on sphere B1

(d) swings/moves away/to R OR idea of repulsion B1 [6]

11 (a) neutron 0 2000 m B2  
proton +1 2000 m B2

(b) 92 B1  
146 B1  
92 no e.c.f. B1 [7]

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- 12 (a)  $37.5 \pm 0.4 \text{ s}$  B1
- (b) 3 B1
- (c) his(a)/his(b) C1  
in range 12 to 13 OR his value calculated correctly A1
- (d) curve above existing line at all points and roughly parallel B1 [5]