

**MARK SCHEME for the May/June 2012 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) (i) to secure the end/prevent slipping/original length doesn't change/
give a strong grip on the wire B1 [1]
- (ii) **breaking wire** is hazard/damages eye B1 [1]
- (b) (i) increase in **length** (from original length) B1 [1]
- (ii) (longer length) increases the extension B1 [1]
- (iii) for movement of marker (as wire extends) B1 [1]
- (c) (i) 50.3 (cm) cao B1 [1]
- (ii) to tension wire/remove kinks/wire straight B1 [1]
- (iii) distance between marker and ruler/marker edge not vertical/
difficult to view from above B1 [1]
- (iv) larger marker/raise ruler/use of set-square described or drawn B1 [1]
- (d) (i) axes: correct way round, labelled quantity and unit B1
 $y: 2\text{ cm} \equiv 5\text{ mm}$ $x: 2\text{ cm} \equiv 5\text{ N}$
scales: more than $\frac{1}{2}$ page, sensible B1
points plotted accurately B1
best fit straight line neatly drawn B1 [4]
- (ii) directly proportional only if line within 1 sq of (0,0)/linear if not through (0,0) B1 [1]
- (e) wire breaks/no longer linear/marker creep/load hits floor/plastic extension/permanently
deformed B1 [1]

[Total: 15]

Page 3	Mark Scheme: Teachers' version	Syllabus	Paper
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- 2 (a) (i) 0.022 and 0.033 (m) \pm 0.001 B1 [1]
- (ii) 9.167/9.17 seen C1
- 9.2 (m/s²) ecf (a) A1 [2]
- (b) comparison required plus explanation
e.g. too small plus friction on tape through timer/air resistance/person holding tape slows it down
- allow ecf e.g. too big plus faulty timer/weight swings/slack in tape at start B1 [1]
- [Total: 4]**
- 3 (a) wax melts and pea falls off B1 [1]
- (b) Any TWO from:
thickness of rod
length of rod/distance to pea
mass of wax/mass of pea/length of rod in water B2 [2]
- (c) pea falls off first B1 [1]
- (d) credit sensible suggestion, e.g.
peas closer to heat, falls off more quickly/quicker results
can time peas falling off
can plot graph (distance against time) B1 [1]
- [Total: 5]**
- 4 (a) (i) ray drawn through M₁ and M₂ to block B1 [1]
- (ii) ray completed accurately through block B1 [1]
- (iii) 28° \pm 2° B1 [1]
- (b) increases angle of incidence described B1
- until emergent ray along surface (described or drawn) B1 [2]
- (c) ray not along normal/not to middle of diameter/refracted on entry B1 [1]
- [Total: 6]**
- [Total: 30]**