

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge Ordinary Level

**MARK SCHEME for the May/June 2015 series**

**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 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 | Paper |
|--------|-----------------------------------|----------|-------|
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- 1 (a) (i) use of set-square described [B1]  
 use of plumb line  
 line up with vertical object in room  
 use of spirit level with explanation
- (ii) bottom of ball AND some explanation [B1]  
 e.g. bottom of ball hits bench  
 H measured to bottom of ball  
 so that the whole ball falls through H
- (iii) line from bench to level with bottom of ball ecf (a) (ii) [B1]
- (iv) eye drawn level with bottom of ball ecf (a) (ii),(iii) [B1]
- (v) **any two** correct answers, e.g. [B2]  
 ball moving  
 ball not close to ruler  
 difficult to drop and observe  
 bounce height varies  
 difficult to position eye at correct position
- (b) (i) 66.7, 60.3, 54.0, 40.3, 26.7, 13.3 cao [B1]
- (ii) axes: correct way round, labelled quantity and unit [B1]  
 scales: more than  $\frac{1}{2}$  grid, linear, not awkward [B1]  
 points plotted accurately within  $\frac{1}{2}$  small square [B1]  
 best fit straight line drawn [B1]
- (iii) one value calculated [B1]  
 two values calculated AND some comment  
 eg values close so relationship holds [B1]
- [Total marks: 13]**
- 2 (a) (i) distance between divisions changes (with depth) [B1]
- (ii) measures small amounts (more accurately) [B1]  
 larger range of readings
- (b) (i) water level drawn at 7.5 mm [B1]
- (ii) sensible comment, e.g. [B1]  
 difficult to hold correctly  
 gauge may be tipped  
 rain sticks to walls of container
- (c) (i) so you can see the water [B1]
- (ii) hold it upright in the ground [B1]  
 more stable  
 stays in position
- [Total marks: 6]**

| Page 3 | Mark Scheme                       | Syllabus | Paper |
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- 3** a correct experiment described [M0]  
i.e. must be refraction
- ray box OR pins AND [B1]  
protractor AND ruler AND  
any one from  
(plain) paper / board / (sharp) pencil
- mark ray in air on both sides of block with pins or crosses [B1]
- written** description of: [B1]  
join points in air to block (both sides) and  
(remove block to) draw ray in block
- correct angles measured and labelled on diagram [B1]  
or described if no diagram drawn
- accuracy mark: e.g. [B1]  
repeats described anywhere  
fine pencil  
pins far apart  
bottom of pins  
large angles  
vary angle of incidence

**[Total marks: 5]**

- 4 (a) (i)** correct circuit symbols for single cell, ammeter, variable resistor [B1]  
all three in series [B1]
- (ii)** ammeter [B1]  
variable resistor/rheostat/potentiometer  
stopwatch/stop-clock/clock  
ALL THREE correct
- (iii)** off scale of 0.1 A meter **and** [B1]  
10 A scale deflection too small
- (iv)** reduce resistance (of variable resistor) (as current decreases) [B1]
- (b)** cell/rheostat/wire becomes hot [B1]

**[Total marks: 6]**