

4 A 3.00 g copper coin at 20.0 °C drops 50.0 m to the ground.

(a) The copper is said to possess internal energy.

Explain what is meant by internal energy.

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..... [2]

(b) The coin does not undergo a change in volume after it lands on the ground.

Determine the gain in temperature of the coin given that the specific heat capacity of copper is 385 J kg⁻¹ K⁻¹. Assume that 10.0 % of the change in gravitational potential energy of the coin goes to increasing the internal energy of the coin.

gain in temperature = K [2]

(c) The first law of thermodynamics for a system can be expressed as

$$\Delta U = q + w$$

where ΔU is the increase in internal energy of the system, q is the heat supplied to the system and w is the work done on the system.

Use the words **positive**, **negative** and **zero** to complete Table 4.1 for the three terms in the equation for each of the processes shown. You may use each word once, more than once, or not at all.

Process	ΔU	q	w
Copper coin drops and lands on the ground			

Table 4.1

[2]