MARK SCHEME for the October/November 2010 question paper

for the guidance of teachers

0625 PHYSICS

0625/31

Paper 3 (Extended Theory), maximum raw mark 80

MMM. Hiremepapers.com

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.



UNIVERSITY of CAMBRIDGE International Examinations

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NOTES ABOUT MARK SCHEME SYMBOLS & OTHER MATTERS

Points applicable to all answers

- 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 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.
- 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.
- 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.

- <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.
- Spelling Be generous about spelling and use of English. If an answer can be understood to mean what we want, give credit.
- 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
- Ignore Indicates that something which is not correct is disregarded and does not cause a right plus wrong penalty.
- 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.

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Points applicable to numerically worked answers only

- Final If the final answer to a numerically worked question is correct, with the correct unit and an acceptable number of significant figures, all the marks for that question are awarded. The points which could have gained C marks need not be examined, even if wrong.
- Ecf 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 ecf. provided his subsequent working is correct, bearing in mind any earlier mistake. This prevents a candidate being penalised more than once for a particular mistake, but **only** applies to marks annotated ecf.
- Significant Answers are acceptable to any number of significant figures \geq 2, except if specified otherwise, or if only 1 sig. fig. is appropriate.
- Units Deduct one mark for each incorrect or missing unit from **an answer that would otherwise gain all the marks available for that answer: maximum 1 per question.** No deduction is incurred if the unit is missing from the final answer but is shown correctly in the working.
- Arithmetic Deduct one mark if the **only** error in arriving at a final answer is an arithmetic one.
- errors
- 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 the mark scheme, use right + wrong = 0

	Page 4		yllabus Paper		
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1	(a) (paralle NOT a two sic one sic diagon Ignore	B B DR R B			
	(b) 98 N – (accep	В			
	(c) (vertica	ally) up/opposite to W_NOT North	В		
	(d) his (b) ignore	OR correct value calculated mass	В		
			[Total: 6		
2	(a) consta	(a) constant velocity must be in a straight line/direction of motion is changing			
		no force, then constant velocity in straight line OR force is n change direction	needed B		
		ody moving in circle is changing direction/velocity/acceleration force is needed	ng B		
	(ii) tov	wards centre (of circle)/at right angles to motion/inwards	В		
	(iii) frio	ction between tyres and road/reaction from banking of track	K B		
			[Total: 5		
3		=) F/A in any form OR 1000/0.01 00 000 Pa accept N/m ²	C A		
	0.0 80	ultiplication of either force or area by 4 08 × his (i) OR 0.02 × his (i) 000 N e.c.f. from (i) 000 N gets C0, C1, A1)	C C A		
	(b) his (ii) 600 kg	– 2000 correctly evaluated e.c.f.	C A		
			[Total: 7		

	Pa	ge 5					: Teach				Syllabu	s	Paper
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4	 (a) heat/energy to raise/change temperature of 1 kg/1g/unit mass through 1°C/1K (mention of change of state scores zero) 										M A		
	(b)	238 907	800 = '.5 or	0.93 × 907 or	c × (41. 908 or 9	3 – 13. ⁻ 910 J/(I	ý °C) oı	r J/(kg	K) at leas and extra	•	•		B C A
	(c)	(i)	1212	2.9 or 1	200 or ⁻	1210 or	1213 or	1214	J/(kg °C)	or J/(kg	JK)		B
		(ii)	(ave	rage) t	emperat	ture is h	-	tial terr	•	-	no cooling v be longe		B
			rate	of heat	ting may	v be low	er						B
	(d)	staı get	t & fir heate	nish sa er up to	me amo	ount belo ature bo	efore ins	ove roc	om tempei) rature)))	any 2		B1 + B′
													[Total: 10
5	(a)	(i)	0.15	m/s or	[·] 15 cm/	S	any forr either if		ds, letters s)	, numbe	ers		C′ A′
		(ii)			0 OR m 98.1 J			mbols,	words or	numbe	rs		C´ A´
		(iii)			OR his 2.45 W		om (ii)						C A
	(b)	(inp	out) gr	eater/c	output le	ss NO	T a nume	erical fa	actor				B
													[Total: 7
6	(a)	ang no l	le of i light r	• •	d		edium critical a	angle/4	2°)))	any 3		B1 × 3
	(b)						reflection			-			Bź
		•		-			urther rei her refle		at <u>lower</u> :	surtace)		[Total: 5

