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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the March 2015 series

0625 PHYSICS

0625/62 Paper 6 (Alternative to Practical), maximum raw mark 40

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Brackets ( )	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.
Underlining	Underlining indicates that this must be seen in the answer offered, or something very similar.
OR / or	This indicates alternative answers or words, any one of which is satisfactory for scoring the marks.
AND	Both answers or words must be given for credit to be awarded.
e.e.o.o.	This means "each error or omission".
o.w.t.t.e.	This means “or words to that effect”.
c.a.o.	This means “correct answer only”.
NOT	This 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.
e.c.f.	This means "error carried forward". If a candidate has made an earlier mistake and has carried an incorrect value forward to subsequent stages of working, marks indicated by e.c.f. may be awarded, provided the subsequent working is correct, bearing in mind the earlier mistake. This prevents a candidate from being penalised more than once for a particular mistake, but **only** applies to marks annotated e.c.f.

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1 **(a)** measure ½ mass length either side of 95.0 cm
OR mark side of mass AND rule [1]

(b) correct calculations of *S*, rounding to 0.17, 0.33, 0.51, 0.61, 0.80 [1]

(c) axes labelled with quantity and unit [1]
appropriate scales [1]
plots correct to 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) M_R = in range 113 to 140 g AND to 2/3 sig. fig. [1]

(e) see if rule balances when pivot at 50 cm mark owtte [1]

[Total: 9]

2 **(a)** units correct, accept symbols or words [1]
t values correct: 0, 30, 60, 90, 120, 150, 180 [1]

(b) statement matching results with comparison of temperature changes over whole available range OR for 120 s from 71 °C [1]

justification with mention of 'in the same time' owtte [1]

(c) two precautions relating to temperature measurement,e.g. [2]
- thermometer at same depth
- read thermometer with reading at eye level/90° to scale/explain parallax
- wait until thermometer has stopped rising (at the start)

(d) two improvements to apparatus or procedure, e.g. [2]
- insulation all way up side of test-tube/covering bottom of test-tube
- start taking measurements at same temperature/same initial temp. of water
- same volume of water/use measuring cylinder for water
- plot cooling curves
- use metal/thinner glass test-tubes
- more layers of insulation
- make sure insulation is dry
- avoid overlapping insulation
- use same tube/same tube thickness in each experiment

[Total: 8]

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3 **(a)** correct voltmeter symbol with appropriate parallel connection [1]

(b) **(i)** meter with 5 V range circled [1]

(ii) arrow indicating 1.5 V on circled meter [1]

(c) *R* calculations correct (9.6 or 9.62, 7.9 or 7.89, 4.5 or 4.55) [1]

consistent 2 or consistent 3 sig. figs. [1]
note: allow 1 sig. fig. fewer for l = 20 cm

(d) link consistent with results [1]
figures to support, matching statement – at least two *R* values compared [1]

(e) increased supply voltage [1]
use of variable resistor OR variable voltage supply clearly indicated as such [1]
any other suitable point, e.g. [1]
- voltmeter with larger range
- ammeter with larger range
- variable resistor symbol and connection correctly shown

[Total: 10]

4 **(a)** **(i)** u_1 = 5.0(cm)/50(mm) [1]
v_1 = 8.7(cm)/87(mm) [1]

(ii) correct calculation of *f*, expect 3.1 to 3.2 (cm)/31 to 32 (mm), e.c.f.**(a)(i)** [1]
matching unit [1]

(b) u_2 in range 8.8 to 8.9(cm)/88 to 89(mm) AND statement matching results [1]
appropriate justification e.g. within limits of experimental accuracy owtte [1]

(c) two appropriate precautions, e.g. [2]
- carry out experiment in dark room/no direct (sun)light/bright lamp
- lens and object same height above bench
- lens, object and screen vertical
- move screen/lens back and forth/slowly to obtain sharp image
- fix/place rule on bench
- mark centre of lens on holder
- readings repeated

[Total: 8]

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5 **(a)** θ_H = 74 AND θ_C = 23(°C) [1]

(b) **(i)** suitable reason, e.g. [1]
- temperature not able to reach max θ_H (in 30s)
- temperature dropped on transfer
- conduction/transfer to metal tongs

matching improvement, e.g. [1]
- leave block in hot water longer
- transfer more quickly
- use insulated tongs/cotton round block

(ii) suitable reason, e.g. [1]
- some (thermal) energy transferred to beaker,
- some (thermal) energy transferred to surroundings,
- evaporation/convection (into atmosphere)

matching improvement, e.g. [1]
- use a less conducting material for beaker/owtte
- insulate beaker
- allow for beaker in any calculation
- lid on beaker

[Total: 5]

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