

MARK SCHEME for the May/June 2014 series

0625 PHYSICS

0625/63

Paper 6 (Alternative to Practical), maximum raw mark 40

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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- 1 (a)(i)(ii) $m_1 = 40.68$ (g) and $m_2 = 113.60$ (g)
correct answer only (not 40:68, 113:60) [1]
- (iii) $V_1 = 72$ (cm³) correct answer only [1]
- (iv) ρ_1 with unit of g/cm³ or kg/m³ seen in (a), (b) or (c) and not contradicted
(unit must match value) [1]
- (b)(i)(ii) $m_3 = 15.47$ (g) and $V_2 = 88$ (cm³) correct answer only [1]
- (iii) $V_3 = 16$ (cm³)/ecf [1]
- (iv) ρ_2 to 2/3 sig. figs. [1]
- (c) $\rho_{AV} 0.99(1)$ (g/cm³) or 991/990 (kg/m³) or ecf from (a) and (b) [1]
- (d) any one from:
 - take reading perpendicularly/at right angles to scale
 - read bottom of meniscus
 - other suitable precaution
[1]
- (e) appropriate source of inaccuracy, other than in (d)
e.g. balance not at zero/test-tube catches on side of measuring cylinder [1]
- matching effect on ρ with explanation
e.g. ρ greater as mass reading larger/ ρ greater as volume smaller [1]
- [Total: 10]**
- 2 (a)(b) 87 and 89, both correct answer only [1]
- (c) units correct in symbols or words, s, °C, °C [1]
- t values correct 0, 30, 60, 90, 120, 150, 180 [1]
- (d) appropriate pattern which fully matches results
e.g. rate of temperature drop greater at start than at end
NOT stated pattern which partly matches results [1]
- (e) statement matching temperature changes
(expect 'Yes' but accept 'No' or 'no significant difference' if ecf) [1]
- justification referring to results and involving comparative change in temperature
with specific mention of in the same time [1]

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- (f) any two from:
- room temperature/external temperature (but not outside temperature)/ environmental factor such as draughts/sunshine
 - initial water temperature/start temperature
 - same amount of stirring/wait same time before reading
 - keep thermometer at same depth
 - same size/thickness/material/surface area of beaker
 - same volumes of water

[2]

[Total: 8]

- 3 (a)(b) 2.8 [1]
- 0.9(0) [1]
- units both correct, symbols or words, V, A [1]

- (c) (i) 3.1(1)/ecf, 2.0/1.95, 1.0(0) penalise rounding errors [1]
- correct unit seen once and not contradicted [1]

- (ii) statement matches results (expect 'Yes' but allow 'No' if ecf >10%)
with matching and correct justification (which refers to figures)
(e.g. 'within limits of experimental accuracy' owtte for 'Yes' or 'too different'
for 'No') [1]

- (d) any one from:
- switch off between readings
 - only switch on for short time
 - use smaller currents/p.d.s
 - suitable means of dissipating thermal energy

[1]

[Total: 7]

- 4 (a) correct symbols for ammeter and variable resistor (rectangle with diagonal strike-through arrow **only**) [1]
- correct series circuit [1]
- accept use of potential divider symbol **only** if correctly shown in parallel circuit

- (b) (i) 8.24 and 12.36 correct answer only [1]

- (ii) expect 'Yes' but allow ecf for incorrect *M* values [1]

- appropriate justification referring to figures [1]

[Total: 5]

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- 5 (a) (i) $w = 2.6$ to 2.5 and $h = 2.5$ to 2.4 [1]
- (ii) $s = 2.6$ or correct rounding from candidate's values [1]
- (iii) appropriate reason e.g.
- w and h not always the same (NOT 'increase at different rates') (need reference to square shape – NOT just 'distorted')
 - difficult to measure shadows/edges not distinct
 - card might not be perpendicular/card might be tilted
 - lamp is not a point source
 - improve reliability [1]
- (b) axes labelled with quantity and unit [1]
- scales appropriate, plots covering at least $\frac{1}{2}$ grid [1]
- plots correct to $\frac{1}{2}$ small square [1]
- well judged curve [1]
- thin, continuous line, precise plots [1]
- (c) large gap between plots for 25 and 15 cm
allow gaps becoming larger/ to ensure curve is consistent [1]
NOT 'more plots, more accurate', 'make line more accurate'
- (d) any suitable reason e.g.
- shadow would be too big (for screen)
 - difference between w and h becomes larger
 - shadows become less distinct/more blurred/too distorted [1]

[Total: 10]