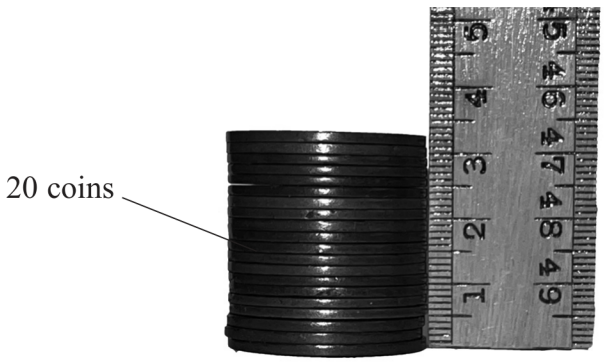
Answer ALL questions.

1 A student was given a collection of old coins.

She placed the coins alongside a ruler, as shown, to determine the diameter and thickness of the coins.



(a) Determine the average volume of one of the coins.

(4)

Average volume = ...

(b) The mass of the 20 coins shown is 196 g.

Determine the average density of the coins.

(2)

Average density = ...

(c) Determine whether the coins could be made from brass.

density of brass = 8550 kg m^{-3} ± 2%

(2)

(d) The surfaces of the coins are uneven, which introduces a systematic error.

Describe an alternative method the student could have used to determine the average volume of one of the coins, which would avoid this error.

Your description should include details of how any measuring equipment is used.

(4)

(Total for Question 1 = 12 marks)

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