Location Entry Codes

UNIVERSITY OF CAMBRIDGE
International

As part of CIE's continual commitment to maintaining best practice in assessment, CIE has begun to use different variants of some question papers for our most popular assessments with extremely large and widespread candidature, The question papers are closely related and the relationships between them have been thoroughly established using our assessment expertise. All versions of the paper give assessment of equal standard.

The content assessed by the examination papers and the type of questions are unchanged.

This change means that for this component there are now two variant Question Papers, Mark Schemes and Principal Examiner's Reports where previously there was only one. For any individual country, it is intended that only one variant is used. This document contains both variants which will give all Centres access to even more past examination material than is usually the case.

The diagram shows the relationship between the Question Papers, Mark Schemes and Principal Examiner's Reports.

Question Paper	Mark Scheme	Principal Examiner's Report
Introduction	Introduction	Introduction
First variant Question Paper	First variant Mark Scheme	First variant Principal Examiner's Report
Second variant Question Paper	Second variant Mark Scheme	Second variant Principal Examiner's Report

Who can I contact for further information on these changes?
Please direct any questions about this to CIE's Customer Services team at: international@cie.org.uk

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2008 question paper

0625 PHYSICS

0625/31   Paper 31 (Extended 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.
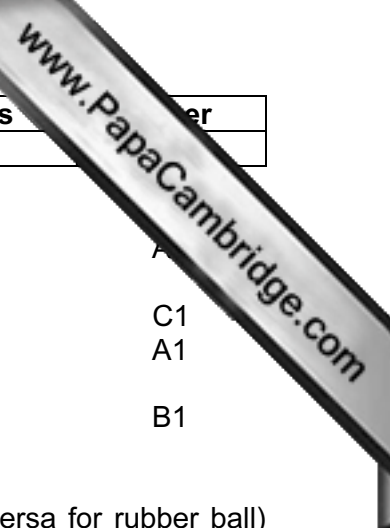
CIE is publishing the mark schemes for the May/June 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

NOTES ABOUT MARK SCHEME SYMBOLS

B marks   are independent marks, which do not depend on any other marks. For a B mark
           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. NOTE: M marks in questions 4 and 11.

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 underline 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.

Page 3	Mark Scheme	Syllabus	er
	IGCSE – May/June 2008	0625	

1 **(a) (i)** v/t or (v-u)/t or 28.5/3 or his correct ratio
9.3 to 9.5 m/s^2 A

(ii) area under graph or 0.5 × 3 × 28.5 or ½b×h C1
42 to 44 m (allow reasonable e.c.f.) A1

(iii) 15 m/s B1

(b) (plastic ball larger so) upward force/air resistance/drag more (or vice versa for rubber ball)
IGNORE wind resistance B1
rubber ball, this force not big enough to balance weight/gravity (force) B1
plastic ball, upward force/air resistance big enough to balance/equal weight/gravity
(force) B1

(c) mg or 0.05 × 10 or 50 x 10 accept 9.8 or 9.81 instead of 10 C1
0.5 N or 0.49N or 0.4905N nothing else A1
[10]

2 **(a)** fusion (of nuclei) CARE: NOT fission or fision ACCEPT fussion B1
condone radiation as an extra

(b) radiant/heat energy from Sun or radiation from Sun)
energy from Sun raises temperature of water/heats water/melts ice)
energy from Sun evaporates water) any 3 B1 × 3
PE in cloud)
rain)
stored water has PE)

(c) (i) 25/100 for gas-fired or 30/90 for hydroelectric
or energy out/energy in or power out/power in B1

(ii) 30/90 or 1/3 or 33% is more than 25/100 or ¼ or 25%
OR lower input into hydroelectric station, but more output than gas-fired station B1
IGNORE hydroelectric losses less than gas-fired losses
[6]

Page 4	Mark Scheme	Syllabus	~~er~~
	IGCSE – May/June 2008	0625	

3 **(a)** mgh or 90 × 10 × 14   accept 9.8 or 9.81 instead of 10
12 600 J or 12348 J or 12360.6 J   nothing else   A~~~~

(b) PE lost = KE gained   or   mgh = ½mv^2 C1
(v^2 =) 280 e.c.f. or 274.4 or 274.68   C1
16.7 m/s e.c.f. or 16.565 m/s or 16.573 m/s NOTE: 16.8 m/s gets A0   A1

(c) energy lost or friction/air resistance/drag/wind resistance   B1
[6]

4 **(a)** (pushing rubber cover) volume reduced   M1
(when volume reduce), pressure goes up   A1

(b) 1 × (10^5) × 60 = 1.5 × (10^5) × V   C1
40 (cm^3)   C1
reduction in volume = 20 cm^3 or 1/3   A1

(c) (ave) speed of mols/particles/atoms greater at high temp NOT energy/KE   B1
stronger/more collisions with walls OR   greater pressure   B1
[7]

5 **(a)** SOLID   higher temperature means higher energy/greater speed of
mols/particles/atoms   B1
NOT more vibration NOT vibrate more

vibrations get bigger or movement greater/take up more space
or separation larger   B1
GAS   (ave) speed/energy of mols/particles/atoms greater   B1
(ave) separation of mols/particles/atoms greater
or mols/particles/atoms take up more space
or increased pressure causes container to get bigger   B1

