

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

0625 PHYSICS

0625/03

Paper 3 (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 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



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International Examinations

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NOTES ABOUT MARK SCHEME SYMBOLS

- 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.
- un.pen. means "unit penalty". An otherwise correct answer will have one mark deducted if the unit is wrong or missing. This **only** applies where specifically stated in the mark scheme. Elsewhere, incorrect or missing units are condoned.
- OR/or indicates alternative answers, any one of which is satisfactory for scoring the marks.

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- 1 (a) (i) 1.6s to 1.8s ALLOW 4.2 – 6s ALLOW 4.4 – 6s NOT 2s NOT 4.0 – 6s B1
- (ii) 6 – his (i), evaluated ALLOW 0 – 4.2s ALLOW 0 – 4.4s NOT 0 – 4s e.c.f. B1
- (iii) his (i) \times 20
32 – 36m or his (i) \times 20 evaluated
allow B1 only for 40m with no working C1
A1
- (iv) area under whole graph or $\frac{1}{2}vt$ + his(iii)
70 – 95m C1
A1
- (b) (i) weight of ball down and (air) resistance up
OR friction opposes weight)
upward/resistance/friction force increases
with time/distance/speed/as ball falls) any 3
net force reduces)
less force, so less acceleration) B1×3
- (ii) up force = down force OR no resultant force OR air res. = weight
no net force, no acceleration/constant speed B1
B1

[Total: 11]

- 2 (a) (i) down to R and up towards Q/S, then reverse OR equivalent
OR back towards Q, then reverse
continues backward and forward until stops (at R) B1
B1
- (ii) idea of energy loss OR because of friction NOT PE/KE B1
- (b) (PE lost =) 1.2×0.5 OR 0.6 (J) OR $0.12 \times 10 \times 0.5$ OR mgh OR wt \times dist
i.e. evidence of mgh C1
- $0.5 \times 0.12 \times v^2 = mgh$ OR 0.6 etc. e.c.f.
i.e. evidence of $\frac{1}{2}mv^2$ C1
- 3.16 OR 3.2 m/s c.a.o. A1

[Total: 6]

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- 3 (a) any logical method e.g.
 extension is 2 cm for 8 N or 1 cm for 4 N
 final extension is 3 cm
 need 12 N to extend to 6 cm
- C1
C1
A1

- (b) (i) shown on diagram:
 distance from pivot to F OR value of weights OR dist from weights to pivot
- B1
- (ii) force/weight of load \times distance from pivot to force
 (accept symbols if clear)
- B1

[Total: 5]

- 4 (a) (i) random
 high speed (between collisions)
- B1
B1
- (ii) hit walls
 many hits/unit area OR hit hard OR large force OR high energy
 OR many hits/s OR hit very often
- B1
B1
- (b) particles vibrate (more) OR electrons gain energy
 particle to particle transfer OR flow of free electrons
- B1
B1
- (c) 75×3200 OR ml
 $240\ 000\ J$ OR $240\ kJ$ OR $2.4 \times 10^5 J$
- C1
A1

[Total: 8]

- 5 (a) take readings of the detectors
 fill box with water
 take readings (again)
- B1
B1
B1
- (b) dull black best AND shiny white worst
- B1
- (c) two different metals
 two junctions (could be at meter) hot and cold need not be indicated
 any cell, max B1,B0
- B1
B1

[Total: 6]

Page 5	Mark Scheme	Syllabus	Paper
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- 6 (a) mirror: 2 reflected rays approx correct
projected back to approx correct labelled image
note: images may be dots or lines
M1
A1
- lens: ray through F, correct by eye
ray through centre OR ray through other F, correct by eye
projected back to approx correct (labelled) image
M1
M1
A1

- (b) (i) not produced by real rays crossing
OR cannot be caught on a screen
OR rays appear to come from image
B1
- (ii) upright/right way up/erect c.a.o.
B1
- (iii) lens image enlarged AND mirror image same size c.a.o.
OR (different) size OR (different) distance OR different side
B1

[Total: 8]

- 7 (a) (i) diagram showing compressions and rarefactions
(could be either spaced vertical lines or dots, or coil or sine wave)
2C's and 2R's in approx correct place
B1
B1
- (ii) wavelength correctly marked, by eye
B1

- (b) (i) all 3 in correct positions
B1
- (ii) radio (waves)
B1
- (iii) 3×10^8 m/s
B1

[Total: 6]

Page 6	Mark Scheme	Syllabus	Paper
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8 (a) circuit 1 series AND circuit 2 parallel B1

- (b) switch off each one separately)
 one fails, other works)
 both get full current/voltage/same voltage) any 2 B1+B1
 other good point e.g. more heat in parallel)
 lower resistance)

- (c) (total R =) 10 (Ω) C1
 (V =) 12V A1

- (d) $1/R = 1/4 + 1/6 (= 5/12)$ OR $1/R = 1/R_1 + 1/R_2$ C1
 2.4 (Ω) A1

- (e) (i) 3(A) B1
 (ii) 24W B1
 (iii) 7200J e.c.f. (ii) B1

[Total: 10]

9 (a) when magnetic field cuts/cut by conductor/wire/coil/solenoid
 OR change in magnetic field linked with coil etc. B1
 current/e.m.f caused B1

- (b) solenoid ends connected to meter/lamp note: any sign of a cell gets B0
 magnet indicated in suitable position on axis of solenoid B1
 B1

- (c) insert/withdraw/move magnet into/out of solenoid
 meter gives reading (as magnet moves) OR watch the meter OR lamp glows B1
 B1

- (d) move magnet faster)
 increase strength of magnet) any 2 B1+B1
 more turns on solenoid)
 closer to solenoid)

[Total: 8]

Page 7	Mark Scheme	Syllabus	Paper
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- 10 (a) (i) low/0/off/no output B1
 (ii) low/0/off/no output B1
- (b) (i) temp sensor to NOT gate input, correct symbol
 output of NOT gate (condone incorrect symbol) and humidity
 sensor to AND inputs (condone labelled box for AND gate) B1
 (ii) NOT low in, high out
 AND both inputs high, high output
 Note: B0, B0 for states on wrong diagram. B1
 B1

[Total: 6]

- 11 (a) detector, no source, no aluminium, take count OR take background B1
 no aluminium, take count B1
 aluminium, take count B1
 subtract background/reading 1 from results B1
- (b) count decreases as thickness of aluminium increases B1
 6-10 sheets/several sheets/few mm,
 count reduced to background count/ β -particles stopped B1

[Total: 6]