



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education (9–1)

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**PHYSICS**

**0972/05**

Paper 5 Practical Test

**For examination from 2018**

MARK SCHEME

Maximum Mark: 40

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**Specimen**

From 2018 the mark scheme design/layout has improved.  
The content and marks remain the same.

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This document consists of **4** printed pages.

## mark scheme abbreviations

( )	the word, phrase or unit in brackets is not required but is in the mark scheme for clarification
accept	accept the response
AND	both responses are necessary for the mark to be allowed
c.a.o.	correct answer only
e.c.f.	error carried forward; marks are awarded if a candidate has carried an incorrect value forward from earlier working, provided the subsequent working is correct
ignore	this response is to be disregarded and does not negate an otherwise correct response
NOT	do not allow
note:	additional marking guidance
/ OR	alternative responses for the same marking point
owtte	or words to that effect
<u>underline</u>	mark is not allowed unless the underlined word or idea is used by candidate
units	there is a maximum of one unit penalty per question unless otherwise indicated
any [number] from:	accept the [number] of valid responses
max	indicates the maximum number of marks

- 1 (a) table:  
 5  $d$  values in cm (all < 50), recorded to nearest mm [1]  
 $d$  values 30.0, 24.0, 20.0, 17.1, 15.0 each to  $\pm 1.0$  cm [1]  
 $1/d$  values correct (note: at least 2 significant figures) [1]
- (b) any one difficulty and corresponding solution from:  
 rule won't balance exactly  
 allowing to tip one way then the other and take average  
  
 finding position of centre of the mass on the rule  
 marking centre of mass so it can be read against rule  
 OR take average of right hand and left hand readings for mass position  
  
 mass or rule slides  
 suitable means for preventing mass or rule sliding  
  
 OR other suitable difficulty and solution [max 2]
- (c) graph:  
 axes labelled with quantity and unit [1]  
 scales suitable, plots occupying at least half grid [1]  
 plots all correct to  $\frac{1}{2}$  square (take centre of plot if large) [1]  
 well-judged thin line ( $\leq \frac{1}{2}$  square) [1]
- (d) triangle method used and shown (any indication on graph) using at least half line (can be seen in calculation) [1]
- (e)  $\mu = 27 - 33$  (g) to 2 or 3 significant figures [1]
- 2 (a) table:  
 $t$  in s, both  $\theta$  in  $^{\circ}\text{C}$  (words or symbols) [1]  
 both tubes temperatures decreasing and to consistent precision [1]  
 both tubes temperatures decreasing at decreasing rate [1]
- (b) statement matches readings (expect tube without cotton wool cooled most rapidly OR no significant difference) [1]  
 justified by reference to temperature differences and time [1]  
 relevant science, consistent with readings and conclusion  
 (e.g. therefore cotton wool is a good/not a good insulator OR most cooling is due to convection or radiation etc.) [1]
- (c) quality poor due to small temperature differences [1]  
  
 any two improvements from:  
 increase initial temperature of water  
 ensure initial temperatures are identical (if they weren't)  
 use a lid  
 stir to eliminate differences between top and bottom of the water  
 use thicker insulation  
 use more sensitive thermometer or datalogger [max 2]
- (d) any two from:  
 laboratory temperature  
 draughts / open windows  
 accept temperature of hot water source [max 2]

- 3 (a) correct symbol [1]  
correct position [1]
- (b) table: [1]  
5  $l$  values range at least 50 cm [1]  
5  $l$  values range at least 70 cm [1]  
 $V$  values all  $< 2.5$  V and decreasing with increasing length [1]  
all  $V$  values to at least 0.1 V and same precision (same no. of decimal places) [1]
- (c) (brightness) decreases (as length increases) [1]
- (d) statement: no (must match readings) [1]  
justification matches statement and by reference to results  
e.g.  $V/l$  not constant,  $V$  increases as  $l$  decreases,  $V$  does not double when  $l$  doubles [1]
- (e) any one from:  
width of sliding contact  
achieving exact same position on wire  
accept heating changes resistance of wire  
accept other sensible practical reason [max 1]  
NOT human error
- (f) do not touch (bare/hot) wire  
OR do not allow C to touch terminal between lamp and supply [1]
- 4 apparatus:  
measuring cylinder/jug OR ruler OR balance (to measure amount of water) [1]
- protractor OR rule to measure height of raised surface  
OR other means of measuring angle of tilt  
OR newtonmeter to apply variable force  
OR other method of applying quantifiable force [1]
- instructions:  
method of tilting or applying variable force and measuring point at which bottle topples [1]
- attention to accuracy, any two from:  
just starts to topple  
slowly  
repeats / more than 10 values for quantity of water  
very large protractor  
or any other suitable precaution which would improve accuracy of data [2]
- values:  
at least 5 values with range at least 1500 cm<sup>3</sup> or 30 cm or 1500 g, approximately evenly spaced [1]
- graph:  
plot of measured variable (angle or height or force) against quantity of water  
(volume or height or mass) (accept vice versa) [1]