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.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 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.
1 (a) area under graph OR $\frac{1}{2}(u + v) t$
   $\frac{1}{2} \times 40 \times 8$
   160 (m)  
   \[C1\]
   \[A1\]

(b) $315 + \text{candidate's (a)}$

   distance = speed $\times$ time  OR distance/time in words, symbols or numbers
   $(315 + 160)/80$  OR  $(315 + \text{candidate's (a)})/80$
   (5.9) 38(m/s)  
   \[C1\]
   \[A1\]

(c) (i) steady/same/constant/uniform speed  
   (ii) slowing down/decelerating/negative acceleration  
   \[B1\]

[Total: 9]

2 (a) measuring cylinder/graduated cylinder  
   \[B1\]

(b) balance, accept spring balance, accept (weighing) scales  
   \[B1\]

(c) find mass of empty cylinder  
   find mass of cylinder + liquid  

   subtract values NOT if stated the wrong way round  
   accept valid alternative methods  
   \[B1\]

(d) density = mass/volume, in words, symbols or numbers
   $62.4 \div 80$
   0.78 OR 780  
   $g/cm^3$ OR $kg/m^3$ as appropriate  
   \[B1\]

[Total: 9]
3 (a) equal (size/magnitude)/the same (size), ignore opposite NOT same direction B1

(b) it would (start to) sink (if weight>upthrust) B1

(c) moves (forward) C1
    accelerates forward/increases speed/moves faster A1

(d) slows down, IGNORE stops (moving) B1

[Total: 5]

4 (a) idea of expansion/gets bigger B1

(b) particles have more energy/vibrate faster B1
    ignore move quickly or move faster
    particles move apart/space between particles increases B1
    NOT particles expand

(c) contracts/gets smaller/shrinks B1
    IGNORE fits tightly

(d) idea of being pushed together B1
    accept move/stick together/compressed
    accept pulled tight/together

[Total: 5]

5 (a) (i) wax melts (faster) on copper rod B1
    wax melts less (far)/not at all/slower on plastic rod B1
    comparison needed

(ii) IGNORE any statements about conduction of electricity B1
    copper is a (good) (thermal) conductor
    plastic is an insulator/poor conductor B1

(b) (only) faster/high (k.)e./most energetic particles B1
    escape/go into the air or leave the water (surface) B1
    (this means) average (k.) e. of water decreases/falls B1
    accept internal energy/thermal energy for k.e.

[Total: 7]
6 (a) speed = distance/time in words, symbols or numbers OR distance/speed

\[ \frac{330}{5000} \]  

0.066(s), allow 0.07 (s) (to one significant figure)  A1

(b) man with hammer hears one sound
accept hears the sound almost instantly/first  B1

other man hears two sounds OR 1 through air and 1 through rail
NOT hears two sounds, one is an echo

any one from: 
hears sound through rail before sound through air 
calculation of time difference between sounds
because (speed of sound) in metal/steel faster than (speed of) sound in air  B1

[Total: 6]

7 (a) (i) correct idea ± 1 line  C1

correct distance  A1

(ii) (slinky spring) moved backwards and forwards owtte  B1

(b) (i) correct idea e.g. crest to crest NOT just 2 peaks marked  C1

(ii) idea of bigger (vertical) distance between crest and trough  B1

(c) (i) no change/nothing  B1

(ii) less/shorter/smaller/decreases  B1

[Total: 7]

8 (a) (i) any one from: aluminium, copper, gold, iron  B1

(ii) any one from: ebonite, glass, plastic, silk  B1

(iii) iron  B1

(iv) any one from: ebonite, glass, plastic, silk  B1
(b) accept correct alternative methods

stroke with pole of magnet
in one direction

OR (alternative answer)
place in solenoid/coil

current in one direction/battery/d.c.

[Total: 6]

9 (a) (i) ammeter NOT ammeter
accept multimeter on current range

(ii) 2\textsuperscript{nd} box ticked, current

(b) (i) 1\textsuperscript{st} box ticked, charge

(ii) 1. \((R =) R_1 + R_2\) in words, symbols or numbers

\[24 \, (\Omega)\]

2. \(V = IR\) in any form OR \(V/R\)

\[12/24 \text{ e.c.f.}\]

\[0.5 \text{ e.c.f.}\]

A OR amp(s) OR ampere(s)

(c) bottom box ticked, 0 V

[Total: 10]

10 (a) lamp will blow/burn out
accept blow up/glow too/very brightly ignore bright/won’t work

(b) (i) transformer shown with one coil across input and other coil across output
accept any reasonable attempt at transformer symbol

(ii) factor of 2 e.g. 12/6, 6/12 or 2:1 ignore units

\[1:2 \text{ OR 1 to 2}\]
(c) (i) resistor shown joining top two wires or bottom two wires
   accept diagonal connection
   complete series circuit
   note: 2 resistors in series gains only one mark
   A1
   B1

(ii) 1.5 (Ω) B1

[Total: 7]

11 (a) 23 B1

(b) 11 B1

(c) 12 B1

(d) 11 no e.c.f. from (b) B1

[Total: 4]

12 (a) 4 (hours) B1
   appropriate indication of method (minimum indication any halving of count rate on axis
   or curve)
   B1

(b) (i) 1000 B1
   (ii) candidate’s (a) B1
   (iii) in the range 62 – 63, e.c.f. from (b) (i) and (b)(ii) B1

[Total: 5]