CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0625 PHYSICS

0625/52 Paper 5 (Practical), maximum raw mark 40

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NOTES ABOUT MARK SCHEME SYMBOLS AND OTHER MATTERS

Brackets ( ) around words or units in the mark scheme are intended to indicate wording used to clarify the mark scheme, but the marks do not depend on seeing the words or units in brackets, e.g. 10 (J) means that the mark is scored for 10, regardless of the unit given.

c.a.o. means "correct answer only".

e.c.f. means "error carried forward". This indicates that if a candidate has made an earlier mistake and has carried his incorrect value forward to subsequent stages of working, he or she may be given marks indicated by e.c.f. provided his or her subsequent working is correct, bearing in mind his or her earlier mistake. This prevents a candidate being penalised more than once for a particular mistake, but **only** applies to marks annotated "e.c.f."

owtte means “or words to that effect”

Underlining indicates that this must be seen in the answer offered, or something very similar.

OR indicates alternative answers, any one of which is satisfactory for scoring the mark.

AND indicates that both answers are required to score the mark.

Spelling Be generous about spelling and use of English. However, do not allow ambiguities, e.g. spelling which suggests confusion between reflection / refraction / diffraction or thermistor / transistor / transformer.

Significant figures Answers are generally acceptable to any number of significant figures ≥ 2, except where the mark scheme specifies otherwise.

Fractions These are only acceptable where specified.

NOT indicates that an incorrect answer is not to be disregarded, but cancels another otherwise correct alternative offered by the candidate. i.e. right plus wrong penalty applies.

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1 (a)(b) correct *a* values 40.(0), 35.(0), 30.(0), 25.(0), 20.(0) [1]
b values 20.0, 17.5, 15.0, 12.5, 10.0 all with tolerance ± 1.0 cm all *b* values given to 1 mm / 1 d.p. [1]

(c) graph:
- axes correctly labelled [1]
- suitable scales [1]
- all plots correct to ½ small square [1]
- good best-fit line judgement, single, thin, continuous line [1]

(d) triangle method using at least half drawn line, shown on graph [1]
G = 0.42–0.54 (2–3 sig. figs. only) [1]

(e) **P** = 20–200 g [1]
Q ≈ 2 × **P** OR Q = **P** / *G* [1]

[Total: 10]

2 **(a)** sensible value for first hot water temperature θ_1 [1]

(b) table:
- s, °C, °C [1]
- *t* values 10, 20, 30, 40, 50, 60 [1]
- temperatures in both columns decreasing and to 1 °C [1]

(c) **(i)** sensible value for first θ_2 temperature AND less than final temperature in θ_1 column [1]

(ii)(iii) see **(b)**

(d)(i)(ii) correct calculation of $\Delta\theta_1$ and $\Delta\theta_2$ (°C) [1]
$\Delta\theta_1 > \Delta\theta_2$ [1]

(iii) lower temperatures / closer to room temperature / lower starting temperature [1]

(e) any one from:
- view thermometer at right angles / at eye level
- turn thermometer so scale crosses thermometer thread
- take reading quickly / get ready so reading is exactly on time
- position stopclock close to thermometer [1]

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(f) any one from:
- room temperature / other environmental factor
- volume / mass / quantity / amount of hot water
- initial temperature of hot water
- initial temperature of cold water [1]

[Total: 10]

3 (a) (i) V_1 to at least 1 d.p. AND < 3 (V) [1]
I_1 to at least 2 d.p. AND < 1.0 (A) [1]

(ii) correct calculation of R_1 (ignore unit) [1]

(b) correct arrangement of resistors [1]
correct position for voltmeter [1]

(c) (i) V_2 and I_2 recorded, $I_2 > I_1$ [1]

(ii) R_2 recorded AND correct units V, A, Ω seen in **(a)** or **(c)** and not contradicted [1]

(iii) correct ratio, no unit and in range 1.8–2.2 [1]

(d) statement matches results [1]
justification including the idea of within (or beyond) the limits of experimental accuracy [1]

[Total: 10]

4(a)–(g) ray-trace:
- normal drawn at centre of **MR** [1]
- first incident ray at 30° (±1°) [1]
- first P_1P_2 distance at least 5 cm apart [1]
- both reflected rays in correct positions [1]
- all lines correctly drawn and all lines single, thin, continuous lines [1]

(h)(l) table:
- *r* values correct to 1° (from trace) [1]
- *r* values = 28–32 [1]

(i) any two from:
- ensure pins are vertical / align pins by viewing bases of pins
- pins as far apart as possible (> 5 cm)
- thin lines / sharp pencil / thin pins [2]

(m) any one from:
- thickness of mirror / mirror glass silvered at back surface
- thickness of pins
- difficulty in exactly lining up pins and their images [1]

[Total: 10]

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