

**MARK SCHEME for the October/November 2011 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 – October/November 2011	5054	41

- 1 (a) (i) (*h* marked on) vertical line from floor to **bottom** of pendulum B1 [1]
- (ii) eye/E labelled level with bottom of pendulum/candidate's line in (a)(i) B1 [1]
- (b) (i) time too large/lose count/amplitude decays/stops swinging B1 [1]
- (ii) T T^2
- | | |
|------------|-----------|
| 3.062/3.06 | 9.38/9.36 |
| 2.992/2.99 | 8.95/8.94 |
| 2.918/2.92 | 8.51/8.53 |
| 2.846/2.85 | 8.10/8.12 |
| 2.774/2.77 | 7.70/7.67 |
| 2.698/2.70 | 7.28/7.29 |
- T values correct to 3 or 4 s.f. B1
- T^2 values correct (ecf T) B1
- T^2 to 3 sf B1 [3]
- (iii) axes: correct way round, labelled quantity and unit B1
- scales: more than $\frac{1}{2}$ grid, sensible B1
- points plotted accurately within $\frac{1}{2}$ small square B1
- best fit straight line neatly drawn B1 [4]
- (iv) straight line/linear **AND** negative gradient/inversely related/one increases other decreases B1 [1]
- [Total: 11]**
- 2 (a) goes down B1 [1]
- (b) use a **known mass** (stated or implied) with link to cm/marks on scale B1 [1]
- (c) (i) 1.5 cao B1 [1]
- (ii) 3.8 cao B1 [1]
- (iii) 0.76 (unit not required) ecf $0.3 \times (\text{c})(\text{ii})/(\text{c})(\text{i})$ B1 [1]
- (d) no electricity needed/cheaper/easy to build/more sensitive/precise B1 [1]
- [Total: 6]**

Page 3	Mark Scheme: Teachers' version	Syllabus	Paper
	GCE O LEVEL – October/November 2011	5054	41

- 3 (a) Y-shift **AND** X-shift B1 [1]
- (b) connections from either side of cell/resistor to Y inputs B1 [1]
- (c) (i) 2 V cao B1 [1]
- (ii) 1.4 to 1.6 V B1 [1]
- (d) (i) dot moves down NOT to centre B1 [1]
- (ii) dot moves horizontally/(dot becomes) (horizontal) line (on screen) B1 [1]
- [Total: 6]**
- 4 (a) (i) normal drawn correctly B1 [1]
- (ii) *i* marked (ecf incorrectly drawn normal) B1 [1]
- (iii) 29° to 31° (ecf (ii)) B1 [1]
- (b) (i) line drawn parallel to and 5 cm ±1 mm below upper surface of block B1 [1]
- (ii) line through (within 1 mm of) crosses M₁ and M₂ to candidate's line in (b)(i) B1 [1]
- (iii) ray drawn within block B1 [1]
- (c) 14° to 20° B1 [1]
- [Total: 7]**