

**MARK SCHEME for the May/June 2010 question paper  
for the guidance of teachers**

**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 must be read in conjunction with the question papers and the report on the examination.

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1	(a)	152 202 252 303	B1	
	(b)	axes, correct way round, labelled quantity and unit y: 2 cm $\equiv$ 50g    x: 2 cm $\equiv$ 50 s or 80 s scales: more than $\frac{1}{2}$ page, sensible points plotted accurately best fit straight line neatly drawn	B1 B1 B1 B1	[4]
	(c)	directly proportional / doubling x doubles y	B1	[1]
	(d)	0.84 $\pm$ 0.02    ignore unit	B1	[1]
	(e)	2400 $\pm$ 50    e.c.f. 2020/(d)	B1	[1]
	(f)	1460 – 860 or 600 seen 715 $\pm$ 15 s    e.c.f. 600/(d)	C1 A1	[2]
	(g)	high temperature / kettle hot / may burn you changes reading on balance / measurement	B1 B1	[2]
	(h)	L increases plus as more water to be boiled away / less mass is boiled off / m decreases gradient of graph is reduced	B1	[1]
				<b>[Total: 13]</b>
2	(a)	5 to 30 s unit required	B1	[1]
	(b)	(i) 1 trundle wheel / long tape measure / metre rules (at least two) 2 stopwatch / watch with second hand <b>both required</b>	B1	[1]
		(ii) timing several / at least 3 intervals intervals round the track marked/used each measures time from start	B1 B1 B1	[3]
	(c)	(i) initial curve in correct direction straight line	B1 B1	[2]
		(ii) second graph line: gradient increasing then decreasing/ S-shaped curve lines meet at 100 m	B1 B1	[2]
				<b>[Total: 9]</b>

Page 3	Mark Scheme: Teachers' version	Syllabus
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- 3 (a) (i) A M0
- (ii)  $22\Omega$  cao A1
- (b) (i) circuit with resistor and d.c. power supply M0  
ammeter connected in series with resistor A1  
voltmeter connected in parallel with resistor A1 [2]
- (ii) tolerance / differences in manufacture / not all identical / student errors B1 [1]
- [Total: 4]**
- 4 (a) (i) rod drawn alongside right hand side of A B1 [1]
- (ii) end of rod A moves away / rotates B1 [1]  
can be shown on diagram
- (b) to be sure we get same sign charge / effect on each rod / ensure rods repel B1 [1]
- (c) charge is dissipated / leaks away into air / bench / lost / decreases B1 [1]
- [Total: 4]**