## 1.3 Determination of the molar mass using the ideal gas eq.

2.

mass=?

$M = 28.01\ g/mol$ ✓

Volume = $200 cm^3 = 200 \cdot 10^{-6} m^3$ ✓ good

Temperature = $17°C = 290\ K$ ✓ good

Pressure = $98,900\ Pa$ ✓

$PV = nRT \rightarrow n = \frac{PV}{RT} \rightarrow$

$\rightarrow n = \frac{98,900 \cdot 200 \cdot 10^{-6}}{8.31 \cdot 290} = 8.21 \cdot 10^{-3}$ ✓

$n = \frac{m}{M} \rightarrow m = n \cdot M \rightarrow m = 8.21 \cdot 10^{-3} \cdot 28.01 = 0.23g$

3.

$m = 1.25g$

$V = 923 \cdot 10^{-6} m^3$

$T = 290K$

$P = 102,000 Pa$

$M = ?$

$PV = nRT \rightarrow PV = \frac{m}{M}RT \rightarrow M = \frac{mRT}{PV} \rightarrow$

$\rightarrow \frac{1.25 \cdot 8.31 \cdot 290}{10,200 \cdot 923 \cdot 10^{-6}} = M \Rightarrow M = 32.0\ g/mol$

Perfect