Location Entry Codes

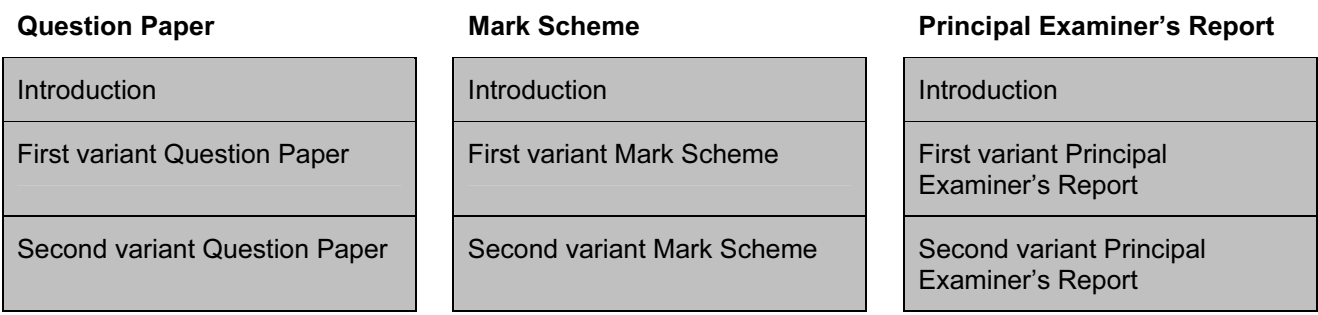UNIVERSITY ~~CAMBRIDGE~~
International

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 October/November 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 will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

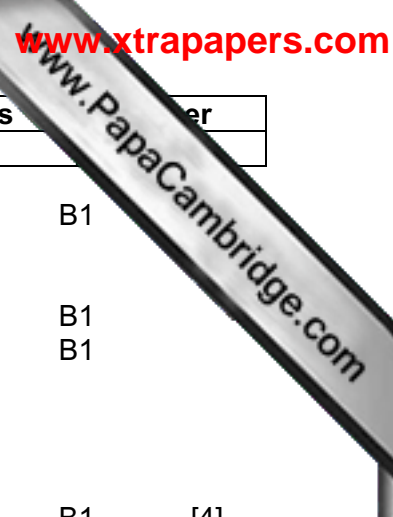NOTES ABOUT MARK SCHEME SYMBOLS AND OTHER MATTERS

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 Answers are acceptable to any number of significant figures $\geqslant 2$, except if
figures   specified otherwise, or if only 1 sig. fig. is appropriate.

Units   It is expected that all final answers will have correct units. Deduct one unit penalty for each incorrect or missing unit, maximum 1 per question. No unit penalty if unit is missing from final answer but is shown correctly in the working.

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.

Work which has been crossed out, but not replaced, should be marked as if it had not been crossed out.

Page 3	Mark Scheme	Syllabus	er
	IGCSE – October/November 2008	0625	

1 (a) (i) any mention of force or weight   ignore mass   C1
        Force to left > force to right   )
        OR <u>resultant</u> force   ) any 1   A1
        OR unbalanced force   )
        OR weight > friction   )

   (ii) to overcome/compensate for friction/resistance   B1

 (b) 2/2.5 or 4/5 etc. or F/a or F = ma   C1
        0.8 kg   A1

 (c) 0.7/0.8   e.c.f. from **(b)**   B1
        0.875 (m/s^2) e.c.f. from **(b)**   could be scored on table (no unit needed)   B1

 (d) (i) v = at   or   0.5 × 1.2   C1
        0.6 m/s   A1

   (ii) any velocity × time or speed × time   C1
        0.36 m c.a.o.   (note: 0.72 m gets C1, A0)   A1   [11]

2 (a) two masses chosen with ratio 2:1 or 3:1 or 3:2   M1
        chosen masses in correct holes to balance   A1

 (b) disc does not rotate/is balanced/in equilibrium/no movement   B1
        NOT spin the disc   NOT anything to do with calculating moments
        NOT when disturbed, returns to original position

 (c) moment of one mass correct (ignore units)
        accept mass × distance calculated   B1
        equal answers   B1

 (d) correct addition of masses/weights, including 200g   B1
        any mass correctly converted to N   B1   [7]

3 (a) (i) hdg or 70 × 1050 × 10   C1
        735 000 Pa or 7.35 × 10^5 Pa   accept N/m^2 for Pa   A1