(b) liquids: slightly more   B1
gases: much more   B1

(c) regular/uniform expansion or appropriate range (be generous if numbers quoted)
or expands a lot/large expansivity
or (relatively) non-toxic
or low freezing point/melting point
or measures low temperatures   any 1   B1
IGNORE reacts to small temp change IGNORE high boiling point   [7]

Page 5	Mark Scheme	Syllabus	er
	IGCSE – May/June 2008	0625	

6 (a) (for all rays, ignore any arrows, -1 for each incorrect extra ray)
   correct ray through F_1 ± 1mm on axis   )
)
   correct ray through F_2 ± 1mm on axis   ) any 2   B1, B
)
   ray through lens centre ± 1mm on axis   )
   image drawn between his intersection and axis   B1

   (b) virtual   upright/erect   magnified/enlarged   further (from lens)   any 3   B1 × 3
                                                                                                    [6]

7 (a) (condone discontinuities at boundaries)

   mirror:
   equally spaced reflected waves, approx. same spacing as incident (by eye)   B1
        IGNORE reflected waves to left of arrowhead
   correct angle to surface, by eye   B1

   block:
   reduced wavelength in block   B1
        ACCEPT refracted waves to left of arrowhead
   at sensible angle of refraction   B1
        CONDONE reflected waves shown as well as refracted

   (b) (i) 3×10^8/speed in glass = 1.5   C1
              2×10^8 m/s   A1

        (ii) sin70°/sin$r$ = 1.5   C1
              38.7895° to 2 or more sig figs   A1
                                                                                       [8]

8 (a) all 4 lights in parallel with supply and none in series   B1
        master switch in a place where it will work (cannot score if no supply or if short
        circuit)   B1

        one switch for 2 lights in living room AND one for bathroom
                                                    AND one for bedroom   B1

   (b) (i)   W = V × I or 100 = 200 × I in any form   C1
              0.5 A or 0.5 a   A1

        (ii) I × t or 0.5 × 60   e.c.f.   C1
              30 C   or   30 c   e.c.f.   A1

(c) (i) 135 W

    (ii) any power × any time   (words or symbols or numbers)   **C1**
           NOTE: 280 (W) is the total power of lamps in house, so counts as "power"

           486 000 J or 486 kJ or 0.135 kWh accept lower case units   **A1**
           NOTE: 45 × 3600 = 162000 J gets e.c.f. from **(i)**

                                                        [10]

9 (a) 3 complete circles about thick wire, roughly concentric on wire   **B1**
     clockwise or anticlockwise arrows on any 2 correct circles, and no contradictions   **B1**

  (b) (i) reduced   **B1**

    (ii) same OR none   **B1**

  (c) (i) thin wire is a current-carrying conductor in a magnetic field   **B1**
          field produced by current in thick wire   **B1**
         OR alternative approach:
         (both wires produce a magnetic field   **B1)**
         (fields interact   **B1)**

    (ii) inwards/towards thick wire/to right/towards T_1T_2 **B1**

    (iii) smaller force   **B1**
                                                        [8]

10 (a) correct symbol, must show 3 connections, condone rounded "nose", ignore width of the
     shape, allow OR gate followed by NOT gate, correctly drawn   **B1**

  (b) if truth table is shown, mark the truth table and ignore the rest
     either input 1, output 0 **AND** both inputs 1, output 0   **B1**
     both inputs 0, output 1   accept high/low, on/off for both   **B1**

  (c) (i) one input is high/1 AND output is low/0   **B1**
         IGNORE any reference to 2nd input

    (ii) 1. on   **B1**
         2. off   **B1**
                                                         [6]

Page 7	Mark Scheme	Syllabus	er
	IGCSE – May/June 2008	0625	

11 (a) number of protons 17 and 17
number of neutrons 18 and 20
number of electrons 17 and 17   B1

(b) alpha, beta, gamma   words or symbols, any order NOT gamma particles   B1

(c) (mark **(i)** and **(ii)** together)

  (i)   any correct use   M1

  (ii) simple correct explanation   A1

                                                                                            [6]

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International General Certificate of Secondary Education

MARK SCHEME for the May/June 2008 question paper

0625 PHYSICS

0625/32   Paper 32 (Extended Theory), maximum raw mark 80

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Page 2	Mark Scheme	Syllabus	~~Paper~~
	IGCSE – May/June 2008	0625	

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OR/or   indicates alternative answers, any one of which is satisfactory for scoring the marks.

