

**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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| Page 2 | Mark Scheme: Teachers' version | Syllabus | Paper |
|--------|--------------------------------|----------|-------|
| | GCE O LEVEL – May/June 2010 | 5054 | 41 |

| | | | |
|---|--|----------------|--------------------|
| 1 | (a) 152 202 252 303 | B1 | [1] |
| | (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 | [4] |
| | (c) directly proportional / doubling x doubles y | B1 | [1] |
| | (d) 0.84 ± 0.02 ignore unit | B1 | [1] |
| | (e) 2400 ± 50 e.c.f. 2020/(d) | B1 | [1] |
| | (f) 1460 – 860 or 600 seen 715 ± 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] |
| | | | [Total: 13] |
| 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 both required | 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] |
| | | | [Total: 9] |

| Page 3 | Mark Scheme: Teachers' version | Syllabus | Paper |
|--------|--------------------------------|----------|-------|
| | GCE O LEVEL – May/June 2010 | 5054 | 41 |

| | | | | |
|----------|------------|--|-------------------|-----|
| 3 | (a) | (i) A | M0 | |
| | | (ii) 22Ω cao | A1 | [1] |
| | (b) | (i) circuit with resistor and d.c. power supply ammeter connected in series with resistor voltmeter connected in parallel with resistor | M0 A1 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 can be shown on diagram | B1 | [1] |
| | (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] | |