Question Number	Answer	Mark
5(a)	• (Diameter is 1/20 the original) so area is 1/400 original (1) • (For the same breaking stress) maximum force needed to break the sample is only 20N (so it is safe) (1) Accept correct calculations of both areas (with no comparison) for MP1 Accept repeated/combined calculations using $\sigma = F / A$ leading to a force of 20N to score both marks.	**2**
5(b)	• Use of $W = mg$ **and** $A = \pi d^2/4$ (1) • Use of $\sigma = F / A$ (1) • Breaking stress of sample = 2.62×10^7 (Pa) **Or** Force for manufacturers breaking stress = 18.1 (N) (1) • Comparative statement consistent with their value (1) For MP1 accept use of $A = \pi r^2$ <u>Example of Calculation</u> $W = mg = 1.9 \text{ kg} \times 9.81 \text{ N kg}^{-1} = 18.6 \text{ N}$ $A = \pi d^2/4 = \pi \times (0.00095 \text{ m})^2 / 4 = 7.1 \times 10^{-7} \text{ m}^2$ $\sigma = F / A = 18.6 \text{ N} / 7.1 \times 10^{-7} \text{ m}^2 = 2.62 \times 10^7 \text{ Pa}$	**4**
	Total for question 5	**6**