2 A student made measurements to determine if some gold coins were made from pure gold. The coins that were available to the student are shown below.

(Source: © Bjoern Wylezich/Shutterstock)

(a) The student used digital calipers to measure the thickness t and the diameter d of one of the coins.

(i) Calculate the volume V of the coin, and the percentage uncertainty in V.

$t = 1.54\,\text{mm}$
$d = 22.16\,\text{mm}$

(7)

$V =$ .....

Percentage uncertainty in $V =$ .....

(ii) The student measured the mass of the coin using an electronic balance. The balance had a resolution of 0.1 g.

Assess whether the coin could be made from pure gold.

density of pure gold $= 1.93 \times 10^4\,\text{kg m}^{-3}$
mass of coin $= 11.2\,\text{g}$

(4)

(b) The student's experimental method could have been improved.

Explain two changes the student could have made to the experimental method.

(4)

(Total for Question 2 = 15 marks)