Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/62**

Paper 6 Alternative to Practical **March 2017**

MARK SCHEME

Maximum Mark: 40

Published

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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This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

NOTES ABOUT MARK SCHEME SYMBOLS AND OTHER MATTERS

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.

Question	Answer	Marks
1(a)	θ_A = 18 and θ_B = 37 (°C)	1
1(b)	units all correct (symbols or words)	1
	t values all present (30, 60, 90, 120, 150 and 180)	1
1(c)	any 2 appropriate precautions: stir before reading, keep thermometer at same level, set eye to same level as / perpendicular / right angles to scale, wait until reading stops rising (at start), position clock so that thermometer and clock can be easily seen	2
1(d)	conclusion matching results	1
	correct mention of comparative temperature change over 180 s	1
1(e)	**any suitable improvement to apparatus or procedure relating to comparison, e.g.:** • measure water into test-tube / beaker, • use same volume of water in test-tube / beaker, use same starting temperatures in tubes, • ensure all water in tube below level of water in beaker, • use insulation / lid on beaker	1
	matching explanation, e.g.: • ensure same amount of water being used each time, • cooling rates different / owtte at different volumes / temps, • all water in tube has same surrounding temperature, • keeps water in beaker at (more) constant temperature	1
1(f)	reading taken perpendicular to scale	1
	at bottom of meniscus	1
	Total:	11

Question	Answer	Marks
2(a)	correct voltmeter symbol shown in parallel	1
2(b)	V = 2.7 (V)	1
	I = 0.48 (A)	1
2(c)	correct calculations of R – 5.63 / ecf, 3.20, 2.59	1
	consistent 2 or consistent 3 sig figs	1
2(d)(i)	correct calculations of r – 6.26, 6.40, 6.48 or ecf from R values	1
	Ω / m seen at least once and not contradicted	1
2(d)(ii)	statement matching results	1
	justification matching statement and results – 'within limits of experimental accuracy' / owtte	1
2(e)	arrow on wire between the inside edge of each crocodile clip	1
2(f)	any suitable precaution: reduce current / voltage, use longer / thinner resistance wires,	1
	Total:	11

Question	Answer	Marks
3(a)	h_I = 4.5 (cm)	**1**
3(b)	correct *M* calculations – 3.00 / ecf, 1.50, 0.73, 0.50, 0.37	**1**
3(c)	graph: axes labelled with quantity and unit	**1**
	appropriate scales (plots occupying at least ½ grid)	**1**
	plots all correct to within ½ small square	**1**
	well judged line and single, continuous thin line	**1**
3(d)	construction line(s) clearly seen on graph	**1**
	u in range 28.0 to 32.0 (cm)	**1**
3(e)	any appropriate difficulty: e.g. hand / ruler in way of image	**1**
	matching improvement: e.g. use translucent screen and view from behind, fix ruler / grid to screen	**1**
3(f)	able to achieve a sharp / complete / focused image / owtte	**1**
	Total:	**11**

Question	Answer	Marks
4	**apparatus:** MP1 springs made by winding wire around rod (or similar)	**1**
	method: MP2 apply load, measure length / extension of spring	**1**
	MP3 repeat for spring(s) of different material	**1**
	MP4 record results in suitable annotated table / bar chart / graph	**1**
	control variables: MP5 mark gained for any <u>two</u> of: unstretched length of spring, diameter of wire, coil spacing, load / range of loads used diameter of spring	**1**
	MP6 **precautions / difficulties / additional points:** MP7 any two from: clamp retort stand / might topple, use small loads / spring might overstretch/spring too weak/use loads which don't overstretch spring to support loads need to apply force smoothly / slowly, suggested range of loads, workable arrangement for applying load to spring (e.g. small loop at end of spring) trial experiment to find (range of) loads to use how to determine extension of spring, repeat each reading <u>and</u> take average, at least 5 loads for each sample if producing graph	**2**
	Total:	**7**