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.

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

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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)		°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]	