

- 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  $385 \text{ J kg}^{-1} \text{ K}^{-1}$ . Assume that 10.0 % of the change in gravitational potential energy of the coin goes to increasing the internal energy of the coin.

$$\text{gain in temperature} = \dots \text{ K} \quad [2]$$

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

$$\Delta U = q + w$$

where  $\Delta U$  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	$\Delta U$	$q$	$w$
Copper coin drops and lands on the ground			

Table 4.1

[2]