Mark Scheme Hooke's Law Past Paper Questions Jan 2002 to Jan 2009

[Note there are more Hooke's Law related questions under Young's Modulus]

Question 3		
(a)	the force (needed to stretch a spring is directly) is proportional to the extension (of the spring from its natural length) or equation with all terms defined ✓ up to the limit of proportionally ✓	**2**
(b) (i)	**Q3 Jan 2009**	
QWC	**descriptor**	**mark range**
good - excellent	The candidate provides a comprehensive and coherent description which includes all the necessary measurements in a logical order. The description should show awareness of the need to use a range of standard masses. In addition, the use of the measurements is explained clearly, including an outline of a graphical method to find the mass of the rock sample, or calculation using two or more standard masses and averaging. For 6 marks there must be a description of how to make accurate measurements.	**5 - 6**
modest - adequate	The candidate's description includes the necessary measurements using one standard mass as well as the rock sample. The description may not be presented in a logical order and they show little consideration in relation to making the measurements accurately. A clear explanation is provided of how to find the mass of the rock sample from their measurements, including correct use of Hooke's law through calculations or inadequate graphical method.	**3 - 4**
poor - limited	The candidate knows the necessary measurements to be made using a standard mass and the rock sample. The explanation of how to find the mass of the rock sample may be sketchy.	**1 – 2**
	The explanations expected in a competent answer should include a coherent account of the following measurements and their use **measurements** (use a metre rule to) measure the length of the spring ✓ when it supports a standard mass (or known) mass (m) and when it supports the rock sample repeat for different (standard) masses accuracy – use a set square or other suitable method to measure the position of the lower end of the spring against the (vertical) mm rule or method to reduce parallax **use of measurements** *either* plot graph of mass against length (or extension) ✓ read off mass corresponding to length (or extension) due to the sample ✓ *or* the extension of the spring = length – unstretched length ✓ mass of rock sample = $\frac{\text{extension of spring supporting rock sample}}{\text{extension of spring supporting known mass}} \times M$ ✓	

(ii)	use a (G) clamp (or suitable heavy weight) to fix/clamp the base of the stand to the table ✓ clamp (or weight) provides an anticlockwise moment (about the edge of the stand greater than the moment of the object on the spring)/ counterbalances (the load) ✓ **or** adjust the stand so the spring is nearer to it ✓ so the moment of the load is reduced (and is less likely to overcome the anticlockwise moment of the base of the stand about the edge of the stand) ✓ **or** turn the base of the stand/rotate the boss by 180° ✓ so the weight of the load acts through the base ✓	
	Total	**10**