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 May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.
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.e.o. 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 ≥ 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 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.
<table>
<thead>
<tr>
<th></th>
<th>Mark Scheme</th>
<th>Syllabus</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>(a) horizontal first section</td>
<td></td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>short lower section, roughly in middle</td>
<td></td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>horizontal after middle section</td>
<td></td>
<td>M1</td>
</tr>
<tr>
<td></td>
<td>same height as first section</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td></td>
<td>final deceleration to rest</td>
<td></td>
<td>B1</td>
</tr>
<tr>
<td>(b)</td>
<td>(i) speed = distance/time OR distance/speed in words, symbols or numbers</td>
<td></td>
<td>C1</td>
</tr>
<tr>
<td></td>
<td>1850 / 15</td>
<td></td>
<td>C1</td>
</tr>
<tr>
<td></td>
<td>120 (s) or 123 (s), accept any number of sig. figs. ≥ 2</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td></td>
<td>(ii) top box ticked, greater than</td>
<td></td>
<td>B1</td>
</tr>
<tr>
<td>(c)</td>
<td>distance travelled = area under graph</td>
<td></td>
<td>C1</td>
</tr>
<tr>
<td></td>
<td>areas calculated</td>
<td></td>
<td>C1</td>
</tr>
<tr>
<td></td>
<td>areas added or subtracted or trapezium equation correct, as appropriate</td>
<td></td>
<td>C1</td>
</tr>
<tr>
<td></td>
<td>400 (m)</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td></td>
<td><strong>[Total: 13]</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **2** | (a) (take) values off rule |  | C1 |
|   | of X and Y |  | C1 |
|   | subtract X from Y |  | A1 |
| (b) | line between X and top RH corner (accept straight or curved) |  | B1 |
|   | **[Total: 4]** |  |   |

| **3** | (a) (i) decreases, accept transferred to KE (and heat) |  | B1 |
|   | (ii) increases |  | B1 |
|   | (iii) nothing/constant |  | B1 |
|   | (iv) increases |  | B1 |
| (b) | transferred into the surroundings (as an increase in internal energy) OR transferred to thermal energy/sound accept decreases/becomes zero |  | B1 |

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(c) decreases, accept becomes thermal energy, accept unchanged  

B1

[Total: 6]

4  (a)  (i)  $80 \pm 2$ (mm)  

B1  

(ii)  $170 \pm 2$ (mm)  

B1  

(b)  (i) greater because  

LH level lower OR RH level pushed up OR attempt at explaining in terms of  

greater force on LH column pushes it down more  

B1  

(ii)  $90$ (mm Hg)  

e.c.f. (a)  

B1  

(c) method for averaging answers to (a) or $90/2$  

C1  

$125$ (mm) for both  

e.c.f. (a) (b) (ii)  

A1  

(allow only one mark if no working but both stated as equal OR given equal but  

incorrect values)  

(d) water would squirt out/not dense enough/tube would need to be (very) long (so  

not practical)  

accept not very dense, less dense than mercury  

B1  

[Total: 7]

5  (a)  top box ticked  

convection  

B1  

second box ticked  

evaporation −1 e.e.o.o.  

B1  

(b) any idea of insulation/lagging  

condone any sensible method for keeping drink warmer  

B1  

[Total: 3]

6  (a)  less loud/quieter/lower volume/not as loud  

B1  

(b)  (i) louder/greater volume  

B1  

(ii) higher pitch  

B1  

(c) any two from:  

compressions and/or rarefactions  

waves/vibrations/it vibrates  

longitudinal  

energy passed from particle to particle/particles vibrate  

B2
(d) any value between 10–25 (Hz)  
any value between 15,000–25,000 (Hz) or 15–25 kHz  

[Total: 7]

7 (a) spectrum  
OR colours  
OR ROYGBIV  
OR red at top/A and violet/blue at bottom

(b) 2nd box ticked Dispersion  
bottom box ticked refraction  
−1 for each extra above 2 ticks

(c) (i) rays crossing/meeting before screen is reached

(ii) any two from:  
spot of light  
blurred/not in focus  
white  
coloured edge  
ignore image

[Total: 6]

8 (a) principal focus  
condone focus/focal point

(b) (i) ray shown parallel to principal axis  
AND  
ray emerges to pass through F

(ii) ray from X to P continues straight on  
OR other principal focus correctly positioned and ray drawn through this and emerging from lens parallel to principal axis  
image (marked Y) correctly positioned  
condone inverted or indicated where rays cross

[Total: 5]

9 (a) top box ticked, increase or decrease a.c.

(b) (i) core
(ii) 1. copper  
2. \[ \frac{V_1}{V_2} = \frac{N_1}{N_2} \] in words, symbols or numbers  
correct substitution  
200  
3. glows less brightly/dimmer OR stops glowing  

[Total: 7]

10 (a) (i) friction/rubbing  
on/with (dry) cloth/insulator  
(ii) moves  
to the right/to(wards)/by the rod/closer to (the rod)  
ignore sticks to, accept attracts/attracted for both marks  
(iii) unlike/opposite charges attract OR positive attracts negative  

(b) threads further apart at bottom than top  
straight threads OR equal angles to vertical  

[Total: 7]

11 (a) voltmeter  

(b) (i) ammeter NOT ammeter  
(ii) correct symbol for ammeter  
ammeter in series with lamp and voltmeter across cell  
condone voltmeter connected in parallel  

(c) (i) \[ V = IR \] OR \[ V/R \] in words, symbols or numbers  
1.9/0.038  
50  
\( \Omega \) OR ohm(s)  

(ii) bottom box ticked, no difference  

[Total: 9]
12  (a)  400 (counts/min)  B1

(b)  3\textsuperscript{rd} box ticked half the number at the start  B1

(c)  2\textsuperscript{nd} box ticked same as at the start  B1

(d)  (i)  84  B1

(ii)  40  B1

(iii)  44  B1

[Total: 6]