Cambridge
O Level

**Cambridge International Examinations**
Cambridge Ordinary Level

**PHYSICS** **5054/42**

Paper 4 Alternative to Practical **May/June 2017**

MARK SCHEME

Maximum Mark: 30

**Published**

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| Question | Answer | Marks |
|---|---|---|
| 1(a) | bottom of ball drawn level with the zero mark on the ruler | **B1** |
| 1(b)(i) | 0.626 / 0.63 seen | **C1** |
| | 0.63 s correct answer only | **A1** |
| 1(b)(ii) | data to 2 d.p. / large variation in raw data | **B1** |
| 1(c)(i) | 5.04 (m / $s^2$) 2 / 3 s.f. only | **B1** |
| 1(c)(ii) | longer time / sufficient time (to fall) | **B1** |
| | reduces percentage error in the time / reduces the effect of (human) reaction error | **B1** |

| Question | Answer | Marks |
|---|---|---|
| 2(a)(i) | correct symbol and parallel connection with lamp P | **B1** |
| 2(a)(ii) | 2.4 (V) correct answer only | **B1** |
| 2(b)(ii) | $I$ = 0.31 (A) correct answer only | **B1** |
| 2(b)(iii) | there is a current in the circuit / lamp P is lit | **B1** |
| 2(b)(iv) | p.d. too small (to make it glow) / much less than working voltage / lamp P takes most of the voltage | **B1** |

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| Question | Answer | Marks |
|---|---|---|
| 3(a) | (hot) water in beaker, take temperature (at regular intervals) as it cools / take temperature after a fixed time / measure the time for a fixed temperature drop | **B1** |
| | repeat with different insulators | **B1** |
| 3(b) | any one of<br><br>constant room temperature<br>same starting / initial temperatures<br>same beaker<br>same volume / mass / amount of hot water<br>same times (of cooling)<br>same temperature drop<br>same thickness of insulator | **B1** |
| 3(c) | 2 / 3 sets of insulator, (change in) temperature / °C, time / s or minutes | **B1** |
| 3(d) | compare temperature drops in equal times – largest drop is the poorest insulator (or reverse argument) / compare times for equal temperature drops – longest time is the best insulator (or reverse argument) / plot graphs to compare temperature drops in equal times / compare gradients – steepest graph is the poorest insulator (or reverse argument) | **B1** |

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| Question | Answer | Marks |
|---|---|---|
| 4(a) | 2.0 (cm) correct answer only | **B1** |
| 4(b)(i) | 2.3 (cm) correct answer only | **B1** |
| 4(b)(ii) | (edges of) shadow curved / not distinct / (shadow of) ruler / hand / person gets in the way / shadow is of variable height | **B1** |
| 4(c) | axes labelled quantity and unit and axes correct way round | **B1** |
| | *x* axis scale linear, not awkward, starts from (0,0) | **B1** |
| | points plotted accurately | **B1** |
| | smooth best fit curve drawn | **B1** |
| 4(d)(i) | 4(.0) ± 0.2 (cm) | **B1** |
| 4(d)(ii) | (d)(i) ÷ 2 | **B1** |
| 4(d)(iii) | expect YES and values very close / nearly the same / close enough / within limits of experimental error / < 10% | **B1** |
| 4(e)(i) | correct value from sensible extrapolation | **B1** |
| 4(e)(ii) | shadow becomes too big **to fit on screen** / becomes more blurred / off the scale of the graph | **B1** |
| 4(f) | changing *D* changes the height of the shadow / to make it (a) fair (test) / a fair comparison | **B1** |

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