

**MARK SCHEME for the October/November 2007 question paper**

**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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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

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

CIE is publishing the mark schemes for the October/November 2007 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

- 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.
- un.pen.** means "unit penalty". An otherwise correct answer will have one mark deducted if the unit is wrong or missing. This only applies where specifically stated in the mark scheme. Elsewhere, incorrect or missing units are condoned.
- OR/or** indicates alternative answers, any one of which is satisfactory for scoring the marks.

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| <b>QU.</b> | <b>SCHEME</b>                                                                                                                                   | <b>MARK</b>          |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>1</b>   | <b>(a)</b> 60 (cm <sup>3</sup> )                                                                                                                | B1                   |
|            | <b>(b)</b> liquid surface lower than in cylinder<br>liquid surface level with 15 cm <sup>3</sup> (± 5 cm <sup>3</sup> )                         | C1<br>A1             |
|            | <b>(c)</b> less                                                                                                                                 | B1                   |
|            |                                                                                                                                                 | <b>[Total: 4]</b>    |
| <b>2</b>   | <b>(a)</b> 200,000 (m <sup>3</sup> )                                                                                                            | B1                   |
|            | <b>(b)</b> D = M/V in any form<br>his <b>(a)</b> x 1.3<br>260,000 c.a.o.<br>kg                                                                  | B1<br>C1<br>A1<br>B1 |
|            | <b>(c)</b> decreases<br>air expands OR density decreases                                                                                        | M1<br>A1             |
|            | <b>(d)</b> hot air rises                                                                                                                        | B1                   |
|            |                                                                                                                                                 | <b>[Total: 8]</b>    |
| <b>3</b>   | <b>(a)</b> 7.5 (cmHg)<br>75 (cmHg)<br>(give C1, A1 for 1.0006 x 10 <sup>5</sup> Pa or 1 x 10 <sup>5</sup> Pa (N/m <sup>2</sup> ) if unit given) | C1<br>A1             |
|            | <b>(b)</b> nothing OR (Torricellian) vacuum OR Hg vapour                                                                                        | B1                   |
|            | <b>(c)</b> tube level lower<br>reservoir level higher (any amount)                                                                              | B1<br>B1             |
|            | <b>(d)</b> pressures on 2 surfaces equal (always) )<br>Hg levels equal (always) OR no Hg column ) any two<br>no change when pressure changes )  | B1+B1                |
|            |                                                                                                                                                 | <b>[Total: 7]</b>    |

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| QU. | SCHEME                                                                                                                                                                                                                                                                                                                                                                                                               | MARK                                                                |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| 4   | <p>(a) (i) arrow labelled <math>W</math>, vertically (by eye) down from somewhere on either boat</p> <p>(ii) arrow labelled <math>F</math>, down slope, between either boat and slipway</p> <p>(b) (i) multiply <math>W</math> by (vertical) height raised OR <math>Wh</math></p> <p>(ii) multiply <math>F</math> by distance along slope OR <math>Fs</math></p> <p>(iii) add (i) and (ii)</p> <p>(c) time taken</p> | <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>[Total: 6]</p> |
| 5   | <p>(a) <math>^{\circ}\text{C}</math></p> <p>(b) (i) ICE marked at 0</p> <p>(ii) STEAM marked at 100</p> <p>(c) expansion/volume/pressure OF a gas )<br/> expansion/length OF a solid )<br/> resistance OF a resistor/thermistor/wire )<br/> bending OF a bimetal strip ) any 2<br/> e.m.f/voltage OF a thermocouple )<br/> colour OF a hot surface )<br/> colour change OF certain chemicals )</p>                   | <p>B1</p> <p>B1</p> <p>B1</p> <p>B1+B1</p> <p>[Total: 5]</p>        |
| 6   | <p>(a) (i) uniform acceleration</p> <p>(ii) 9 (m/s)</p> <p>(iii) <math>s = vt</math> in any form<br/> 90 (m) OR 10 x his (ii), evaluated</p> <p>(b) average speed is lower</p>                                                                                                                                                                                                                                       | <p>B1</p> <p>B1</p> <p>C1<br/>A1</p> <p>B1</p> <p>[Total: 5]</p>    |

