3 **(a)** Two bodies are in thermal equilibrium.

State what is meant by *thermal equilibrium*.

.....

.....

..... [2]

(b) The temperature of a body is found to increase from 15.9 °C to 57.2 °C.

Determine, in kelvin and to an appropriate number of decimal places,

(i) the rise in temperature of the body,

temperature rise = ... K [1]

(ii) the final temperature.

temperature = ... K [1]

(c) An ideal gas at a constant pressure of 1.2×10^5 Pa is heated from a temperature of 290 K to a final temperature of 350 K. The change in volume of the gas is 950 cm^3.

The total change in kinetic energy ΔE_K, measured in joules, of the gas molecules is given by the expression

$$\Delta E_K = \frac{3}{2} \times 1.9 \times \Delta T$$

where ΔT is the change in temperature in kelvin.

Determine the thermal energy required to produce the change in temperature from 290 K to 350 K.

energy = ... J [4]