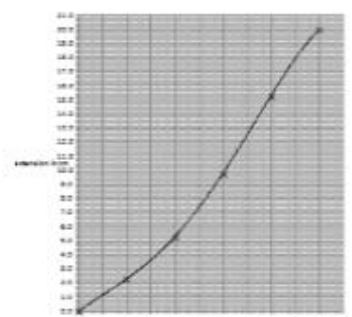
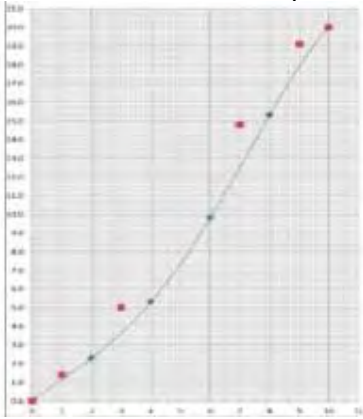
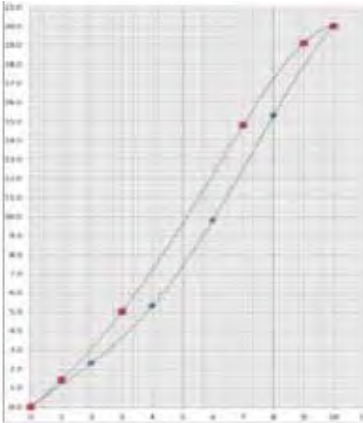


Question number	Answer	Notes	Marks
11 (a) (i)	MP1. means of securing one end of elastic band; MP2. ruler; MP3. weights;		(3)
(ii)	extension linked to dependent force linked to independent temperature linked to control <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>variable</p> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px;">extension</div> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px;">force</div> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px;">temperature</div> </div> <div style="text-align: center;"> <p>type of variable</p> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px;">control</div> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px;">dependent</div> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px;">independent</div> </div> </div> <p>all three correct;; any one correct;</p>		(2)
(iii)	any two from: determine length without weights; determine length with 12 N; subtraction to get extension;	allow find difference in lengths	(2)
11 (b)(i)	any two suggestions from: - MP1. unloading and loading at same intervals; MP2. filling in the (large) gap in the unloading data; MP3. more readings (where curve is most pronounced); MP4. increase the range of loads;	ignore repeat and average allow 'go up in ones'	(2)
(ii)	best fit curve; 		(1)

11 (b)(iii)	<p>4 points plotted correctly;; -1 for each incorrect point</p> 		(2)
(vi)	<p>best fit curve;</p> 		(1)
(v)	<p>a discussion to include any three points:</p> <p>MP1. does not obey Hooke's law; MP2. because graph is not linear throughout; MP3. Hooke's law requires extension directly proportional to force; MP4. it does show elastic behavior; MP5. because it returns to its original length; MP6. data points quoted to support other MP;</p>	<p>MP1 should only be awarded if there is an attempt at an explanation</p>	(3)

Total for Question 11 = 16 marks