

Length & Time

Mark Scheme 3

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	General Physics
Sub-Topic	Length & Time
Paper Type	Alternative to Practical
Booklet	Mark Scheme 3

Time Allowed: 72 minutes

Score: /60

Percentage: /100

- 1 (a) Blocks parallel with ONE sphere completely between [1]
Rule correctly placed [1]
- (b) (Line of sight perpendicular to scale [1]
Line of sight along bottom of meniscus [1]
- (ii) 70 (cm³) [1]
- (iii) 0.53 cm³, 2 or 3 significant figures, with unit [1]

[Total: 6]

- 2 (a) Measuring cylinder
Tape measure
Newtonmeter (spring balance)
Electronic balance
Manometer
- 1 mark each [5]
- (b) (i) Viewing scale perpendicularly (owtte) [1]
- (ii) Any one from:
Moving lens back and forth
Dark area (owtte)
Object and lens at same height from bench
Object lens and screen at right angles to bench [1]

[Total: 7]

- 3 (a) l value 10.5(cm) / 105(mm) [1]
- (b) l value 52.5/525 (ecf) [1]
Both in cm/mm with unit stated at least once [1]
- (c) Use blocks/protractor/set square; move ruler close to bob/lower bob
(Can score the mark from a well-drawn diagram) [1]
- (d) T values 1.45, 1.47, 1.43, 1.44, 1.46 [1]
 T values consistent 2 or 3 significant figures [1]
Table: cm, s, s [1]
- (e) Description: little or no effect (owtte) allow ecf from 5(d) [1]
Justification: T values very similar (owtte) [1]
- (f) Any one from:
Reduces human reaction error
Gives a more accurate value of T
 T is too small/oscillations are too quick
Gives an average value (of T) [1]

[Total: 10]

4. 1.5 cm [1]
100 cm³ [1]
0.07 m² [1]
0.12 A [1]
23 cm [1]

[Total: 5]

- 5 (a) column 1: d , m (or in words) [1]
 columns 2 and 3: t , T (or in words) [1]
 columns 2 and 3: s, s (or in words) [1]

(b) accuracy/reducing uncertainty/sensible comment on reaction time [1]

(c) at least three correct values entered in table
 1.66, 1.52, 1.40, 1.28, 1.17 (at least 2 significant figures) c.a.o [1]

(ii) statement matches result (expect NO) AND
 justification matches statement and by reference to result
 (expect decreasing, not equal, not constant, different, changing, wtte)
 allow ecf from (i) [1]

[Total: 6]

- 6 (a) d 2.5 (cm) [1]
 x 14.5 (cm) [1]
 diagram showing blocks correctly placed across the ends [1]
 rule position (or distance) shown correctly [1]

(b) V_e 71.1 - 71.2 (cm³) ecf allowed [1]

(ii) measuring cylinder reading 56 (cm³) [1]

(iii) ρ 2.05–2.08 (or 2.1) ecf allowed [1]
 g/cm³ and 2 or 3 significant figures [1]

[Total: 8]

- 7 (a) (i) d 0.5 cm or 5mm [1]
(ii) x 10.0 [1]
- (b) (i)–(i)
table: T 1.0, 0.95, 0.895 (0.90, 0.9), 0.84, 0.775 (0.78) [1]
 T^2 1.00, 0.903, 0.801, 0.706, 0.601 (if T correct) [1]
- (c) graph:
axes labelled [1]
scales suitable, plots occupying at least half grid [1]
plots all correct to $\frac{1}{2}$ square [1]
well judged line [1]
thin line, 5 neat plots [1]
- (d) statement NO and not through origin/
inverse/negative gradient/
 x increases, T^2 decreases/ wtte [1]

[Total: 10]

- 8 (a) (i) triangle method used
(whether or not shown on graph) [1]
Triangle using more than half line
and position indicated on graph [1]
Expect $G = 4.00$ – 4.35 (but allow correct working
from points read from beyond 1.0 on x axis) [1]
Expect $g = 9.07$ – 9.87 (ecf from G) [1]
- (ii) greater accuracy/average value [1]
- (b) (i) amplitude [1]
length [1]
(other possible correct responses shape/size of bob
and number of swings)
- (ii) does not affect time [1]

[Total: 8]