
PHYSICS

5054/42

Paper 4 Alternative to Practical

May/June 2017

MARK SCHEME

Maximum Mark: 30

Published

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This document consists of **4** printed pages.

| 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. / <u>large</u> 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 <u>effect</u> 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 constant room temperature same <u>starting</u> / initial temperatures same beaker same volume / mass / amount of hot water same times (of cooling) same temperature drop 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 <u>equal times</u> – largest drop is the poorest insulator (or reverse argument) / compare times for <u>equal temperature drops</u> – longest time is the best insulator (or reverse argument) / plot graphs to compare temperature drops in <u>equal times</u> / <u>compare gradients</u> – steepest graph is the poorest insulator (or reverse argument) | B1 |

| Question | Answer | Marks |
|-----------|--|-----------|
| 4(a) | 2. <u>0</u> (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) \pm 0.2 (cm) | B1 |
| 4(d)(ii) | (d)(i) \div 2 | B1 |
| 4(d)(iii) | expect YES <u>and</u> 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 |