   (ii) 8.35 × 10^5 Pa OR his **(a)(i)** + 1.0 × 10^5 accept N/m^2 for Pa   B1

 (b) pressure × area or P = F/A or 6.5 × 10^5 × 2.5   C1
        1.625 × 10^6 N   A1

 (c) because density is less   accept new calculation of pressure
        OR because salt water is denser   B1   [6]

Page 4	Mark Scheme	Syllabus	er
	IGCSE – October/November 2008	0625	

4 **(a)** typical random path drawn, at least 3 abrupt changes of direction   B1

    (b) air molecules hit dust particles in all directions/move it in all directions   B1
           just as likely to be up as down   B1
           (allow marks scored on diagram)

    (c) random movements smaller OR slower movement
           OR less energy OR movement decreases   B1   [4]

5 **(a)** **(i)** funnel no longer giving heat to ice OR ice at M.P./constant temp
               OR heater reached max temp   B1

         (ii) inside of large pieces could be well below freezing point)
                OR smaller air gaps if pieces smaller   ) any 1   B1
                OR better contact between heater and ice   )
                OR to ensure heat from heater only goes to the ice   )
                OR larger surface area   )
                Ignore ice melts faster

    (b) mass of beaker NOT mass of ice NOT mass of water   B1
           mass of beaker + water   B1
           (apply $\checkmark$ + $\times$ = 0 for extras other than power & time)

    (c) (mass of ice melted by heater = 16.3 – 2.1) = 14.2 g   C1
           ml in any form, words, symbols or numbers   C1
           Wt or Pt in any form, words, symbols or numbers   accept VIt   C1
           338 J/g OR 338 000 J/kg   c.a.o   A1   [8]

6 **(a)** light of one colour/frequency/wavelength   B1

    (b) n = sin$r$/sin$i$ OR n = sin$i$/sin$r$ in any form   C1
           sin$r$/sin30 = 1.49 OR sin$r$ = 1.49 $\times$ sin30   C1
           48.0° – 48.2°   A1

    (c) ray at angle >30° and <60° to normal, by eye, correct way   **NO** e.c.f.   B1
           Ignore any angles or labelling

    (d) colours/spectrum would appear OR range of angles (ignore "rainbow")
           OR dispersion OR ray splits up   B1

    (e) 90° approx (accept any value 80° to 90°)   B1

    (f) (totally internally) reflected OR T.I.R.   ignore not refracted   B1   [8]

Page 5	Mark Scheme	Syllabus		er
	IGCSE – October/November 2008	0625		

7 **(a)** clear attempt at arcs of circles, at least 3   B1
same wavelength as incoming waves, by eye
(ignore shape ignore distance to first wave)   B1
centre of curvature of arcs at centre of gap, by eye   B1

(b) speed/wavelength or 20/2.5 or $v = f\lambda$ C1
8 Hz or $8\,s^{-1}$ or 8 waves/second   A1

(c) his **(b)** or "the same"   B1   [6]

8 **(a)** changes a.c. to d.c. OR rectifies a/c OR allows current to flow one way only
OR prevents current flowing backward   B1

(b) $I \times t$ or 2×12 or $2 \times 12 \times 60 \times 60$ or amps × seconds   C1
24 Ah or 86 400 C or 86 000 C   A1

(c) emf = J/C OR energy converted/work done per unit charge/coulomb
OR W/A OR volts/p.d. when no current in circuit   C1
12 J of energy are delivered/needed for every coulomb of charge
OR 12 W is the power to drive a current of 1 A   A1

(d) **(i)** series connection shown, any recognisable symbols   B1

(ii) total power = 16 W OR 8/6   C1
1.33 A accept fraction c.a.o.   A1

(iii) any power × any time or $16 \times 60 \times 60$ or IVt or $8 \times 60 \times 60$ C1
57 600 J or 0.016 kWh or 28 800 J or 0.008 kWh   A1   [10]

9 **(a)** pump water to higher level storage   )
or heat water   ) any one   B1
or charge accumulators/batteries   )
ignore charge capacitor   NOT generator

(b) less/no energy/power/heat loss OR to reduce current
OR to allow thinner cables OR more efficient   NOTHING ELSE   B1

(c) I^2R B1

(d) $N_s/1200 = 32000/1100$ OR $N_1/N_2 = V_1/V_2$ in any arrangement   C1
34 880 or 34 900 or 34 909 or 34 910 or 35 000   A1

