SECTION A

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)			As mass increases extension increases	1			1		1
	(b)			All data recorded and logically organised (1) Headings - mass/ length/ extension(1) Units – g / mm / mm (1) Accept kg / m Extension calculated correctly (1) Extension means calculated correctly (1)	1 1 1	 1 1		 5	 2	 5
				Section A total	**4**	**2**	**0**	**6**	**2**	**6**

SECTION B

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		Independent variable – mass (1) Dependent variable – extension (1)	2			2		2
		(ii)		Same spring (1) Different springs have different stiffness (1)	1	1		2		2
	(b)			Scales & use of at least ½ of graph paper (1) All plots correctly plotted with ± ½ small square tolerance (2) 1 error (1) >1 error (0) Line of best fit within ± ½ small square division of all points (1) Don't accept thick, double, whispy lines Correct force used (1)	1 1	2 1		5	5	5
	(c)			Yes (no mark) Since straight line (1) through origin (1) **ecf**		2		2		2
	(d)			Matched values taken from graph (1) Substitution (1) Correct answer with consistent unit N/m or N/cm (1)	1	1 1		3	2	3
	(e)			Calculation of k (2 × their value) (1) Substitution (1) Calculation of correct force e.g. consistent units in substitution (1)	1 1	1		3	2	3
	(f)			Scatter about mean (1) Scatter around line of best fit (1) Comment on overlapping (1)			3	3		3
	(g)			Effect of parallax when taking readings(1) Use a pointer / use a set square (1)		1	1	2		2

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(h)			Doubling force does not double extension (1) So not directly proportional (1)			2	2		2
				Section B total	**8**	**10**	**6**	**24**	**9**	**24**