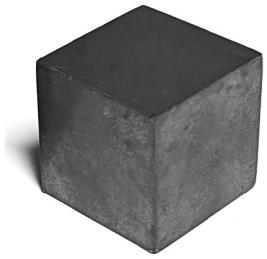
Answer ALL questions.

1 A student investigated the metal cube shown.



She measured the length, width and height of the cube.

She repeated these measurements in different places on the cube. Her measurements are shown in the table below.

	Length / mm	**Width / mm**	**Height / mm**
Measurement 1	20.3	20.4	20.1
Measurement 2	20.2	20.5	20.1
Measurement 3	20.1	20.0	20.1
Mean	20.2	20.3	20.1

(a) Identify a suitable measuring instrument for these measurements.

(1)

.....

(b) The student noticed that the uncertainty in the mean width is larger than the uncertainties in the mean length and the mean height.

Suggest why the uncertainty in the mean width is larger.

(1)

.....

.....

(c) Determine the percentage uncertainty in the mean length.

(2)

Percentage uncertainty = ...

(d) The student measured the mass of the metal cube as 72.8 g, using a top pan balance.

(i) Show that the density of the metal is about 8800 kg m^{-3}.

(4)

(ii) The student is told the cube is made from copper, bronze or brass.

The table shows the densities of these metals.

Metal	Density / kg m^{-3}
copper	8940
bronze	8620
brass	8520

She estimates the percentage uncertainty in the value of the density of the cube to be 2%.

Deduce which metal the cube is made from.

(3)

.....

.....

.....

.....

.....

.....

(Total for Question 1 = 11 marks)

DO NOT WRITE IN THIS AREA