

- 2** Sources of α -particles are frequently found to contain traces of helium gas. A radioactive source emits α -particles at a constant rate of $3.5 \times 10^6 \text{ s}^{-1}$. The α -particles are collected for a period of 40 days. Each α -particle becomes one helium atom.

- (a)** By reference to the half-life of the source, suggest why it may be assumed that the rate of emission of α -particles is constant.

.....

..... [1]

- (b)** The helium gas may be assumed to be an ideal gas. Calculate the volume of gas that is collected at a pressure of $1.5 \times 10^5 \text{ Pa}$ and at a temperature of 17°C .

volume = m^3 [3]