CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2013 series

5054 PHYSICS

5054/41 Paper 4 (Alternative to Practical), maximum raw mark 30

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.

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1	(a)	(i)	vertical arrow/line by eye from bench to sphere	B1	[1]
		(ii)	sensible suggestion, e.g. mark (on track)	B1	[1]
	(b)	(i)	correct shape path drawn from end of channel to floor	B1	[1]
		(ii)	horizontal arrow/line from end of channel to where candidate's line meets floor	B1	[1]
	(c)		sensible suggestion, e.g. sphere lands in tray of sand/mark made on floor use of second person clearly explained paint/stain on the sphere to leave mark on floor	B1	[1]
	(d)		66 cao (no unit required)	B1	[1]
	(e)	(i)	**yes +** sensible suggestion, e.g. no horizontal velocity/falls straight down **no +** sensible suggestion, e.g. systematic error explained/size of sphere	B1	[1]
		(ii)	axes: correct way round, labelled quantity and unit	B1	
			scales: linear, sensible *x*-axis: e.g. 2 cm ≡ 5 cm *y*-axis: e.g. 2 cm ≡ 10 cm	B1	
			points plotted accurately within ½ small square neat crosses or small points (in circle)	B1	
			smooth curve of best fit drawn	B1	[4]
		(iii)	**not correct +** statement, e.g. line not straight	B1	[1]
2	(a)	(i)	card falls further (before catching it) misses card increases reaction time	B1	[1]
		(ii)	less distance fallen low(er) number	B1	[1]
	(b)	(i)	5 cm cao (unit required)	B1	[1]
		(ii)	0.17(32) s cao (unit required)	B1	[1]
		(iii)	**1.** mark time (and position) on card	B1	[1]
			2. at least two lines with increasing separation line at 15 cm point on card labelled 0.17 s	B1	[1]

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3	(a)	(i)	correct normal drawn	B1	[1]
		(ii)	42° ± 1°	B1	[1]
	(b)	(i)	so pins stand up so not to damage bench	B1	[1]
		(ii)	pins far apart pins more than 5 cm apart P2 near left hand edge of board/at end of L P2 near edge of paper	B1	[1]
		(iii)	to be above line cannot line up pins otherwise or can only use base of pins	B1	[1]
	(c)		pins on emergent ray mentioned	B1	
			pins too close will not fit on paper block too near edge emergent ray too short	B1	[2]
4	(a)		circuit containing power supply, resistor, ammeter in series	B1	
			voltmeter across resistor	B1	
			means of varying current, e.g. variable resistor change additional resistor variable power supply change/add cells use of potentiometer	B1	
			use of $V = IR$ and average I–V graph and find R	B1	[4]
	(b)		can be credited in **(a)** if seen sensible suggestion, e.g. check zero on meters contacts tight / clean wires avoid parallax in reading meters keep current low switch off between readings use more sensitive meter	B1	[1]

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