CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2014 series

5054 PHYSICS

5054/41 Paper 4 (Alternative to Practical), maximum raw mark 30

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1 **(a)** any **one** from:
measures two ends of ruler from the bench (same height) B1 **[1]**
use of spirit level
align with horizontal object e.g. windowsill
allow answers on diagram e.g. ruler and set-square to measure height at two places
check the strings are perpendicular to the metre rule with a set square

(b) **(i)** at least one horizontal line drawn between A and B and *x* accurately labelled B1

(ii) measure from bench / support to same point on each bob / ensure the pendulum is not moving / explain how parallax error is avoided. B1 **[2]**

(c) axes labelled quantity and unit B1
scales linear B1
points plotted accurately B1
best fit curve drawn B1 **[4]**

(d) **(i)** observe both together / observe simultaneously B1

(ii) any **one** from:
strings tangle B1 **[2]**
bobs collide

(e) **(i)** 15 ± 1 ecf from graph B1

(ii) 15.484 C1
15 A1

(iii) If both values are the same – Yes, they are the same.
If values are similar (±10%) – Yes + close enough / within experimental error B1 **[4]**
If values differ (by more than 10%) – No + difference outside experimental error / they are too far apart

[Total: 13]

2 **(a)** metre rule B1 **[1]**

(b) **(i)** error in taking measurement due to position of observer B1

(ii) view from level with top of stool B1 **[2]**

(c) **(i)** metre rule upside down B1

(ii) 62.175 or 62.18 or 62.17 or 62.22 seen C1
62.2 cm cao A1 **[3]**

[Total: 6]

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3 **(a)** place bulb in (pure) melting ice — B1
place bulb above boiling water / in steam — B1 **[2]**

(b) **(i)** 2.85 ± 0.1 and 12.1 ± 0.1 seen OR 1, 3.8 and 13 OR 2, 4.8 and 14 (all ± 0.1)
answer in correct range without unit — C1
answers in range 22.5 to 24.6 °C with unit — A1

(ii) liquid expands uniformly / uniform bore — B1 **[3]**

[Total: 5]

4 **(a)** Two methods can gain up to 5 marks.

1. cut wires method and line up horizontally (max 3 if less than 10 cuts)
2. wrap wire around a rod/ruler (max 3 if wound less than 10 times)

any other method – maximum 3 marks if viable

equipment used stated in account — B1
how equipment is used — B1
readings taken stated — B1
how diameter is obtained — B1
detail of accuracy — B1 **[5]**

(b) micrometer — B1 **[1]**

[Total: 6]

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