CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 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 May/June 2014 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.

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 ½(u + v) t C1

½ × 40 × 8 C1

160 (m) A1

(b) 315 + candidate's **(a)** C1

distance = speed × time **OR** distance / time in words, symbols or numbers C1

(315 + 160) / 80 **OR** (315 + candidate's **(a)**) / 80 C1

(5.9) 38(m/s) A1

(c) **(i)** steady / same / constant / uniform speed B1

(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 B1

find mass of cylinder + liquid B1

subtract values **NOT** if stated the wrong way round
accept valid alternative methods B1

(d) density = mass / volume, in words, symbols or numbers C1

62.4 ÷ 80 C1

0.78 **OR** 780 A1

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
ignore move quickly or move faster — B1

particles move apart / space between particles increases
NOT particles expand — B1

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

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

[Total: 5]

5 (a) (i) wax melts (faster) on copper rod — B1

wax melts less (far) / not at all / slower on plastic rod
comparison needed — B1

(ii) IGNORE any statements about <u>conduction of electricity</u>
copper is a (good) (thermal) <u>conductor</u> — B1

plastic is an <u>insulator</u> / poor <u>conductor</u> — 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
accept internal energy / thermal energy for k.e. — B1

[Total: 7]

6 **(a)** speed = distance / time in words, symbols or numbers **OR** distance / speed C1

330 / 5000 C1

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 B1
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 B1

in one direction B1

OR (alternative answer)
place in solenoid / coil (B1)

current in one direction / battery / d.c. (B1)

[Total: 6]

9 (a) (i) ammeter **NOT** ampmeter
accept multimeter on current range B1

(ii) 2nd box ticked, current B1

(b) (i) 1st box ticked, charge B1

(ii) **1.** ($R =$) $R_1 + R_2$ in words, symbols or numbers C1

24 (Ω) A1

2. $V = IR$ in any form **OR** V/R C1

12 / 24 e.c.f. C1

0.5 e.c.f. A1

A **OR** amp(s) **OR** ampere(s) B1

(c) bottom box ticked, 0 V B1

[Total: 10]

10 (a) lamp will blow / burn out
accept blow up / glow too / very brightly ignore bright / won't work B1

(b) (i) transformer shown with one coil across input and other coil across output
accept any reasonable attempt at transformer symbol B1

(ii) factor of 2 e.g. 12 / 6, 6 / 12 or 2:1 ignore units C1

1:2 **OR** 1 to 2 A1

(c) (i) resistor shown joining top two wires or bottom two wires
accept diagonal connection — M1

complete series circuit — A1
note: 2 resistors in series gains only one mark — 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]