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| <b>QU.</b>         | <b>SCHEME</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>MARK</b>                                                                                       |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>7</b>           | <p><b>(a) (i)</b> 1.5 (cm)</p> <p><b>(ii)</b> circle centred on X, outside printed circle (circle need not be drawn with a compass, but must be carefully drawn)<br/>diameter 4.5 cm by eye</p> <p><b>(b)</b> sound longitudinal, water transverse )<br/>sound wave faster (than water wave) ) any 2<br/>different frequency/wavelength )</p>                                                                                                                                                                                                                    | <p>B1</p> <p>M1<br/>A1</p> <p>B1,B1</p>                                                           |
| <b>[Total: 5]</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                   |
| <b>8</b>           | <p><b>(a) (i)</b> principal focus unambiguously marked<br/>focal length approximately indicated<br/>focal length precisely indicated, from pole to principal focus</p> <p><b>(ii)</b> any ray from X to Y, correctly refracted at lens</p> <p><b>(b)</b> [mark in pairs, using <math>\checkmark + \times = 0</math>]<br/>real<br/>diminished<br/>inverted<br/>image distance less</p> <p><b>(c)</b> gets smaller<br/>gets closer to lens</p>                                                                                                                     | <p>B1<br/>C1<br/>A1</p> <p>B1</p> <p>B1<br/>B1<br/>B1<br/>B1</p> <p>B1<br/>B1</p>                 |
| <b>[Total: 10]</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                   |
| <b>9</b>           | <p><b>(a)</b> points correctly plotted (<math>\pm\frac{1}{2}</math> small square) –1 e.e.o.o.<br/>smooth curve through his points<br/>reasonable thickness</p> <p><b>(b) (i)</b> 5.3 – 6.1</p> <p><b>(ii)</b> 0.9 – 1.7</p> <p><b>(c)</b> <math>R = V/I</math> in any form<br/>division by 25 or <math>25 \times 10^{-3}</math> somewhere</p> <p><b>(i)</b> answer between 220 and 240</p> <p><b>(ii)</b> answer between 40 and 60<br/><math>\Omega</math> shown in either <b>(i)</b> or <b>(ii)</b></p> <p><b>(d)</b> answer compatible with his <b>(c)</b></p> | <p>B2<br/>B1<br/>B1</p> <p>B1</p> <p>B1</p> <p>C1<br/>C1</p> <p>B1</p> <p>B1<br/>B1</p> <p>B1</p> |
| <b>[Total: 12]</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                   |

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| <b>QU.</b>        | <b>SCHEME</b>                                             | <b>MARK</b>       |
|-------------------|-----------------------------------------------------------|-------------------|
| <b>10 (a) (i)</b> | shape appropriate outside coil (condone incomplete loops) | M1                |
|                   | lines mostly parallel within coil                         | A1                |
|                   | pattern roughly symmetrical                               | A1                |
|                   | no lines touching or crossing                             | A1                |
|                   | <b>(ii)</b> iron bar                                      | B1                |
| <b>(b)</b>        | rods become magnetised                                    | M1                |
|                   | same direction                                            | A1                |
|                   | repel                                                     | B1                |
|                   |                                                           | <b>[Total: 8]</b> |
| <b>11 (a)</b>     | within range 18–20 (mins)                                 | B1                |
| <b>(b) (i)</b>    | 922 or thereabouts                                        | B1                |
|                   | <b>(ii)</b> his <b>(a)</b>                                | B1                |
| <b>(c)</b>        | alpha OR beta                                             | B1                |
|                   |                                                           | <b>[Total: 4]</b> |
| <b>12 (a)</b>     | electrons                                                 | B1                |
| <b>(b)</b>        | move                                                      | M1                |
|                   | towards $P_1$                                             | A1                |
| <b>(c)</b>        | idea of making both $P_3$ and/or $P_4$ positive           | B1                |
|                   | equal potential                                           | B1                |
|                   | (earthing of $P_1$ and $P_2$ not required for answer)     |                   |
| <b>(d)</b>        | fluorescent screen OR any other appropriate method        | B1                |
|                   |                                                           | <b>[Total: 6]</b> |