

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
**International General Certificate of Secondary Education**

**MARK SCHEME for the October/November 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 October/November 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 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 this incorrect value forward to subsequent stages of working, the candidate may be given marks indicated by e.c.f. provided the subsequent working is correct, bearing in mind this 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.
- Significant figures Answers are acceptable to any number of significant figures  $\geq 2$ , 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 the 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) 7.02 7.13 6.97 B1
- (b) evidence of adding three times C1
- 7.04 e.c.f. (a) A1
- (c) distance / length of slope B1
- (d) oil axles (accept oil wheels)  
steeper slope / raise plank  
push trolley } any 1 B1 [5]
- 2 (a) speed × time  
OR  
area under graph C1
- $8 \times 50$  C1
- 400 (m) A1
- (b) half candidate's (a)  
OR  
 $\frac{1}{2} \times \text{base} \times \text{height}$  C1
- 200 (m) e.c.f. from (a) A1
- (c) 600 (m) e.c.f. from (a)(b) B1
- (d) (i) equation using candidate's (c)/60 C1
- 10 e.c.f. (c) C1
- m/s B1
- (ii) horizontal straight line at 10 m/s e.c.f. (i) M1
- from 0 s – 60 s, not beyond A1 [11]

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- 3 (a) (i) food  
coal  
oil/diesel/petrol/etc.  
gas } any 1 B1
- (ii) waves  
wind  
hydro (electric)  
tides  
geothermal  
sun (light) / solar  
biofuel  
wood } any 1 B1
- (iii) waves  
tides / tidal  
hydro (electric) } any 1 B1
- (b) fossil fuels will run out/not renewable  
fossil fuels increasingly expensive to extract  
fossil fuels cause pollution/climate change/global warming } any 2 B1 + B1 [5]
- 4 (a) (i) tick under boy lying down M1  
(ii) larger area (of contact with floor) A1
- (b) (i) greater/more/stronger/higher than B1  
(ii) becomes less / decreases / falls B1 [4]
- 5 (a)  $31 \pm 2$  (mm) C1  
 $31 \pm 0.2$  (mm) A1
- (b) (i) number of waves per second/unit time B1  
(ii) reference to (vertical) displacement/distance/height/depth  
half peak to trough distance / distance from mean position B1 A1
- (c) reflects / 3<sup>rd</sup> box ticked B1 [6]

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**6 (a) Mark both parts together**

- (i)(ii) glycerol highest BP and water highest thermal capacity B1  
 1<sup>st</sup> explanation, needs to be comparative:  
 glycerol stops rising at higher temperature than water  
 OR  
 290 > 100 – both numbers must be seen B1
- 2<sup>nd</sup> explanation:  
 more energy to raise temperature (in 1 minute)  
 OR  
 4 < 8; water must be stated to score mark B1

- (b) (i) conduction B1  
 (ii) convection B1  
 radiation B1  
 (iii) arrows indicating air moving up above heater  
 complete convection current indicated B1 B1 [8]

- 7 (a) cell OR battery B1  
 rheostat / variable resistor / resistance B1  
 lamp / light / bulb B1  
 switch B1

- (b) all 5 components shown in series B1  
 correct symbol for ammeter B1  
 (c) 2<sup>nd</sup> box ticked B1 [7]

- 8 (a) A and B both B1  
 (b) C B1  
 (c) D B1  
 (d) (i) attract c.a.o. B1  
 (ii) no effect / nothing c.a.o. B1 [5]

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- 9 (a) (i)** at least 1 complete circle drawn C1  
 at least two circles not touching each other and centred on hole A1  
 at least 4 concentric circles not touching each other B1
- (ii)** iron filings M1  
 OR  
 compass (needle)  
 sprinkle / tap card  
 OR  
 move around wire / tap compass A1
- (b) (i)** break circuit when current too high/large  
 OR  
 break circuit when overloaded  
 OR  
 prevent wires/circuit overheating/damage to circuit / electrocution B1
- (ii)**  $V = IR$  in any form C1  
 OR  
 V/R  
 12/4 C1  
 3.0 (A)  
 OR  
 3 (A) A1  
 nothing happens to circuit breaker  
 e.c.f. allow correct deduction based on candidate's current B1 [10]
- 10 (a) (i)** normal correct B1  
**(ii)** reflected ray correct B1  
**(iii)** both angles  $i$  and  $r$  in correct place B1
- (b)** bottom box/ $i = r$  ticked B1
- (c) (i)** ray continued to upper mirror B1  
 reflected at correct angle B1  
**(ii)** parallel  
 OR  
 same (direction) B1 [7]

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- 11 (a) (i) protons and neutrons  
two of each M1  
A1
- (ii) easier to get inside body OR can be breathed in  
reference to ability of gas to diffuse/spread/move in air  
danger to internal organs / damages cells } any 2 B1 + B1
- (b) (i) C B1  
(ii) B or D any 1 B1  
(iii) A B1  
(iv) C B1 [8]
- 12 (a) radioactive materials/sources  
OR  
any named radioactive material B1
- (b) to prevent access by (unauthorised) people / can only be opened by key holder B1
- (c) to reduce/prevent escape of radiation/radioactive emissions C1  
to reduce/prevent escape of beta or gamma radiation A1 [4]