

- 1 A sheet of gold leaf has a thickness of $0.125\text{ }\mu\text{m}$. A gold atom has a radius of 174 pm .

Approximately how many layers of atoms are there in the sheet?

- A 4 B 7 C 400 D 700

- 2 The drag coefficient C_d is a number with no units. It is used to compare the drag on different cars at different speeds. C_d is given by the equation

$$C_d = \frac{2F}{v^n \rho A}$$

where F is the drag force on the car, ρ is the density of the air, A is the cross-sectional area of the car and v is the speed of the car.

What is the value of n ?

- A 1 B 2 C 3 D 4

- 3 A student measures the current through a resistor and the potential difference (p.d.) across it. There is a 4% uncertainty in the current reading and a 1% uncertainty in the p.d. reading. The student calculates the resistance of the resistor.

What is the percentage uncertainty in the calculated resistance?

- A 0.25% B 3% C 4% D 5%

- 4 A student applies a potential difference V of $(4.0 \pm 0.1)\text{ V}$ across a resistor of resistance R of $(10.0 \pm 0.3)\text{ }\Omega$ for a time t of $(50 \pm 1)\text{ s}$.

The student calculates the energy E dissipated using the equation below.

$$E = \frac{V^2 t}{R} = \frac{4.0^2 \times 50}{10.0} = 80\text{ J}$$

What is the absolute uncertainty in the calculated energy value?

- A 1.5 J B 3 J C 6 J D 8 J