

CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

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MARK SCHEME for the October/November 2012 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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Page 2	Mark Scheme	Syllabus	
	GCE O LEVEL – October/November 2012	5054	

- 1 (a) time (for one length) is small/
 reaction error large (compared with time)/
 gives average B1
- (b) (i) distance (travelled by wave) / length of tray varies/
 cannot place rule close to water B1 [1]
- (ii) clear sensible description, e.g.
 ruler viewed from vertically above / perpendicularly
 use tape measure (flexible)
 answers may be on diagram, e.g.
 ruler and eye above
 ruler and set squares B1 [1]
- (c) (i) zero error / dead space at end of ruler/
 zero on ruler not at end/base of tray B1 [1]
- (ii) use second ruler to measure length of dead space
 length of dead space added to ruler reading (of depth) B1 [2]
- (d) (i) axes: correct way round, labelled quantity and unit B1
- scales: more than $\frac{1}{2}$ grid, linear, not awkward
 e.g. x-axis: 2 cm \equiv 0.5 cm y-axis: 2 cm \equiv 5 cm/s B1
- points plotted accurately within $\frac{1}{2}$ small square
 neat crosses or small points (in circle) B1
- smooth curve of best fit drawn B1 [4]
- (ii) tray not deep enough/
 water spills out (when wave made)/
 time too small / wave travels too fast B1 [1]
- (iii) speed becomes constant / does not vary (with d)/
 increase in speed becomes smaller (with increasing d)/
 gradient decreases (with increasing d) B1 [1]

[Total: 12]

Page 3	Mark Scheme	Syllabus	
	GCE O LEVEL – October/November 2012	5054	

- 2 (a) 2755 used correctly or 34 seen
 4861.8... (any number of sf)
 81 or 81.0 or 5290 or 5300
 4860 / 4900 unit not required
 C1
 A1
- (b) (i) uniform temperature / heat distribution B1 [1]
 (ii) base kettle hotter than water B1 [1]
- (c) heat losses to kettle / surroundings / to evaporate water
 power too large/
 time too large/
 mass too small/
 temperature difference too small B1 [1]
- [Total: 6]
- 3 (a) table headings correct: m and t B1
 both units: g and s B1
 mass values correct in order (up or down) B1 [3]
- (b) (i) NO +
 within experimental error / readings very close / no pattern B1 [1]
- (ii) check (at least) one reading (to check random/operator error)/
 time more swings/
 extend range of values of m /
 take intermediate values/
 repeat **experiment** with different length string B1 [1]
- [Total: 5]

Page 4	Mark Scheme	Syllabus	
	GCE O LEVEL – October/November 2012	5054	

- 4 (a) (i) line correctly drawn through P_1 and P_2 and extended into prism B1 [1]
- (ii) line correctly drawn through P_3 and P_4 and extended back to cross (a)(i) B1 [1]
- (iii) correct construction lines **and** $36^\circ \pm 2^\circ$ B1 [1]
- (iv) path through prism correctly drawn B1 [1]
- (b) spectrum formed/
dispersion occurs/
splits into colours B1 [1]
- (c) (i) not perpendicular/at 90° to surface/prism/side of prism
normal is perpendicular to surface B1 [1]
- (ii) correct normal seen and $32^\circ \pm 2^\circ$ B1 [1]

[Total: 7]