Hooke's Law
Mark Scheme 1

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	General Physics
Sub-Topic	Hooke's Law
Paper Type	Alternative to Practical
Booklet	Mark Scheme 1

Time Allowed: 58 minutes

Score: /48

Percentage: /100

Question	Answer	Marks
1(a)	l_0 = 55 (mm) c.a.o.	**1**
1(b)(i)	4, 9, 14, 19, 23 ecf **(a)**	**1**
1(b)(ii)	Viewing scale at right angles or use of straight edge / set square / pointer between bottom of spring and scale / ruler	**1**
1(c)	Gr Axes correctly labelled with quantity and unit Suitable scales All plots correct to ½ small square Good line judgement, thin, continuous line, neat plots	 **1** **1** **1** **1**
1(d)(i)	e = 17 (mm) ecf **(a)**	**1**
1(d)(ii)	method clearly shown on graph W value 3.5–3.75 Unit N needed No ecf from **(i)**	**1** **1**
		Total: 10

2 **(a** any one from: [1]
- clamp rule
- rule close to spring
- ensure rule vertical
- avoidance of parallax errors (explained)
- use of set square / fiducial aid

(b) graph:
- axes both correctly labelled, right way round and with units [1]
- suitable scales [1]
- all plots correct to within ½ small square [1]
- good best-fit straight line, single, thin, continuous line [1]

(c) value consistent with candidate's graph [1]

(d) **(i)** 8(.0) (cm) [1]

(ii) W = 1.4–1.7 (N) [1]
indication on graph which <u>matches candidate's value</u> [1]

(e) any one from: [1]
- data only to 2 sig. figs.
- cannot plot / read graph to that level of accuracy
- cannot read rule to that level of accuracy

[Total 10]

3   **(a) (b)**   21 (mm)   [1]

         210 (mm) ecf from l_0 [1]

(b)   45 (mm) <u>and</u>
          0.067 or 0.0667 (N/mm), 2 or 3 sig. figs.
          ecf from l_0 and L_0 [1]

          correct unit N/mm or N/m or N/cm as appropriate   [1]

(c) T = 1.342 (s) or 1.34 (s)   [1]

(d) T = 1.724 s (no mark)
          statement NO (ecf from **(c)**)   [1]

          difference <u>too</u> large (for experimental inaccuracy) (ecf)   [1]

(e)   clear diagram or explanation that indicates:
          perpendicular viewing of spring or scale
          OR appropriate use of horizontal pointer/set square/rule, etc.
          OR rule touching/very close to spring   [1]

                                                                                                   [Total: 8]

4   **(a**   54 – 55   [1]

(b)   table:
               e values 12, 22, 36, 50, 60 (e.c.f. from **(a)**)   [1

      (ii) graph:
               axes correctly labelled e / mm and F / N and correct way round   [1]
               suitable scales   [1]
               all plots correct to ½ small square   [1]
               good line judgement   [1]
               thin, single continuous line   [1]

      (iii) triangle method using at least half of candidate's line, shown on the graph   [1]
               G = 11 – 13, no e.c.f.   [1]

                                                                                                              [Total: 9]

5 **(a** d_0 = 21 (mm)   [1]

(b) D_o = 210 (mm) or 10 × candidate's **(a)**   [1]

(c) L values 1.0, 2.0, 3.0, 4.0, 5.0   [1]
e values 1.0, 9.0, 21.0, 29.0, 40.0   [1]

(d) Graph:
Axes correctly labelled with quantity and unit and correct way around   [1]
Suitable scales   [1]
All plots correct to ½ small square
Good line judgement <u>and</u> a single, thin, continuous line   [1]

(e) Triangle method used and shown on the graph   [1]
Using at least half of line   [1]

(f) Any one from:
Always measure from same point on spring (top or bottom of ring)
Wait for spring/weight to stop bouncing
Use of horizontal aid/ensure ruler is vertical
Bench surface not uniform   [1]

[Total: 11]