UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

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 must be read in conjunction with the question papers and the report on the examination.

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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.

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.

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 — Ignore units, except where a mark is specified for a particular unit.

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

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

1 **(a)** **(i)** 6 (cm)
5 (cm)

(ii) $6 \times 5 \times 2$ ecf
60 (cm^3) ecf A1

(b) D = M/V in any form, letters, words or numbers B1
53 C1
2.65 OR 2650 A1
g/cm^3 OR kg/m^3 (unit must be appropriate) B1

[Total: 8]

2 **(a)** distance/time in any form C1
960/8 OR 960/(8 × 60) C1
120 OR 2 A1
m/min OR m/s must correspond with value B1

(b) friction or air resistance or force accelerating/decelerating legs B1

[Total: 5]

3 **(a)** tidal B1
wave B1
hydroelectric accept waterfall B1
(any order)

(b)

tidal	**wave**	**hydroelectric**	
PE of rise and fall	PE of rise and fall	water stored at high level	B1
flow through turbine	rotates/moves floats	flowing water drives turbine	B1
turbine drives generator	floats drive generator	turbine drives generator	B1

[Total: 6]

4 **(a)** focal length OR focal distance B1

(b) 4 rays all passing through F M1
appropriate refraction at both lens surfaces
OR all rays bent at lens mid-line A1

(c) <u>focused</u> image OR <u>sharp</u> image OR dot B1

(d) 4 dots OR out-of-focus/blurred/fuzzy image B1

[Total: 5]

5 **(a)** alpha and beta both underlined –1 e.e.o.o.

(b) gamma

(c) radio B1

(d) alpha B1

[Total: 5]

6 **(a)** conduction B1

(b) **(i)** convection B1

(ii) hot water expands OR hot water less dense B1
hot water rises (ignore anything about cold water falling) B1

(c) convection cannot occur B1
water is a poor conductor B1

[Total: 6]

7 **(a)** *i* correctly shown B1

(b) **(i)** ray shown in air at angle > 40° C1
angle same as in Fig. 7.1, by eye A1

(ii) ray reflected (MO if says along surface) M1
critical angle exceeded A1

[Total: 5]

8 **(a)** **(i)** one sound or equivalent (NOT an echo) B1

(ii) distance = speed × time in any form ..... condone factor of 2 C1
330 × 1.5 C1
495 (m) A1

(b) **(i)** idea of one sound direct
OR original sound B1
other sound by echo B1

(ii) 1.5 (s) B1
4.5 (s) B1

[Total: 8]

9 **(a)** **(i)** N at left end **and** S at right end (inside or outside magnet outline)
both N and S within magnet outline

(ii) attracted/moves towards magnet OR it becomes magnetised

(iii) nothing B1

(b) **(i)** pass current through coil/wire OR connect a battery across coil B1

(ii) iron NOT steel B1

(iii) can be very strong)
can be switched on & off easily) any one B1
can reverse polarity easily)
adjustable strength)

[Total: 7]

10 **(a)** parallel B1

(b) I = V/R in any form C1
100/250 C1
0.4 (A) A1

(c) 12 (A) OR 30 × his **(b)**, correctly evaluated B1

(d) parallel B1

(e) **(i)** none e.c.f. from **(a)** B1

(ii) none e.c.f. from **(d)** B1

[Total: 8]

11 **(a)** cell/battery shown M1
complete series circuit, including cell/battery A1
(ignore any switch, open or closed
ignore any other component, as long as a current would flow)

(b) **(i)** S and M on door and frame (either way) so they would be next to each other when door closed B1
S on frame **and** M on door edge/door face close to edge B1

(ii) any suitable application B1
e.g. shop door, security door, lift door, fridge door, oven door

[Total: 5]

12 **(a)** yes
yes
no

(b) nucleus B1

(c) **(i)** 6 points correct ±½ small square –1 e.e.o.o. B2
thin, smooth curve through points B1

(ii) 8 ± 1 (mins) C1
108 ± 1 (mins) C1
100 ± 2 (mins) e.c.f. if working shown A1

(iii) half his **(ii)** e.c.f. B1

(d) his **(ii)** e.c.f. B1

[Total: 12]