**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

# MARK SCHEME for the October/November 2013 series

## 0625 PHYSICS

**0625/63** Paper 6 (Alternative to Practical), 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.

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**1** **(a)** $m$ = 180.2(0) and unit (g) [1]
$V_1$ value = $m$ [1]
unit $\underline{cm^3}$ c.a.o. [1]

**(b)** $V_2$ = 170 c.a.o. [1]

**(c)** $d_1$ = 7.35 to 7.4, $d_2$ = 5.0 to 5.1, $h$ = 7.9 [1]
$D$ = 6.2 to 6.3 allow e.c.f. [1]
$V_3$ = 239 to 246 and 2 or 3 significant figures only allow e.c.f. [1]

**(d)** method 2 – one from:
some water left in cup/spilt
measuring cylinder not read at eye level/perpendicularly/bottom of meniscus
parallax explained [1]

method 3 – one from:
$d_1$ not at liquid level
$d_1$ and $d_2$ not inside diameters
difficult to measure $h$ (because of sloping side)
$h$ not measured at eye level/perpendicularly/parallax explained [1]

**(e)** mass of cup / zero reading on balance [1]

**[Total: 10]**

**2** **(a)** **A** = 87(°C) and **B** = 88(°C) [1]

**(b)** units correct (symbols or words) [1]
times correct (0, 30, 60, 90, 120, 150, 180) [1]

**(c)** statement matching temperature changes (accept 'no significant difference' if justified) and justification matching statement (comparison of temperature changes) [1]
including specific mention of temperature change in same time [1]

**(d)** appropriate condition relating to comparison
i.e. any one from:
same size/thickness of beaker
same volume of water
same initial temperature
same room temperature / appropriate environmental condition
same time for cooling [1]

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**(e)** any sensible alteration e.g.
put lid on/cover top of **A**
extra experiment without insulation or lid / take lid off **B** [1]
matching explanation e.g.
most thermal energy loss by convection or o.w.t.t.e.
have only changed one factor or o.w.t.t.e. [1]

**[Total: 8]**

**3** **(a)** correct symbol connected in parallel [1]

**(b)** **(i)** axes labelled, with units [1]
appropriate scales (plots occupying at least ½ grid) [1]
plots correct to ½ square [1]
best-fit line and thin, neat line, neat plots [1]

**(ii)** triangle method seen on graph [1]
large triangle (at least 1/2 candidate's line) [1]

**(iii)** *R* correct from *M* and in range 0.7 to 0.8 [1]
2 or 3 significant figures and unit Ω (symbol or word) [1]

**[Total: 9]**

**4** **(a)** normal correct and pin separation at least 5 cm [1]

**(b)(c)** both reflected lines in correct place (through $P_3$, $P_4$ / $P_5$, $P_6$) and thin/neat [1]
$\theta$ = 40° within 1° [1]
$\theta$ = 62° within 1° [1]

**(d)** definite statement matching results (expect 'Yes' but allow e.c.f. if difference >10%)
and justification matching statement
(expect 'within the range of experimental accuracy' or o.w.t.t.e.) [1]
values from results shown/used (correctly w.r.t statement) [1]

**(e)** any two suitable precautions:
thin lines / fine pencil
view protractor perpendicularly/parallax explained
lines through centre of pin holes
pins well separated
pins vertical/not bent/viewed at base
place mirror so that reflecting surface is on line o.w.t.t.e. [2]

**[Total: 8]**

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**5** **(a)** neat, clear table with column headings and correct units [1]
results arranged in order [1]

**(b)** **(i)** 40° [1]

**(ii)** plot a line graph [1]
reading will clearly not lie on line [1]
allow suggestion of appropriate mathematical treatment

**[Total: 5]**

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