CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0625 PHYSICS

0625/63 Paper 6 (Alternative to Practical), maximum raw mark 40

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, which would have considered the acceptability of alternative answers.

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)** $m_1 = 40.68\,(g)$ <u>and</u> $m_2 = 113.60\,(g)$
correct answer only (not 40:68, 113:60) [1]

(iii) $V_1 = 72\,(cm^3)$ correct answer only [1]

(iv) ρ_1 with unit of g/cm^3 or kg/m^3 seen in **(a)**, **(b)** or **(c)** and not contradicted
(unit must match value) [1]

(b)(i)(ii) $m_3 = 15.47\,(g)$ <u>and</u> $V_2 = 88\,(cm^3)$ correct answer only [1]

(iii) $V_3 = 16\,(cm^3)/$ecf [1]

(iv) ρ_2 to 2/3 sig. figs. [1]

(c) ρ_{AV} 0.99(1) (g/cm^3) **or** 991/990 (kg/m^3) **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 <u>0</u>, 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 <u>in the same time</u> [1]

(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 <u>matching</u> and <u>correct</u> 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 <u>figures</u>   [1]

    [Total: 5]

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 ½ grid [1]

plots correct to ½ 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]