CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0625 PHYSICS

0625/53 Paper 5 (Practical Test), 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.

Cambridge will not enter into discussions about these mark schemes.

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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.

1 **(a)** a_0 and b_0 both in cm OR both in mm [1]

matching unit [1]

(b) a_1 and b_1 present AND correct calculation of first d_A AND d_B [1]

$d_B > d_A$ [1]

correct calculation of first M [1]

M to 2 or 3 sig. figs. [1]

second set of values complete AND second M within 10 % of first M [1]

(c) appropriate explanation, e.g.
- measure height (from bench)/distance from rule at two places
- line up with rule or suitable horizontal surface
- use of spirit level [1]

(d) repeat with different (sized) loops/different values (of d_A, d_B) [1]

any one from:
- (at least) 3 more sets of results and evaluate d_A:d_B
- plot a graph to (check if) a straight line through the origin [1]

[Total: 10]

2 **(a)** sensible initial θ [1]

θ decreasing AND to at least 1 °C [1]

(b) **(i)** correct calculation of x_1 [1]

°C / s [1]

(ii) $x_2 < x_1$ [1]

(iii) $x_3 < x_2$ AND x_1 [1]

(c) prediction less than x_3 [1]

justification with specific mention of (average) cooling rate decreasing with time/temperature [1]

(d) any one precaution relating to temperature measurement e.g.: [1]
- stir before reading
- keep thermometer at same depth
- read thermometer 90° to scale/with reading at eye level
- wait until thermometer has stopped rising (at the start)
- thermometer in middle of water/not touching beaker

(e) any one variable which would change conditions of experiment e.g: [1]
- initial temperature of water
- volume of water
- interval *T*
- size of beaker

[Total: 10]

3 **(a)** p.d.s all < 4.0 V AND to at least 1 d.p. [1]

currents all < 1.00 A AND to at least 2 d.p. [1]

(b) *R* calculations correct AND *R* values decreasing [1]

(c) Graph:
- axes labelled correctly, right way round and with units [1]
- suitable scales, plots occupying at least half grid in both directions [1]
- plots correct to within ½ small square [1]
- well-judged straight line, thin line, precise plots [1]

(d) **(i)** *G* present and triangle method seen on graph [1]

(ii) *r* in range 6–10 [1]

2 or 3 sig. figs. AND unit Ω / m [1]

[Total: 10]

4 **(a)** both *f* values present, clearly in cm [1]

(b) correct calculation of F_1 [1]

(c) both *v* values present [1]

correct calculations of *f* [1]

both to at least 1 d.p. [1]

(d) (i) F_2 within 10% of F_1 [1]

(ii) statement matching results [1]

appropriate justification, including idea of within limits of experimental accuracy owttte [1]

(e) any two appropriate precautions e.g.: [max.2]

- carried out experiment in dark room/no direct (sun)light OR used bright lamp
- lens and object same height (above bench)
- lens, object and screen/mirror vertical/perpendicular
- move screen/lens back and forth/slowly to obtain sharp image
- fix/place rule on bench/clamp rule
- mark centre of lens <u>on holder</u>
- readings/experiment repeated (and average taken)

[Total: 10]