CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2013 series

5054 PHYSICS

5054/42 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)** accurate horizontal line from object to centre of lens
and labelled *u* or 15 cm B1 [1]

(b) **(i)** move screen (along ruler) B1 [1]

(ii) raise object B1 [1]

(c) **(i)** 45.1 cm cao unit required B1 [1]

(ii) 30.1 cm ecf **(c)(i)** – 15.0 B1 [1]

(d) **(i)** 15.0 **and (c)(ii)** inserted into top line of table B1 [1]

(ii) axes: correct way round, labelled quantity and unit B1

scales: more than ½ grid, linear, not awkward
y-axis e.g.: 2 cm ≡ 5 cm *x*-axis e.g.: 2 cm ≡ 5 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]

(e) any two from:
repeat (the measurement of *v*) and average
avoid parallax in **reading** ruler **or**
eye line/line of sight perpendicular to scale/reading **or**
lens or screen close to ruler **or**
mark centre of lens on base of holder
use of set-square described
check for zero error on ruler
use darkened room
clear explanation of focussing
e.g. move screen from left, then from right
move through focussed image from both directions, then stop B2 [2]

(f) 9.8 to 10.0 cm ecf graph unit required B1 [1]

[Total: 13]

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2 **(a)** **(i)** line from (5, 500) to (15, 1000) B1
line to (22, 1000) **or**
line horizontal for 7 minutes at 1000 m B1
line to (25, 1500) B1 [3]

(ii) 1500 m or 1.5 km cao unit required B1 [1]

(b) use of pedometer
measure one pace and count paces
tape measure with repeated use described
use of trundle wheel B1 [1]

(c) **find/measure** gradient **and**
where steepest/largest gradient B1 [1]

[Total: 6]

3 **(a)** **(i)**

using measuring cylinder	**using displacement can**	
measuring cylinder stated	measuring cylinder stated	B1
initial reading	fill can to spout	
+ immerse object	+ immerse object	B1
new reading + find difference	find volume of water collected	B1 [3]

(ii) sensible suggestions e.g.
repeat (measurement of volume) and average
avoid parallax **reading** measuring cylinder **or**
eye line/line of sight perpendicular to scale/reading
view level with lower meniscus
avoid splashing B1 [1]

(b) mass cao **and** balance B1 [1]

[Total: 5]

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4	**(a)**	**(i)**	circuit diagram containing only solar cell, voltmeter and switch in series	B1	[1]
		(ii)	voltmeter terminals to wrong terminals of cell current in voltmeter in wrong direction voltmeter has polarity	B1	
			reverse connections to voltmeter reverse connections to cell connect red/+ve terminal of voltmeter to red/+ve terminal of cell	B1	[2]
		(iii)	needle drawn from centre to 0.96 V	B1	[1]
	(b)		(movement of) head/body reduces amount of light falling on solar cell **head/body** not between window (light source) and cell	B1	
			sensible suggestion e.g. position of solar cell/other light sources considered	B1	[2]

[Total: 6]

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