 8 (a) capacitor/capacitance/condenser (b) (i) 5 Ω (ii) 5 and 20 both used OR 25 	31 B1 B1 C1 C1 A1 [Total: 6] B1 C1 C1 C1 A1
(ii) particle OR mechanical OR compression OR longitudinal OR matter wave (iii) ultra violet/uv (b) $v = f\lambda$ OR $\lambda = v/f$ $3.0 \times 10^8/2.5 \times 10^8$ OR $3.0 \times 10^8 = 2.5 \times 10^8 \lambda$ 1.2 m (Tot 8 (a) capacitor/capacitance/condenser (b) (i) 5Ω (ii) $5 \text{ and } 20 \text{ both used OR } 25$	B1 B1 C1 A1 [Total: 6] B1 C1 C1
iii) ultra violet/uv (iii) ultra violet/uv (b) $v = f\lambda$ OR $\lambda = v/f$ $3.0 \times 10^8/2.5 \times 10^8$ OR $3.0 \times 10^8 = 2.5 \times 10^8 \lambda$ 1.2 m (Tot 8 (a) capacitor/capacitance/condenser (b) (i) 5Ω (ii) $5 \text{ and } 20 \text{ both used OR } 25$	B1 C1 A1 [Total: 6] B1 C1 C1
(b) $v = f\lambda$ OR $\lambda = v/f$ $3.0 \times 10^8/2.5 \times 10^8$ OR $3.0 \times 10^8 = 2.5 \times 10^8 \lambda$ 1.2 m [Tot 8 (a) capacitor/capacitance/condenser (b) (i) 5Ω (ii) $5 \text{ and } 20 \text{ both used OR } 25$	B1 C1 A1 [Total: 6] B1 B1 C1 C1
 3.0 × 10⁸/2.5 × 10⁸ OR 3.0 x 10⁸ = 2.5 × 10⁸ λ 1.2 m 8 (a) capacitor/capacitance/condenser (b) (i) 5 Ω (ii) 5 and 20 both used OR 25 	C1 A1 [Total: 6] B1 C1 C1
 8 (a) capacitor/capacitance/condenser (b) (i) 5 Ω (ii) 5 and 20 both used OR 25 	B1 B1 C1 C1
 (b) (i) 5 Ω (ii) 5 and 20 both used OR 25 	B1 C1 C1
(ii) 5 and 20 both used OR 25	C1 C1
	C1
$1/R = 1/R_1 + 1/R_2$ OR (R =) $\frac{R_1R_2}{R_1 + R_2}$ seen or used	A1
4Ω	
(c) EITHER OR ammeter reading falls (to zero) no current/reading	M1
as capacitor charges P already charged/does not conduct d.c.	A1
 (d) Formula for calculation of I (I = V/R) OR P (P = V²/R) Use of energy = power × time in any form 400 s 	C1 C1 A1
[Tota	[Total: 10]
9 (a) (i) negative at LH end and positive at RH end	D4
	B1
 (ii) (+ve) charge on A attracts electrons/-ve charges/-ve ions OR unlike charges attract (ignore reference to + charges) <u>electrons</u> move to end X/towards A (unbalanced) +ve charges (left) at end Y NOT repelled to Y 	B1 B1 B1 B1
OR unlike charges attract (ignore reference to + charges) electrons move to end X/towards A	B1 B1
 OR unlike charges attract (ignore reference to + charges) <u>electrons</u> move to end X/towards A (unbalanced) +ve charges (left) at end Y NOT repelled to Y (iii) idea that each electron leaves behind an equal unbalanced proton in nucleus/B has no net charge/B is neutral/idea that B has not 	B1 B1 B1
 OR unlike charges attract (ignore reference to + charges) <u>electrons</u> move to end X/towards A (unbalanced) +ve charges (left) at end Y NOT repelled to Y (iii) idea that each electron leaves behind an equal unbalanced proton in nucleus/B has no net charge/B is neutral/idea that B has not gained or lost any charges 	B1 B1 B1

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10	(a)			ackground radiation different at different times NOT places		M1 A1					
	(b)	Α		ing OR background ing doesn't change (when source removed)		M1 A1					
		В	gam	ma OR γ ma undeflected (by magnetic field) narged/neutral OR electromagnetic radiation		M1 A1 A1					
		С	defle	OR β ection is big/more deflection than alpha mass/much smaller than alpha		B1 B1 B1					
			OR								
			nega	OR β ative ects according to left-hand rule		B1 B1 B1					
						[Total: 10]					
11	1 battery a.c. supply a.c. supply + diode			horizontal line across at least 4 squares above or below horizontal centre line		M1 A1					
				alternating trace, any shape one or more cycles 4 squares wide above and below centre line, need not be symm		M1 A1					
				only humps or only troughs seen, minimum 2 h	umps or troughs	M1					
				horizontal lines, approximately same width as h separating humps or troughs	umps or troughs,	A1					