**2** **(a)** State what is meant by

**(i)** the Avogadro constant $N_A$,

.....

..... [1]

**(ii)** the mole.

.....

..... [2]

**(b)** A container has a volume of $1.8 \times 10^4$ cm$^3$.

The ideal gas in the container has a pressure of $2.0 \times 10^7$ Pa at a temperature of 17 °C.

Show that the amount of gas in the cylinder is 150 mol.

[1]

**(c)** Gas molecules leak from the container in **(b)** at a constant rate of $1.5 \times 10^{19}$ s$^{-1}$.
The temperature remains at 17 °C.
In a time $t$, the amount of gas in the container is found to be reduced by 5.0%.

Calculate

**(i)** the pressure of the gas after the time $t$,

pressure = ..... Pa [2]

**(ii)** the time $t$.

$t$ = .....s [3]

[Total: 9]