CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0625 PHYSICS

0625/61 Paper 6 (Alternative to 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) (i) 4.2 (cm) OR 42 (mm) [1]

(ii) centre of bob touching rule OR how to use fiducial aid, e.g. 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) 28.2(0) (s) [1]

(ii) 1.41(s) (e.c.f. from **(i)** AND T_C = 1.16(s)) [1]

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

(c) (i) repeats OR start counting at nought OR use a fiducial mark owtte [1]

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

(d) correct statement for results [1]
justification must include idea of too different to be within limits of experimental accuracy
(e.c.f. close enough to be within limits of experimental accuracy) [1]

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

[Total: 9]

2 (a) (i) V = 2.2 (V) [1]

(ii) I = 0.2(0) (A) [1]

(b) graph:
- axes both correctly labelled, right way round and with units [1]
- suitable scales, to include origin [1]
- all plots correct to within ½ small square [1]
- good best-fit line judgement, single, thin, continuous line [1]

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

(ii) ratio correct AND R value equal to ratio, ignore any unit, e.c.f. allowed [1]

(iii) 2 or 3 sig. figs. AND unit of Ω [1]

[Total: 9]

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3 (a)(i)(ii) ray-trace:
- normal at 90° and crossing **MR** at intersection with P_3P_4 line [1]
- incident ray at 30° ± 2° in correct quadrant [1]
- incident ray 8.0 cm long [1]

(b) **B** to **X** at least 5.0 cm [1]

(c) (i) P_3P_4 line correctly drawn AND all lines single, thin, continuous lines [1]

(ii) r =31(°)–33(°) [1]

(d) any two from:
- ensure pins are vertical / view bases of pins
- pins far apart (or > 5 cm)
- ensure mirror exactly on **MR** / ensure mirror does not move
- thin lines / sharp pencil / thin pins
- repeats [2]

(e) any one from:
- thickness of lines / pencil / mirror / pins
- difficulty of lining up pins and images [1]

[Total: 9]

4 (a) θ_C = 22 °C [1]

(b) view thermometer at right angles OR stirring OR wait for reading to stop rising OR thermometer (bulb) not touching sides / bottom of beaker owtte [1]

(c) θ_A = 52.5 (°C) OR e.c.f. [1]

(d) any two from:
- heat loss to surroundings / beaker OR heat loss / drop in temperature by evaporation
- delays in taking readings
- reference to uncertainty in volume measurements [2]

(e) (i) 78 (cm^3) [1]

(ii) EITHER:
Student 1 (80) – read to top of meniscus OR scale not read at right angles
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: 7]

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5 **(a)** in correct order: object, lens, screen [1]
all three components on bench and all perpendicular to bench [1]

(b) 50–100 (cm) [1]

(c) any two from:
- difficulty in deciding exact position of lens for best image / image not quite clear owtte
- difficulty in measuring to centre of lens
- room too bright / lamp too dim [2]

(d) image shown upside down [1]

[Total: 6]

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