**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

International General Certificate of Secondary Education

# MARK SCHEME for the May/June 2013 series

# 0625 PHYSICS

**0625/21** 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 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 & 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 <u>must</u> 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)  15 ±1 (cm$^3$)                                                                          B1

   (b)  level shown at 40 ±1 cm$^3$ OR 25 + candidate's (a) ±1 cm$^3$ on magnified figure        B1

   (c)  idea of goes up further OR more sensitive
        OR idea of small variations causing larger height differences                           B1
        OR larger divisions / more gradations

                                                                                        [Total: 3]


2  (a)  (i)   D = M / V in any form OR D × V                                                     C1
             2300 × 0.0012                                                                       C1
             2.76 OR 2.8 (kg)                                                                    A1

        (ii)  (mass of bricks =) 500 × 2.76 OR 500 × candidate's (a)(i)                          C1
              (total mass = ) 1480 OR e.c.f. candidate's (a)(i)                                  C1
              yes / no ticked (expect yes), must be compatible with candidate's total mass       A1

   (b)  (i)   the same because made of same material                                            B1

        (ii)  less than OR equivalent answer                                                    B1
                                                                                        [Total: 8]


3  (a)  (frictional/tension/applied) force and newton/N                                          B1
        distance and metre/m, centimetre/cm or correct metric unit                              B1

   (b)  time / speed                                                                             B1

   (c)  (i)   smaller / less / drops                                                            B1

        (ii)  smaller / less / drops                                                            B1

        (iii) smaller / less / drops                                                            B1

   (d)  chemical                                                                                 B1
                                                                                        [Total: 7]


4  (a)  mercury/Hg OR alcohol OR named alcohol e.g. ethanol                                      B1

   (b)  vacuum OR nothing OR empty OR vapour                                                     B1

   (c)  ice point indicated and labelled at 0 °C                                                 B1
        steam point indicated and labelled at 100 °C                                            B1

**(d) (i)** moves to the right (or equivalent e.g. goes higher/up/rises)　　　　B1

　　**(ii)** liquid expands NOT thermometer/particles expands　　　　B1

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　**[Total: 6]**


**5** **(a)** 4 (hours) OR 5 ½ / 5.5 (hours) / 5 hours 30 mins　　　　B1

　**(b) (i)** 300 (km)　　　　B1

　　**(ii)** 30 (km)　　　　B1

　　**(iii)** 270 (km) e.c.f. **(i)** & **(ii)**　　　　B1

　**(c)** 2 horizontal sections clearly indicated　　　　B1

　**(d)** last section, however expressed e.g. after 6 hours　　　　B1
　　　smallest slope OR smallest distance in ½ hour　　　　B1

　**(e)** distance ÷ time　　　　C1
　　　300 ÷ 6.5　　　　C1
　　　answer in range 46–46.2　　　　A1
　　　correct unit e.g. km / h　　　　B1
　　　　　　　　　　　　　　　　　　　　　　　　　　　　**[Total: 11]**


**6** **(a)** same pressure　　　　B1

　**(b)** 6 cm of oil greater　　　　B1

　**(c) (i)** 1. falls / decreases / down

　　　　2. rises / increases / up　　　　both needed　　B1

　　**(ii)** they move faster / more energetically o.w.t.t.e.
　　　　collisions more frequent/often or harder　　　　any 3 points　　B1 × 3
　　　　collisions with walls/container/sides
　　　　larger force (on wall/container)

　　　　　　　　　　　　　　　　　　　　　　　　　　　　**[Total: 6]**


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**7** **(a)** refracting, converging                                                                    B2

**(b)** dispersing, refracting                                                                         B2

**(c)** violet    accept blue/purple/mauve/indigo                                                      B1

**(d)** **(i)** infra-red / IR                                                                         B1

**(ii)** idea of lamp hot/emitting heat OR glass passes IR                                             B1
                                                                                                      **[Total: 7]**

**8** **(a)** **(i)** principal focus / focal point / focus / focus point                              B1

**(ii)** PF                                                                                            B1

**(b)** **(i)** rays from top of object
ray parallel to axis, to lens centre and through F
ray to P and then straight on                          } any 2                          B1 × 2
ray through other f.p. and then parallel

Z labelled at intersection of rays (even if rays wrong)                                                B1

**(ii)** correct inverted image drawn (condone no labelling) between candidate's Z
and the axis and perpendicular to axis                                                                 A1
(if no label, must be very clear what is image)
                                                                                                      **[Total: 6]**

**9** **(a)** current                                                                                  B1

**(b)** **(i)** **1.** $R_1 + R_2$ OR 16 + 8                                                           C1
24 ($\Omega$)                                                                                          A1

**2.** $V = I R$ in any form OR $V / R$                                                                C1
12 / 24 e.c.f. **1.**                                                                                  C1
0.5                                                                                                    A1
A/amp/ampere(s)                                                                                        B1

**(ii)** **1.** 0 OR zero/nothing (ignore any unit)                                                    B1

**2.** 12 V                                                                                            B1
                                                                                                      **[Total: 9]**

**10 (a)** rheostat/potential divider/<u>variable</u> resistor/potentiometer/dimmer     B1

   **(b) (i)** 0 (V) OR zero OR nothing     B1

      **(ii)** 12 (V)     B1

   **(c)** idea of increasing brightness as S moves from A to B     C1
       appropriate correct comment on resistance or voltage     A1
      **[Total: 5]**

**11 (a)** towards top of page     B1

   **(b)** indication of battery connected correctly to the bare wires     B1
       magnet's poles shown either side OR end OR above and below X     C1
       magnetic field clearly vertical and interact with conductor     A1
      **[Total: 4]**

**12 (a)** inside     positive / + / +1     B1 + B1
       outside     negative/ – / –1     B1 + B1
       inside     no charge / nothing / neutral / 0     B1 + B1

   **(b) (i)** electron     B1

      **(ii)** electron     B1
      **[Total: 8]**