CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0625 PHYSICS

0625/51 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)** centre of bob touching rule OR how to avoid parallax OR how to use set-square OR measure to top / bottom of bob and add / subtract radius OR measure to top and bottom of bob and average OR look perpendicularly at scale [1]

(b) **(i)** t_S 10–35 (s) [1]

(ii) $T_S = t_S / 20$ (s) and value 1.3–1.5 [1]
T_S = 1.40–1.45 [1]

(iii) reaction time inaccuracy is a smaller part of total time measured (owtte) [1]

(c)(i)(ii) t_C recorded, $T_C = t_C / 20$ and T_C = 1.05–1.3 [1]
unit s given for times [1]

(d) correct statement for results (expect No) [1]

justification must include idea of too different to be within limits of experimental accuracy [1]

(e) pivot at 1 cm mark (owtte) OR centre of mass not 50 cm below pivot [1]

[Total: 10]

2 **(a)** θ_R 10–50 (°C) [1]

(b) **(i)** θ_H 50–100 (°C)

(ii) view thermometer at right angles OR wait until reading stops rising OR stir water OR thermometer not touching sides / bottom [1]

(c) θ_M value between θ_R and θ_H [1]

(d) correct calculation of θ_A and value $\geqslant \theta_M$ [1]
temperatures given in °C [1]

(e) any two from:
heat loss to surroundings / beaker OR heat loss / drop in temperature by evaporation
delays in taking readings
amount / mass / volume of cold water different to hot (owtte)
thermal capacity of beaker [2

(f) **(i)** 78 (cm^3) [1]

(ii) EITHER: Student 1 (80) – read to top of meniscus
OR Student 2 (79) – divisions are every 2 cm^3, not 1 cm^3
OR Student 2 (79) – scale not read at right angles [1]

[Total: 10]

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3 (a) (i) I to at least 2 dp and less than 1A [1]

(ii) (iii) all V to at least 1 dp and less than 3V and increasing [1]

(b) graph:
axes both correctly labelled and right way round, with units [1]
suitable scales, to include origin [1]
all plots correct to ½ small square [1]
good line judgements. Single, thin, continuous line [1]
quality of results: all points within 2 small squares on candidate's straight line [1]

(c) (i) intercept correct to ½ small square [1]

(ii) ratio correct AND in range 3–7(Ω) [1]

(iii) r value equal to ratio, 2 or 3 significant figures and Ω [1]

[Total: 10]

4 (a) ray-trace:
normal drawn at centre of MR, second normal 2 cm and 2 mm to right [1]
first incident ray at 30° ± 1° [1]
first P_1P_2 at least 5 cm apart [1]
reflected rays in correct positions [1]
all lines correctly drawn and neat [1]

table:
i value correct ± 1° from trace [1]
r values within 2° of i values [1]

(m) any two from:
ensure pins are vertical / view bases of pins
pins far apart (or greater than 5 cm)
ensure mirror is exactly on MR
thin lines / sharp pencil / thin pins
repeats [2]

(n) any one from:
thickness of mirror / silvering at back of the glass / mirror
thickness of pins
difficulty in exactly lining up pins and their images [1]

[Total: 10]

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