



PHYSICS

0625/63

Paper 6 Alternative to Practical

May/June 2017

MARK SCHEME

Maximum Mark: 40

Published

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This document consists of **5** printed pages.

| Question | Answer | Marks |
|----------|--|-----------|
| 1(a) | $W_1 = 1.5 \text{ (N)}$ | 1 |
| 1(b)(i) | $V_1 = 155 \text{ (cm}^3\text{)}$ | 1 |
| 1(b)(ii) | line of sight perpendicular | 1 |
| | to bottom of meniscus | 1 |
| 1(c) | $W_2 = 0.7 \text{ (N)}$ <u>and</u> $V_2 = 235 \text{ (cm}^3\text{)}$ | 1 |
| 1(d) | $\rho_1 = 1.0$ or ecf | 1 |
| | unit g/cm^3 | 1 |
| 1(e) | $m_1 = 241 \text{ (g)}$ | 1 |
| 1(f) | $\rho_{AV} 0.978 / 0.977 \text{ (g/cm}^3\text{)}$ | 1 |
| 1(g) | appropriate cause of inaccuracy: e.g: <ul style="list-style-type: none"> • some water still in empty measuring cylinder • water spilled, splashed when putty put in water • water drops on putty when removed • air bubbles on putty | 1 |
| | suitable improvement: e.g: <ul style="list-style-type: none"> • measure m_2 at start (when cylinder dry) • measure new volume in Method OR refill to correct value • shake putty to remove air / smooth surface to minimise bubbles | 1 |
| | Total: | 11 |

| Question | Answer | Marks |
|----------|--|-----------|
| 2(a)(i) | correct voltmeter symbol connected in parallel across P and Q | 1 |
| 2(a)(ii) | $I = 0.38(\text{A})$ | 1 |
| 2(b) | graph: axes labelled with quantity and unit | 1 |
| | appropriate scales (plots occupying at least $\frac{1}{2}$ grid) | 1 |
| | plots all correct to $\frac{1}{2}$ small square | 1 |
| | well-judged straight line <u>and</u> thin line, precise plots | 1 |
| 2(c)(i) | <i>M</i> present and triangle method <u>seen on graph</u> | 1 |
| 2(c)(ii) | <i>R</i> in range 1.8 to 2.4 Ω | 1 |
| | 2 or 3 sig figs <u>and</u> unit = Ω | 1 |
| 2(d) | suitable reason: wire becomes too hot, current exceeds full scale deflection(owtte) of meter / becomes too large | 1 |
| 2(e) | correct symbol for variable resistor (rectangle with strike-through arrow only) | 1 |
| | Total: | 11 |

| Question | Answer | Marks |
|-----------|---|-----------|
| 3(a) | $\theta = 30^\circ \pm 1^\circ$ | 1 |
| 3(b) | distance $\geq 5 \text{ cm} \leq 15 \text{ cm}$ | 1 |
| 3(c)(i) | normal correct | 1 |
| 3(c)(ii) | $a = 6.4 \text{ (cm)}$ <u>and</u> $b = 4.3 \text{ (cm)}$ | 1 |
| 3(c)(iii) | $n = 1.49$ or ecf | 1 |
| | 2 or 3 sig figs <u>and</u> no unit | 1 |
| 3(d)(i) | all lines in correct places and neat | 1 |
| | $\alpha = 28^\circ \pm 3$ | 1 |
| 3(d)(ii) | statement matching results | 1 |
| | justification matching the statement ('within limits of experimental accuracy' / owtte) | 1 |
| 3(e) | difficulty in aligning pins / placing pins accurately, pins (too) thick | 1 |
| | Total: | 11 |

| Question | Answer | Marks |
|------------|--|----------|
| 4 MP1 | apparatus beaker <u>with</u> insulation <u>and</u> thermometer <u>and</u> stopclock (or alternative) mentioned | 1 |
| MP2 | method pour <u>hot</u> water into container measure temperature of hot water over period of time | 1 |
| MP3 | repeat for additional layers | 1 |
| MP4 | results: suitable table / graph / cooling curve | 1 |
| MP5 | control variables any pair from: same initial temperature, same volume of water, same size/material/thickness of beaker, same thickness of each layer, | 1 |
| MP6 MP7 | additional points any 2 from: how cooling rate calculated/how to compare cooling curves, read thermometer perpendicularly, thermometer at same depth (for repeat) thermometer not touching beaker, stir before reading thermometer, use of lid, minimum of 5 different thicknesses of insulation, repeat experiment with different sized beakers/different amount of water, sensible amount of water (50 cm ³ to 500 cm ³) | 2 |
| | Total: | 7 |