

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
GCE Ordinary Level

**MARK SCHEME for the October/November 2011 question paper  
for the guidance of teachers**

**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 must be read in conjunction with the question papers and the report on the examination.

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|--------|-------------------------------------|----------|-------|
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- 1 (a) (i) move lens (along the ruler) / moves object and screen together (lens not moved) B1 [1]
- (ii) (horizontally) align (centres) of object, lens and screen / raise object / lower lens (allow raise screen) B1 [1]
- (iii) any sensible answer for finding middle of side of block, e.g. how non-parallax used such as viewed from above measuring of length of block and divide by 2 B1 [1]
- (b) (i) 0.14 m cao B1 [1]
- (ii) 0.245(1)m allow 0.25 m B1 [1]
- (c) (i) axes: labels correct way round, labelled quantity and unit B1  
scales: more than  $\frac{1}{2}$  grid, sensible, values consistent with labels B1  
2 cm  $\equiv$  0.1 cm on both axes B1  
points plotted accurately B1  
straight line of best fit neatly drawn through all points B1 [4]
- (ii) 0.97 to 1 ignore unit B1  
correct use of at least half graph line ( $\Delta D \geq 0.2$ ) shown on graph or in calculation B1 [2]
- (iii) 0.24 m to 0.25 m B1 [1]
- (d) (more accurate because) gradient / more readings gives **average** (of different readings) / can ignore anomalous points / straight line from many/several points B1 [1]
- [Total: 13]
- 2 (a) (i) circuit with power supply and given wire with ammeter in series B1  
variable resistor / variable power supply B1 [2]
- (ii) decrease variable resistor/resistance (of variable resistor) / increase supply voltage / increase number of cells B1 [1]
- (iii) reverse connections to battery/cell / change polarity of battery (accept reverse wire in the field) B1 [1]
- (iv) turn magnet other way up / S-pole on top and N-pole under wire / change polarity of magnets B1 [1]
- (b) wire becomes hot / melts / fuses / burns / trips power supply / damages/fuses ammeter B1 [1]
- [Total: 6]

| Page 3 | Mark Scheme: Teachers' version      | Syllabus | Paper |
|--------|-------------------------------------|----------|-------|
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- 3 (a) (i) movement of water/purple colour/crystal clear(er)/takes longer/more visible (to class) B1 [1]
- (ii) water stops moving B1 [1]
- (iii) water moves slowly or e.g. all happens too quickly B1 [1]
- (b) arrow(s) up start from/above crystal B1  
 arrow(s) to left near bottom of water / arrow(s) down on right B1 [2]
- (c) water/beaker already warm / water already coloured B1 [1]
- [Total: 6]**
- 4 (a) solid state detector / Geiger counter / Geiger-Muller/Geiger/GM tube B1 [1]
- (b) (i) 53.6 / 54 / 0.447 seen /  $\pm 120$  seen /  $\Sigma$  values/5 C1  
 0.45 cao A1 [2]
- (ii) (radioactive) decay is random (in time) B1 [1]
- (c) no (radiation) source / count rate low / always present (in environment) / no (additional) hazard / source is in lead box B1 [1]
- [Total: 5]**