UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

0625 PHYSICS

0625/02   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.

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.

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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.

QU.	SCHEME	MARK

1 **(a)** 60 (cm^3)   B1

(b) liquid surface lower than in cylinder   C1
liquid surface level with 15 cm^3 (± 5 cm^3)   A1

(c) less   B1

[Total: 4]

2 **(a)** 200,000 (m^3)   B1

(b) D = M/V   in any form   B1
his **(a)** x 1.3   C1
260,000   c.a.o.   A1
kg   B1

(c) decreases   M1
air expands   OR   density decreases   A1

(d) hot air rises   B1

[Total: 8]

3 **(a)** 7.5 (cmHg)   C1
75 (cmHg)   A1
(give C1, A1 for 1.0006 x 105 Pa or 1 x 105 Pa (N/m^2) if unit given)

(b) nothing OR (Torricellian) vacuum OR Hg vapour   B1

(c) tube level lower   B1
reservoir level higher (any amount)   B1

(d) pressures on 2 surfaces equal (always)   )
Hg levels equal (always) OR no Hg column   )   any two   B1+B1
no change when pressure changes   )

[Total: 7]

QU.	SCHEME	MARK

4 (a) (i) arrow labelled *W*, vertically (by eye) down
from somewhere on either boat   **B1**

(ii) arrow labelled *F*, down slope, between either boat and slipway   **B1**

(b) (i) multiply *W* by (vertical) height raised OR *Wh*   **B1**

(ii) multiply *F* by distance along slope OR *Fs*   **B1**

(iii) add **(i)** and **(ii)**   **B1**

(c) time taken   **B1**

                                                                    [Total: 6]

5 (a) $^\circ$C   **B1**

(b) (i) ICE marked at 0   **B1**

(ii) STEAM marked at 100   **B1**

(c)
expansion/volume/pressure	OF	a gas	)	
expansion/length	OF	a solid	)	
resistance	OF	a resistor/thermistor/wire	)	
bending	OF	a bimetal strip	) any 2	**B1+B1**
e.m.f/voltage	OF	a thermocouple	)	
colour	OF	a hot surface	)	
colour change	OF	certain chemicals	)	

                                                                    [Total: 5]

6 (a) (i) uniform acceleration   **B1**

(ii) 9 (m/s)   **B1**

(iii) s = vt   in any form   **C1**
90 (m) OR 10 x his **(ii)**, evaluated   **A1**

(b) average speed is lower   **B1**

                                                                    [Total: 5]

QU.	SCHEME	MARK

7 **(a)** **(i)** 1.5 (cm)   B1

(ii) circle centred on X, outside printed circle (circle need not be drawn
with a compass, but must be carefully drawn)   M1
diameter 4.5 cm by eye   A1

(b) sound longitudinal, water transverse   )
sound wave faster (than water wave)   )   any 2   B1,B1
different frequency/wavelength   )

[Total: 5]

8 **(a)** **(i)** principal focus unambiguously marked   B1
focal length approximately indicated   C1
focal length precisely indicated, from pole to principal focus   A1

(ii) any ray from X to Y, correctly refracted at lens   B1

(b) [mark in pairs, using ✓ + × = 0]
real   B1
diminished   B1
inverted   B1
image distance less   B1

(c) gets smaller   B1
gets closer to lens   B1

[Total: 10]

9 **(a)** points correctly plotted (±½ small square)   −1 e.e.o.o.   B2
smooth curve through his points   B1
reasonable thickness   B1

(b) **(i)** 5.3 – 6.1   B1

(ii) 0.9 – 1.7   B1

(c) $R = V/I$ in any form   C1
division by 25 or 25 x 10^{-3} somewhere   C1

(i) answer between 220 and 240   B1

(ii) answer between 40 and 60   B1
Ω shown in either **(i)** or **(ii)**   B1

(d) answer compatible with his **(c)**   B1

[Total: 12]

QU.	SCHEME	MARK

10 (a) (i) shape appropriate outside coil (condone incomplete loops) — M1
lines mostly parallel within coil — A1
pattern roughly symmetrical — A1
no lines touching or crossing — A1

(ii) iron bar — B1

(b) rods become magnetised — M1
same direction — A1
repel — B1

[Total: 8]

11 (a) within range 18–20 (mins) — B1

(b) (i) 922 or thereabouts — B1

(ii) his **(a)** — B1

(c) alpha OR beta — B1

[Total: 4]

12 (a) electrons — B1

(b) move — M1
towards P_1 — A1

(c) idea of making both P_3 and/or P_4 positive — B1
equal potential — B1
(earthing of P_1 and P_2 not required for answer)

(d) fluorescent screen OR any other appropriate method — B1

[Total: 6]

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