

## 10-8

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$$V = 40,0 \text{ dm}^3 = 0,040 \text{ m}^3$$

$$T = (17 + 273,15) \text{ K} = 290,15 \text{ K}$$

$$p = 10,0 \text{ MPa} = 10,0 \cdot 10^6 \text{ Pa}$$

$$m(\text{O}_2) = ?$$

$$\rho(\text{O}_2) = 1,43 \frac{\text{g}}{\text{dm}^3} = 1,43 \frac{\text{kg}}{\text{m}^3}$$

TAPPA I

$$R = 8,31451 \frac{\text{Pa} \cdot \text{m}^3}{\text{mol} \cdot \text{K}}$$

$$M(\text{O}_2) = 2 \cdot 16,00 \frac{\text{g}}{\text{mol}} = 32,00 \frac{\text{g}}{\text{mol}}$$

Ideaalikaasun tilanyhtälö:

$$pV = nRT \quad \parallel \text{Sij. } n = \frac{m}{M}$$

$$pV = \frac{m}{M} \cdot RT \quad \parallel \cdot M$$

$$pVM = mRT \quad \parallel : (RT)$$

$$m = \frac{pVM}{RT}$$

$$m = \frac{10,0 \cdot 10^6 \text{ Pa} \cdot 0,040 \text{ m}^3 \cdot 32,00 \frac{\text{g}}{\text{mol}}}{8,31451 \frac{\text{Pa} \cdot \text{m}^3}{\text{mol} \cdot \text{K}} \cdot 290,15 \text{ K}}$$

$$m = 5305,7982... \text{ g}$$

$$m = 5,3057... \text{ kg}$$

$$m \approx 5,3 \text{ kg}$$

TAPPA II

$$T_0 = 273,15 \text{ K}$$

$$p_0 = 101\,325 \text{ Pa}$$

$$V_0 = ?$$

Kaasujen yleinen tilanyhtälö:

$$\frac{pV}{T} = \text{vakio}$$

$$\frac{pV}{T} = \frac{p_0 V_0}{T_0} \quad \parallel \cdot T_0$$

$$\frac{pVT_0}{T} = p_0 V_0 \quad \parallel : p_0$$

$$V_0 = \frac{pVT_0}{p_0 T}$$

$$V_0 = \frac{10,0 \cdot 10^6 \text{ Pa} \cdot 0,040 \text{ m}^3 \cdot 273,15 \text{ K}}{101\,325 \text{ Pa} \cdot 290,15 \text{ K}}$$

$$V_0 = 3,7163... \text{ m}^3$$

Hapen massa:

$$\rho = \frac{m}{V_0} \quad \parallel \cdot V_0$$

$$m = \rho V_0$$

$$m = 1,43 \frac{\text{kg}}{\text{m}^3} \cdot 3,7163... \text{ m}^3$$

$$m = 5,314446... \text{ kg}$$

$$m \approx 5,3 \text{ kg}$$