(e) input power = output power or $V_1I_1 = V_2I_2$ C1
current = power/voltage in any form, words, symbols or numbers   C1
25 A   A1   [8]

Page 6	Mark Scheme	Syllabus	er
	IGCSE – October/November 2008	0625	

10 (a) (i) LDR correctly identified   B1

    (ii) lamp correctly identified   B1

    (iii) transistor correctly identified   B1

(b) (ignore anything that is in terms of currents)
resistance of LDR becomes high   M1
LDR gets larger share of the voltage OR voltage across LDR gets bigger   A1
transistor switches/turns lamp on   A1   [6]

11 (a) A   cathode OR electron gun
B   Y plates OR vertical deflection plates
C   X plates OR horizontal deflection plates
D   screen OR fluorescent/phosphor OR tube   NOT glass
4 correct B2, 3 or 2 correct B1   B2

(b) A; idea of releasing electrons/thermionic emission   B1
B; move the electron beam vertically   B1

(c) (i) y-plates/y-input or B   **NO** e.c.f.   B1

    (ii) x-plates/x-input or C   **NO** e.c.f.   B1   [6]

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 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 – October/November 2008	0625	

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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.

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Significant   Answers are acceptable to any number of significant figures $\geqslant 2$, except if
figures   specified otherwise, or if only 1 sig. fig. is appropriate.

Units   It is expected that all final answers will have correct units. Deduct one unit penalty for each incorrect or missing unit, maximum 1 per question. No unit penalty if unit is missing from final answer but is shown correctly in the working.

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.

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	Page 3	Mark Scheme	Syllabus	Paper
		IGCSE – October/November 2008	0625	

1 (a) idea of accelerating force/force down slope = friction force
OR no resultant force/forces balanced   B1
(accept energy argument if Physics correct)

(b) (i) idea of accelerating force/force down slope > friction force
OR forces unbalanced   B1
(accept energy argument if Physics correct)

    (ii) $F = ma$ NOT $f \propto a$ B1

   (iii) 12×2 C1
24N   A1

(c) (i) resultant force = 38N OR his **(b)(iii)** + 14   C1
38/12 OR (his **(b)(iii)** + 14)/12   C1
$3.166\,m/s^2$ or $3.17\,m/s^2$ or $3.2\,m/s^2$ NOT 3.16   e.c.f.   A1

    (ii) $v = at$ or 3.2×2.5 e.c.f.   C1
$7.8 - 8.0\,m/s$ e.c.f.   A1

(d) idea of acceleration   B1   [11]

2 (a) two masses chosen with ratio 2:1 or 3:1 or 3:2   M1
chosen masses in correct holes to balance   A1

(b) disc does not rotate/is balanced/in equilibrium/no movement   B1
NOT spin the disc   NOT anything to do with calculating moments
NOT when disturbed, returns to original position

(c) moment of one mass correct (ignore units)
accept mass $\times$ distance calculated   B1
equal answers   B1

(d) correct addition of masses/weights, including 200 g   B1
any mass correctly converted to N   B1   [7]

3 (a) (i) hdg or $70 \times 1050 \times 10$ C1
$735\,000\,Pa$ or $7.35 \times 10^5\,Pa$ accept N/m^2 for Pa   A1

    (ii) $8.35 \times 10^5\,Pa$ OR his **(a)(i)** $+ 1.0 \times 10^5$ accept N/m^2 for Pa   B1

(b) pressure $\times$ area or $P = F/A$ or $6.5 \times 10^5 \times 2.5$ C1
$1.625 \times 10^6\,N$ A1

(c) because density is less   accept new calculation of pressure
OR because salt water is denser   B1   [6]

Page 4	Mark Scheme	Syllabus		er
	IGCSE – October/November 2008	0625		

4 **(a)**   typical random path drawn, at least 3 abrupt changes of direction   B1

(b)   air molecules hit dust particles in all directions/move it in all directions   B1
just as likely to be up as down   B1
(allow marks scored on diagram)

(c)   random movements smaller OR slower movement
OR less energy OR movement decreases   B1   [4]

5 **(a)** **(i)**   funnel no longer giving heat to ice OR ice at M.P./constant temp
OR heater reached max temp   B1

(ii)   inside of large pieces could be well below freezing point   )
OR smaller air gaps if pieces smaller   ) any 1   B1
OR better contact between heater and ice   )
OR to ensure heat from heater only goes to the ice   )
OR larger surface area   )
Ignore ice melts faster

