Solution.

We can calculate the density for the crown using the formula:

$$\text{density} = \text{mass} \div \text{volume} = d$$

So

$$d_{crown} = \frac{1.8 \text{ kg}}{125 \text{ cm}^3} = 0.0144 \text{ kg}/_{cm^3}$$

Using this formula we can calculate the density of gold and silver:

$$d_{gold} = \frac{1 \text{ kg}}{50 \text{ cm}^3} = 0.02 \text{ kg}/_{cm^3}$$

$$d_{silver} = \frac{1 \text{ kg}}{100 \text{ cm}^3} = 0.01 \text{ kg}/_{cm^3}$$

Compare the values:

$$d_{crown} < d_{gold} \quad \& \quad d_{crown} > d_{silver}$$

So the crown is not pure gold.