MARK SCHEME for the October/November 2013 series

0625 PHYSICS

0625/32

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, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.



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NOTES ABOUT MARK SCHEME SYMBOLS & OTHER MATTERS

- M marks are method marks upon which further marks 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 marks can be scored.
- B marks are independent marks, which do not depend on other marks. For a B mark to scored, the point to which it refers must be seen specifically in the candidate's answers.
- A marks In general A marks are awarded for final answers to numerical questions. If a final numerical answer, eligible for A marks, is correct, with the correct unit and an acceptable number of significant figures, all the marks for that question are normally awarded. It is very occasionally possible to arrive at a correct answer by an entirely wrong approach. In these rare circumstances, do not award the A marks, but award C marks on their merits. However, correct numerical answers with no working shown gain all the marks available.
- C marks are compensatory marks in general applicable to numerical questions. These can be scored even if the point to which they refer are not written down by the candidate, **provided subsequent working gives evidence that they must have known it.** For example, if an equation carries a C mark and the candidate does not write down the actual equation but does correct substitution or working which shows he knew the equation, then the C mark is scored. A C mark is not awarded if a candidate makes two points which contradict each other. Points which are wrong but irrelevant are ignored.
- 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.
- <u>Underlining</u> indicates that this <u>must</u> be seen in the answer offered, or something very similar.
- OR / or indicates alternative answers, any one of which is satisfactory for scoring the marks.
- e.e.o.o. means "each error or omission".
- o.w.t.t.e. means "or words to that effect".
- c.a.o. means "correct answer only".
- Spelling Be generous about spelling and use of English. However, do not allow ambiguities, e.g. spelling which suggests confusion between reflection/refraction/diffraction or thermistor/transistor/transformer.
- Not/NOT indicates that an incorrect answer is not to be disregarded, but cancels another otherwise correct alternative offered by the candidate i.e. right plus wrong penalty applies.
- Ignore indicates that something which is not correct or irrelevant is to be disregarded and does not cause a right plus wrong penalty.

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e.c.f. meaning "error carried forward" is mainly applicable to numerical questions, but may in particular circumstances be applied in non-numerical questions. This indicates that if a candidate has made an earlier mistake and has carried an incorrect value forward to subsequent stages of working, marks indicated by e.c.f may be awarded, provided the subsequent working is correct, bearing in mind the earlier mistake. This prevents a candidate being penalised more than once for a particular mistake, but **only** applies to marks annotated e.c.f.

Significant Figures

Answers are normally acceptable to any number of significant figures \geq 2. Any exceptions to this general rule will be specified in the mark scheme.

Units Deduct one mark for each incorrect or missing unit from a final answer that would otherwise gain all the marks available for that answer: maximum 1 per question.

Arithmetic errors

Deduct one mark if the **only** error in arriving at a final answer is clearly an arithmetic one.

Transcription errors

Deduct one mark if the only error in arriving at a final answer is because given or previously calculated data has clearly been misread but used correctly.

Fractions Only accept these where specified in the markscheme.

	Pa	Page 4			Mark Scl	heme		Syllabus	Paper	,
				IGCSE	– October/N	November 2013		0625	32	
1	(a)	mea	asure	area (under c	urve)				B1	[1]
	(b)	draws tangent at steepest part by eye, within thickness of lines accept triangle/lines to indicate values on straight steepest part of curve							B1	
		finds Δv and Δt from tangent or at straight steepest part of curve								
		any <i>v</i> divided by any <i>t</i> or in equation								
		3.0	- 4.2	m/s²					B1	[4]
	(c)	uses 62 and 10 NOT 2 × 62 6.2 m/s					C1 A1	[2]		
									[Tot	al: 7]
2	(a)	evid	lence	of division of	12mm by 0.0	180 s			C1	
		(v =) 0.1	5m/s or 150m	m/s				C1	
		use	s <i>t</i> =	nis (∆) <i>v/a</i> in ar	ly form				C1	
		•	-	– 0] / 0.03 = 0 .f. from clearly	,	5(.0)s accept 1s vrong speed	sig. fig.		A1	[4]
	(b)	use	of F	a OR F = ma	in any form,	numbers or symb	ols, ign	iore g	C1	
		(0.0	6/0.0	3=) 2(.0) kg a	ccept 1 signi	ficant figure			A1	[2]
	(c)	grea	ater						M1	
		bec	ause	mass is less, i	gnore comm	ents about force			A1	[2]
									[Tota	al: 8]
3	(a)	(i)	(botł	n have) magnit	ude o.w.t.t.e	э.			B1	
			(only) vector has d	irection				B1	[2]
		(ii)		example of ve displacement,					B1	
				example of so distance, lengt	• •	sure, mass, energ	gy acc	ept height	B1	[2]