(b)   mass of beaker NOT mass of ice NOT mass of water   B1
mass of beaker + water   B1
(apply ✓ + ✗ = 0 for extras other than power & time)

(c) **(i)**   Pt/Wt in any form, words, symbols or numbers   C1
mcθ in any form, words, symbols or numbers   C1
4.88 or 4.9 J/(gK) or J/(g°C) or J/(gdegC) condone no brackets   A1
Or 4880 or 4900 J/(kgK) etc.   accept double solidus in unit

(ii)   heat lost/gained OR impurities in water   B1   [8]

6 **(a)** **(i)**   light of one colour/frequency/wavelength   B1

(ii) $n = \sin r/\sin i$ OR $n = \sin i/\sin r$ in any form   C1
$1.33 = \sin r/\sin 40$ OR $\sin r = 1.33 \times \sin 40$ C1
Any value between 58.68° – 60° inclusive   A1

(iii)   ray correct, by eye, bent away from normal
ignore any arrows or labelling   **NO** ecf   B1

(b) **(i)**   reflected (at B) or T.I.R.   NOT deflects/refracts   M1
<u>angle</u> of incidence bigger than critical angle
or 50° is bigger than 48.8°/C.A.   A1

(ii)   ray correct, by eye, with no refracted part   ignore any arrows   B1   [8]

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE – October/November 2008	0625	

7 (a) clear attempt at arcs of circles, at least 3   B1
same wavelength as incoming waves, by eye
(ignore shape   ignore distance to first wave)   B1
centre of curvature of arcs at centre of gap, by eye   B1

(b) speed/wavelength or 20/2.5 or $v = f\lambda$ C1
8 Hz or $8\,s^{-1}$ or 8 waves/second   A1

(c) his **(b)** or "the same"   B1   [6]

8 (a) changes a.c. to d.c. OR rectifies a/c OR allows current to flow one way only
OR prevents current flowing backward   B1

(b) $I \times t$ or 2×12 or $2 \times 12 \times 60 \times 60$ or amps × seconds   C1
24 Ah or 86 400 C or 86 000 C   A1

(c) emf = J/C OR energy converted/work done per unit charge/coulomb
OR W/A OR volts/p.d. when no current in circuit   C1
12 J of energy are delivered/needed for every coulomb of charge
OR 12 W is the power to drive a current of 1 A   A1

(d) (i) series connection shown, any recognisable symbols   B1

     (ii) total power = 16 W OR 8/6   C1
     1.33 A accept fraction c.a.o.   A1

     (iii) any power × any time or $16 \times 60 \times 60$ or IVt or $8 \times 60 \times 60$ C1
     57 600 J or 0.016 kWh or 28 800 J or 0.008 kWh   A1   [10]

9 (a) pump water to higher level storage   )
or heat water   ) any one   B1
or charge accumulators/batteries   )
ignore charge capacitor   NOT generator

(b) less/no energy/power/heat loss OR to reduce current
OR to allow thinner cables OR more efficient   NOTHING ELSE   B1

(c) $I^2 R$ B1

(d) $N_s/1200 = 32000/1100$ OR $N_1/N_2 = V_1/V_2$ in any arrangement   C1
34 880 or 34 900 or 34 909 or 34 910 or 35 000   A1

(e) input power = output power or $V_1 I_1 = V_2 I_2$ C1
current = power/voltage in any form, words, symbols or numbers   C1
25 A   A1   [8]

Page 6	Mark Scheme	Syllabus	er
	IGCSE – October/November 2008	0625	

10 (a) (i) LDR correctly identified   B1

      (ii) lamp correctly identified   B1

     (iii) transistor correctly identified   B1

(b) (ignore anything that is in terms of currents)
resistance of LDR becomes high   M1
LDR gets larger share of the voltage OR voltage across LDR gets bigger   A1
transistor switches/turns lamp on   A1   [6]

11 (a) A   cathode OR electron gun
          B   Y plates OR vertical deflection plates
          C   X plates OR horizontal deflection plates
          D   screen OR fluorescent/phosphor OR tube   NOT glass
          4 correct B2, 3 or 2 correct B1   B2

(b) A; idea of releasing electrons/thermionic emission   B1
       B; move the electron beam vertically   B1

(c) (i) y-plates/y-input or B   **NO** e.c.f.   B1

      (ii) x-plates/x-input or C   **NO** e.c.f.   B1   [6]