CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0625 PHYSICS

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

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NOTES ABOUT MARK SCHEME SYMBOLS & 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 (cm) 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 may be given marks indicated by e.c.f. provided his subsequent working is correct, bearing in mind his 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 / 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 with spelling and use of English. However, do not allow ambiguities.

Sig. figs. Candidates are expected to give answers to a suitable precision. The use of an inappropriate number of significant figures will be penalised where indicated in the mark scheme. Rounding errors will also be penalised.

Fractions Fractions are only acceptable where specified.

Extras If a candidate gives more answers than required, irrelevant extras are ignored; for extras which contradict an otherwise correct response, or are forbidden by the mark scheme, use right plus wrong = 0.

Ignore indicates that something which is not correct is disregarded and does not cause a right plus wrong penalty.

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)** any one from:
- reference to how to determine the centre of the bob
- measure to top of bob then add on half diameter measured with blocks and rule or callipers
- measure to top and bottom of bob and average
- reference to perpendicular viewing (reducing parallax)
- rule parallel with/close to string/appropriate use of set-square [1]

(b) **(i)** t value in range 27.6 to 29.2 (s) (showing correct l and 20T measured) [1]

(ii) correct T value = $t \div 20$ calculated, allow ecf from **(i)** [1]

(iii) reduce effect of errors in starting/stopping stopwatch [1]

(c) t and T values recorded, correct units seen and not contradicted [1]

T value 2.0 ± 0.1 s OR approximately 1.4 × value in **(b)(ii)** [1]

(d) statement to match results (expect no) [1]

justification using results, including idea of difference is beyond limits of experimental uncertainty owtte [1]

(e) minimum of three more values [1]

all values ≥ 20 cm and ≤ 300 cm, and three values are at least 10 cm apart [1]

[Total: 10]

2 **(a)** **(i)** sensible hot water temperature [1]

(ii) any one from:
- wait for thermometer reading to stop rising
- perpendicular viewing of scale
- stirring
- thermometer bulb in middle of water/not touching beaker [1]

(b) **(i)** $\theta_1 < \theta_H$ [1]

(ii) θ_A correct [1]

(c) **(i)** $\theta_2 < \theta_1$ [1]

(ii) θ_B correct and temperatures in °C seen and not contradicted [1]

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(d) any two from:
- room temperature/other environmental statement;
- initial hot water temperature;
- heat loss to surroundings /evaporation/conduction through sides of beaker;
- time delays in adding water [max.2]

(e) perpendicular viewing/eye level with meniscus [1]

reading to bottom of meniscus [1]

[Total: 10]

3 **(a)** **(i)** V_P to at least 1 d.p. and < 4 V [1]

I_P to at least 2 d.p. and < 1 A [1]

(ii) R_P calculated correctly [1]

(b) lamps in series [1]

voltmeter in correct position, with rest of circuit and symbols correct [1]

(c) **(i)** V_S and I_S recorded with correct units, AND Ω for R_S [1]

(ii) R_S correct to 2 or 3 significant figures [1]

$R_P < R_S$ by a factor of more than 3 [1]

(d) **(i)** correct symbol for variable resistor NOT potentiometer [1]

(ii) X correctly positioned [1]

[Total: 10]

4 **(a)–(h)** Ray-trace:
- normal at 90° in correct position and angle of incidence 30° ± 1° [1]
- all lines present and neat [1]
- P_1P_2 distance > 5.0 cm [1]

Table:
α values correct: 30°, 50°, 70°, 90° all ± 4° [1]

(i) Graph:
- axes correctly labelled, right way round and with units [1]
- suitable scales, plots occupying at least ½ of grid in both directions [1]
- all plots correct to within ½ small square [1]
- good best-fit line judgement, thin, continuous [1]

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(j) NO [1]

matching justification referring to line through origin [1]

[Total: 10]

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