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(1)				
(D)		ch vector to scale and correct angle, ger vector clockwise by acute angle from smaller	B1	
	par	rallelogram or correct two sides of triangle	B1	
	res	sultant drawn correct, from his parallelogram or his sides of triangle	M1	
	ma	ignitude 4.5 – 5.4 ×10 ⁴ N, accept 1 sig. fig. if exact		
	AN	ID direction 4 – 12° from 3 × 10^4 N force OR 8 – 16° from 2 × 10^4 N force cept values from diagram	A1	[4
		[Tota	-	
			[10ta	
(a)	irre	gular/random/haphazard movement	B1	
	any	y mention of different directions or clearly described	B1	[2
(b)	<u>sm</u>	<u>oke</u> particles condone atoms, molecules etc. AND (invisible) <u>air molecul</u>	<u>es</u> B1	
		and smoke/dots collide	D4	Г
	ign	ore other collisions	B1	[2
(c)	dot	ts move in or out of focus/disappear OR appear brighter/dimmer	B1	[
			[Tota	al: {
(a)		ck can/B loses heat energy quicker/cools faster R polished can loses heat energy slower/cools slower	M1	
	bla	ck radiates/emits more OR polished radiates/emits less		
	ign	ore anything about absorption	A1	[2
(b)	(i)	any four from:	B4	
()	()	viable experiment e.g. pour in water and measure temperature		
		ignore methods with external thermometers (for this point only)		
		pour (hot) water into both cans to <u>same level/same amount</u>		
		place thermometers in <u>same position</u> relative to each can/detail relatin stirring	ig to	
		thermometers not touching the metal of can		
		observe change of temperature		
		correct detail of timing		

Pa	ige 6			Mark Scheme		Syllabus	Paper	
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	(ii)	use tiles as lids reduce convec		poration (to ro	om)		M1 A1	
	OR alternative method put tiles under cans reduce, ignore prevent, conduction (to bench) for both methods, ignore other modes of heat transfer, ignore place tiles							
		around can	, 0					[2]
(c)	bla	ck can/B					M1	
	bla	ck absorbs (radi	ation) be	etter, ignore a	nything about e	mission	A1	[2]
							[Total	: 10]
6 (a)	SOL	t in air Ind in air Ind in water		3 × 10 ⁸ m/s 300m/s 1500m/s			B1 B1 B1	[3]
(b)	dist	ance = speed ×	time in	any form N	OT speed = 2 <i>d</i> /	t	C1	
	t _{air} =	= 120 ÷ value fo	r speed (of sound in ai	r		C1	
	$t_{\rm rail}$	(= 120/5000) =	0.024 s				C1	
		ne difference =) (pect 0.400 – 0.0			lidate's t _{rail} corre	ectly evaluated	A1	[4]
							[Tota	al: 7]
7 (a)	(i)	BOX 2 ticked BOX 3 ticked	virtual magnifi	ied			B1 B1	
	(ii)	AB circled					B1	[3]
(b)	(i)	normal at M to	wards C				B1	[1]
	(ii)	$40^{\circ} \leq \text{angle of}$	reflectior	n ≤ 50°			B1	[1]
	(iii)	any <u>clear</u> indica	ation tha	t OP is also tl	ne reflected ray		B1	[1]
	(iv)	lines extended AND indication			meet to the rig age position	ht of mirror	M1	
		image within 28 AND higher tha			rgin line		A1	[2]
							[Tota	al: 8]

	Page	7		Mark Scheme	Syllabus	Paper				
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8	(a) (o	ne thir	d length so) one		C1					
	(h	alf are	If area so) twice R , accept any doubling, including divide by $\frac{1}{2}$							
	(re	esistan	sistance = $0.45 \times 2/3$) = $0.3(0)\Omega$ accept 1 sig. fig.							
	(b) (i)) 1(Ω)) and 3(Ω) used i	n correct parallel formula		C1				
		2(Ω)	added to candic	late's <u>parallel</u> resistance		C1				
		2.7 (or 2.8 or 2.75 Ω			A1	[3]			
	(ii)	$I_1 =$		³ OR $I_4 = I_2 + I_3$ evant equation/inequality e.g. $I_4 =$	4 <i>I</i> ₃ , <i>I</i> ₄ > <i>I</i> ₃	B2	[2]			
	(iii)	$V_1 =$		+ V_3 OR $V_4 = V_2 + V_3$ nequality e.g. $V_1 > V_3$		B2	[2]			
						[Total:	10]			
9	(a) (i)	curr	ent/electricity cou	uld flow through/across switch due	e to dampness / hum	idity				
		OR	water (good) con	ductor		B1				
		dan	ger of shock/elec	trocution		B1				
		shor	ept alternative: t (circuit) ger because) lig	hts go out when fuse blows		(B1) (B1)	[2]			
	(ii)	ÖR	normal switch ou	cord of insulating material itside workroom contact operation/insulating cover	/sensor actuation	B1	[1]			
	(b) (i)) fricti	on with hose			M1				
			oning relating to rubber insulates	charge moved <u>to/from aircraft</u> OF	R to/from hose	A1	[2]			
	(ii)		er conducts) ch s/wheels	to ground OR throu	gh					
		OR		B1	[1]					
				[Tota	l: 6]					

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10	(a)	(i)	AND	B1						
		(ii)		correct symbol must have 2 inputs, 1 output concave input side, somewhat pointed on output side with small circle						
	(b)	(i)	HIG	HIGH/1						
		(ii)	HIG	H/1		B1	[2]			
	(c)	trar	nsisto	r circled		B1	[1]			
						[Tota	l: 5]			
11	(a)	(i)	90			B1				
		(ii)	39			B1	[2]			
	(b)	(i)	tick	B1	[1]					
		(ii)	zirco	B1	[1]					
	(c)	X (a	and) Z	M1						
		san	ne pro	oton number		A1	[2]			
						[Tota	l: 6]			