3 A student was asked to investigate the ultimate tensile stress of a sample of thin nylon fishing line.

(a) Describe a method to determine the maximum force the nylon fishing line can withstand before breaking.

(4)

(b) Identify one safety issue with this investigation and how it may be dealt with.

(2)

(c) Before testing, the student measured the diameter at five points along the sample of nylon fishing line.

0.55 mm 0.57 mm 0.54 mm 0.55 mm 0.53 mm

(i) Calculate the percentage uncertainty in the mean diameter of the nylon fishing line.

(3)

Percentage uncertainty = ...

(ii) The student read an article that suggested nylon fishing line can absorb water.

The article suggested that the ultimate tensile stress of nylon decreases by 10% after absorbing water.

She repeated her experiment, using new samples of fishing line before and after they absorbed water.

Sample	Maximum force / N	Diameter / mm
Before	65.8	0.45
After	57.8	0.46

Evaluate whether her results support the suggestion in the article.

(5)

(Total for Question 3 = 14 marks)