

## MARK SCHEME for the October/November 2008 question paper

### 5054 PHYSICS

5054/04

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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                         | Syllabus | Paper |
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- 1 (a) 21 cao B1 [1]
- (b) any one of following:  
allow answer correctly drawn on Fig 1.1  
scale/ruler placed close to tube  
eye (level)/sight perpendicular to ruler/scale/reading **NOT** meniscus  
eye level with reading/meniscus B1 [1]
- (c) axes: correct way round, labelled quantity and unit B1  
scales: more than  $\frac{1}{2}$  grid, sensible, at least three values B1  
points: plotted accurately, to  $\frac{1}{2}$  smallest square, maximum size 1 mm dots B1  
line: best fit, straight neatly drawn with ruler; allow joints first to last points B1 [4]
- (d) pressure not zero when not in liquid/when  $d = 0$  /  
 $p = 3$  to 6 cm water when  $d = 0$  /  
zero error in reading/measuring pressure /  
pressure changed when apparatus assembled B1 [1]
- (e)  $d$  increases (equal amounts) as  $p$  increases (by equal amounts) /  
linear relationship / straight line not through 0,0/positive gradient B1 [1]  
**NOT** directly proportional / doubling  $d$  doubles  $p$  / linearly proportional /  
 $p$  proportional to  $d$
- (f) 18.5 to 19.5 ecf graph B1 [1]  
**NOT** if no line through points drawn on graph

[Total: 9]

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|  |  |                   |                   |
|--|--|-------------------|-------------------|
| 2  | (a) line through $OP_1P_2$ with ruler, neat, touching each dot   | B1                |                   |
|  | line through $P_3P_4$ with ruler, neat, touching each dot  | B1                |                   |
|  | lines produced to meet   | B1                | [3]               |
|  | (b) repeat for Q   | B1                | [1]               |
|  | (c) mirror line accurately drawn through intersections   | B1                | [1]               |
|  | (d) $P_3P_4$ and $Q_3Q_4$ produced back to meet  | B1                | [1]               |
| 3  | (e) 12.5 to 14.0 cm to nearest mm unit required  | B1                | [1]               |
|  | (f) pins may not be vertical / pins not straight / where pins enter paper<br>allow more accurate / pins placed correctly or properly | B1                | [1]               |
|  |  |                   | <b>[Total: 8]</b> |
|  | (a) reading on scale not zero when closed / no object  | B1                | [1]               |
|  | (b) 28 seen or implied   | C1                |                   |
|  | 1.28 seen / 8 seen   | C1                |                   |
| 0.16 cao unit not required (0.427 scores 2)  | A1   | [3]               |                   |
| (c) easier to use (e.g. no vernier to read/automatic reading) / reduces operator error / quicker to use / more sf or dp or precise | B1   | [1]               |                   |
|  | uses a battery / cell / battery / cell may run out / expensive / too sensitive / readings fluctuate / (circuit) malfunction          | B1                | [1]               |
|  |  | <b>[Total: 6]</b> |                   |

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|   |   |    |     |
|---|---|----|-----|
| 4 | (a) (i) dim(mer than normal) / not lit  | B1 | [1] |
|   | normal brightness / brighter (than A) / bright  | B1 | [1] |
|   | (ii) (glows brightly then) blows / filament fuses / melts   | M1 |     |
|   | voltage / current (too) high / more than working value/6V   | A1 | [2] |
|   | (b) variable resistor / variable power supply /<br>changing number / voltage of cells drawn or described                                    | B1 |     |
|   | voltmeter across lamp / power supply drawn or described   | B1 |     |
|   | start with low V/high R then measure V just before lamp blows   | B1 | [3] |
|   | <b>max 2</b> if no circuit drawn showing lamp and power supply /<br>incorrectly drawn symbols / additional incorrectly connected components |    |     |

**[Total: 7]**