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

0625/22 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.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2010 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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)** 13.6 (s) B1

(b) 13.6/40 e.c.f. C1
0.34 (s) e.c.f. A1

(c) more accurate OR errors less significant OR time for 1 interval too small B1

(d) 4 intervals OR 4 and a bit intervals OR 5 intervals C1
4 × his **(b)** OR (4 and a bit) × his **(b)** 5 × his **(b)** C1
1.36 – 1.5 (s) e.c.f. A1

(e) drops accelerate/go faster B1

[Total: 8]

2 **(a)** extension indicated between two broken lines B1

(b) **(i)** 4 points correctly plotted ± ½ small square –1 e.e.o.o. B2
(condone 0,0 not plotted)
straight line through points and origin, by eye B1

(ii) proportional B1

(iii) **1**. newton(s) B1
2. 25 – 26 (mm) C1
75 – 76 (mm) A1

[Total: 8]

3 **(a)** **(i)** (engine) thrust **and** (air) friction B1

(ii) force shown vertically upwards, anywhere on plane B1

(b) **(i)** v = s/t in any form C1
2200/2.75 C1
800 (km/h) A1

(ii) idea of
headwind on outward journey
OR tailwind on return journey
OR shorter route on return journey
OR air friction is less
OR idea of less weight
NOT flies slower B1

[Total: 6]

4 work B1
potential/gravitational/PE/GPE/position B1
kinetic/KE/movement B1
constant/the same/uniform B1
joule(s) OR J condone j B1

[Total: 5]

5 **(a)** **(i)** internal energy B1

(ii) thermal capacity B1

(iii) boiling point B1

(b) increases temperature rises OR mercury/alcohol/liquid expands B1 + B1
changes rod/brass expands B1 + B1

[Total: 7]

6 **(a)** 40 condone no unit B1

(b) **(i)** ray reflected at angle > 40° to dotted line B1

(ii) 60 condone no unit B1

(iii) his **(ii)** – 40 C1

20 e.c.f. condone no unit A1

(c) **(i)** 2 (cm) B1

(ii) idea of distance behind = distance in front C1
10 (cm) A1

[Total: 8]

7 **(a)** **(i)** refraction B1

(ii) dispersion B1

(b)

red
yellow

B1

e.c.f. from red B1

(c) any two from
gamma, cosmic, X-rays, UV, IR, microwaves, radio, TV
(ignore extras, unless wrong, in which case ✓ + × = 0) B1 + B1

[Total: 6]

8 **(a)** **(i)** amplitude B1

(ii) wavelength B1

(b) **(i)** string moves air M1
backwards & forwards OR up & down
OR compressions & rarefactions A1

(ii) gets quieter/softer/less loud B1

[Total: 5]

9 **(a)** **(i)** (accept any recognisable symbols for M1 and A1 marks)
battery/cell, ammeter, coil in series (ignore any switch or rheostat) M1
voltmeter clearly in parallel with coil A1
standard symbols used for battery/cell, voltmeter and ammeter B1

(ii) R = V/I in any form B1

(iii) length (of wire))
diameter/cross-section/area (of wire)) any 2 B1 + B1
resistivity/type of material)
temperature)

(b) EITHER

6/1.5 C1
(circuit res. =) 4 (Ω) C1
(res. of AB =) 1 (Ω) e.c.f. C1
0.5 (Ω/m) e.c.f. A1

OR

p.d. across 3Ω = 4.5 (V) C1
p.d. across AB = 1.5 (V) C1
res. of AB = 1 (Ω) e.c.f. C1
0.5 (Ω/m) e.c.f. A1

[Total: 10]

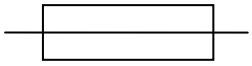
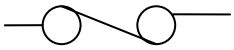
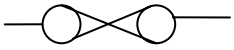
10 (a) (i) deflects NOT vibrates OR oscillates M1
returns to zero/centre again A1

(ii) induction/induced current or emf B1
axle/wire cuts magnetic field B1
not when axle out of field B1

(iii) opposite deflection B1

(b) needle/pointer swings from side to side B1

[Total: 7]

11 (a)  condone  OR  B1

(b) current too large B1
fuse wire melts B1

(c) live ticked B1

[Total: 4]

12 (a) (i) it is an electron B1

(ii) no/negligible mass/weight allow "its mass"
OR not one of nuclear particles B1

(iii) negative charge allow "its charge" M1
one unit of A1

(b) 250 B1
98 B1

[Total: 6]