Page 3	Mark Scheme	Syllabus	er
	IGCSE – May/June 2008	0625	

1 (a) straight line through origin and reaching (or would reach) 30m/s after 3s

(b) average speed × time   or   area under graph or s = ut + ½at² or ½b × h   C1
20 m c.a.o.   A1

(c) line, all below first line and horizontal at 14m/s (±½ small square)   B1
      NOTE: "knee" of line need not be curved

(d) (i) any intelligent attempt
      e.g. effect of air resistance, B larger area than A, B smaller mass/weight than A B1

   (ii) (eventually) upward force on B = downward force or equivalent.   B1
      no more acceleration or constant speed   NOT terminal velocity   B1

(e) (i) 2.0 N or 2 N   B1

   (ii) 0.2 kg   or   200 g   B1

(f) 2 N   or   2.0 N   or   candidate's **(e)(i)**   B1
      [10]

2 (a) fusion (of nuclei) CARE: NOT fission or fision   ACCEPT fussion   B1
      condone radiation as an extra

(b) radiant/heat energy from Sun or radiation from Sun   )
      energy from Sun raises temperature of water/heats water/melts ice   )
      energy from Sun evaporates water   ) any 3   B1 × 3
      PE in cloud   )
      rain   )
      stored water has PE   )

(c) (i) 25/100 for gas-fired or 30/90 for hydroelectric
      or energy out/energy in or power out/power in   B1

   (ii) 30/90 or 1/3 or 33% is more than 25/100 or ¼ or 25%
      OR lower input into hydroelectric station, but more output than gas-fired station B1
      IGNORE hydroelectric losses less than gas-fired losses
      [6]

Page 4	Mark Scheme	Syllabus	er
	IGCSE – May/June 2008	0625	

3 (a) mgh or 90 × 10 × 14 accept 9.8 or 9.81 instead of 10
12 600 J or 12348 J or 12360.6 J nothing else   A

(b) PE lost = KE gained or mgh = ½mv^2 C1
(v^2 =) 280 e.c.f. or 274.4 or 274.68   C1
16.7 m/s e.c.f. or 16.565 m/s or 16.573 m/s NOTE: 16.8 m/s gets A0   A1

(c) energy lost or friction/air resistance/drag/wind resistance   B1
                                                                         [6]

4 (a) pV = const in any form, words or recognisable symbols   B1
NOT p proportional to 1/V, NOT p =1/V, any mention of T gets B0

(b) p × V is the same each time OR when p is doubled, V is (always) halved   M1
so if gas obeys the law, the temperature must have been constant   A1

(c) $p_1V_1 = p_2V_2$ C1
1.2 (× 10^5) × 75 (× A) = 3.0 (× 10^5) × l (× A)   C1
l = 30 mm   C1
distance moved = 45 mm   e.c.f.   A1
                                                                         [7]

5 (a) SOLID higher temperature means higher energy/greater speed of
mols/particles/atoms   B1
NOT more vibration NOT vibrate more

vibrations get bigger or movement greater/take up more space
or separation larger   B1
GAS (ave) speed/energy of mols/particles/atoms greater   B1
(ave) separation of mols/particles/atoms greater
or mols/particles/atoms take up more space
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(b) liquids: slightly more   B1
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or expands a lot/large expansivity
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or measures low temperatures   any 1   B1
IGNORE reacts to small temp change IGNORE high boiling point   **[7]**

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	IGCSE – May/June 2008	0625	

6 (a) two correct rays   ±1 mm on axis   ignore any arrows
I drawn between candidate's intersection and axis

(b) (i) (becomes) larger   B1
further from lens   B1

(ii) (becomes) virtual   )
(becomes) (even) larger   ) any 2   B1 + B1
(becomes) upright   )
situated to right of lens (IGNORE further away))

                                                                                        [6]

7 (a) (condone discontinuities at boundaries)

mirror:
equally spaced reflected waves, approx. same spacing as incident (by eye)   B1
    IGNORE reflected waves to left of arrowhead
correct angle to surface, by eye   B1

block:
reduced wavelength in block   B1
    ACCEPT refracted waves to left of arrowhead
at sensible angle of refraction   B1
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(b) (i) 3×10^8/speed in glass = 1.5   C1
2×10^8 m/s   A1

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                                                                                        [8]

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master switch in a place where it will work (cannot score if no supply or if short
circuit)   B1

one switch for 2 lights in living room AND one for bathroom
                                              AND one for bedroom   B1

(b) (i) $W = V \times I$ or $100 = 200 \times I$ in any form   C1
0.5 A or 0.5 a   A1

(ii) $I \times t$ or 0.5×60 e.c.f.   C1
30 C   or   30 c   e.c.f.   A1

Page 6	Mark Scheme	Syllabus	er
	IGCSE – May/June 2008	0625	

(c) (i) 135 W

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          NOTE: 280 (W) is the total power of lamps in house, so counts as "power"

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          NOTE: 45 × 3600 = 162000 J gets e.c.f. from **(i)**

                                              [10]

9 (a) 3 complete circles about thick wire, roughly concentric on wire   B1
      clockwise or anticlockwise arrows on any 2 correct circles, and no contradictions   B1

  (b) (i) reduced   B1

     (ii) same OR none   B1

  (c) (i) thin wire is a current-carrying conductor in a magnetic field   B1
           field produced by current in thick wire   B1
           OR alternative approach:
           (both wires produce a magnetic field   B1)
           (fields interact   B1)

     (ii) inwards/towards thick wire/to right/towards T_1T_2 B1

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   (ii) simple correct explanation   A1

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