

کتاب کار صحت

$n = 1. \text{ mol}$

$PV = nRT \rightarrow V = \frac{nRT}{P} \Rightarrow V = \frac{1 \times 8.314 \times 300}{1 \times 10^5} = 24.942 \text{ Lit}$

$P = 1. \text{ atm}$

$\theta = 27^\circ\text{C} \rightarrow T = 273 + 27 = 300. \text{ K}$

$V = ? \text{ Lit}$

$R = 8.314 \frac{\text{J}}{\text{mol K}}$

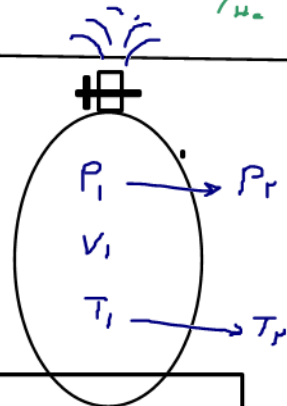
$\rho_{\text{H}_2} = 0.08988 \frac{\text{kg}}{\text{m}^3}$   
 $M_{\text{H}_2} = 2 \frac{\text{g}}{\text{mol}}$

$n = \frac{m}{M} \Rightarrow m_{\text{H}_2} = n M_{\text{H}_2} = 1 \times 2 = 2. \text{ g}$

$V = \frac{m_{\text{H}_2}}{\rho_{\text{H}_2}} = \frac{2. \text{ g}}{0.08988 \frac{\text{kg}}{\text{m}^3}} = 22.24 \text{ Lit}$

$120 \frac{\text{kg}}{\text{m}^3} \div 1000 = 0.12 \frac{\text{kg}}{\text{m}^3}$

$V_i = 1. \text{ Lit}$   
 $P_i = 12 \text{ atm} \rightarrow P_f = 1 \text{ atm}$   
 $T_i = 127^\circ\text{C} + 273 = 400. \text{ K} \rightarrow T_f = 300. \text{ K}$



$n_i = \frac{P_i V_i}{RT_i} = \frac{12 \times 1}{8.314 \times 400} = 0.36 \text{ mol}$

$n_f = \frac{P_f V_f}{RT_f} = \frac{1 \times V_f}{8.314 \times 300} = \frac{V_f}{2494.2}$

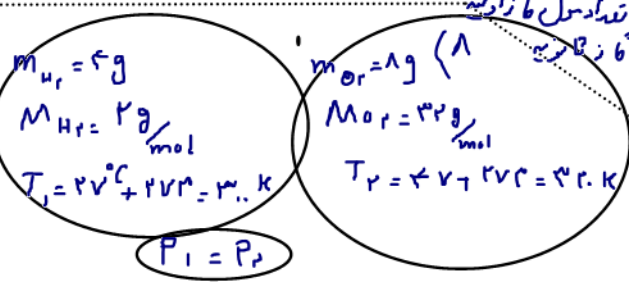
$n_i = n_f + n'$

$n' = n_i - n_f = 0.36 - \frac{V_f}{2494.2} = \frac{d}{r} \text{ mol}$

قانون دالتون:  $\frac{P_i V_i}{T_i} = \frac{P_f V_f}{T_f} + \frac{P' V'}{T}$

$n_i = n_f + n'$

$m' = ?$   
 خارج شده



$n' = \frac{m'}{M_{O_2}} \Rightarrow m' = n' \times M_{O_2} = \frac{d}{r} \times 32 = \frac{32d}{r} \text{ g}$

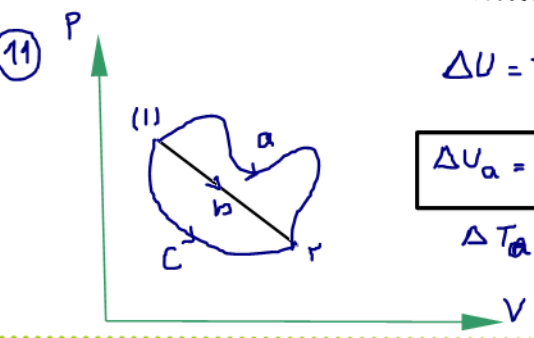
$n_i = n_{H_2} = \frac{m_{H_2}}{M_{H_2}} = \frac{2}{2} = 1 \text{ mol}$

$n_f = n_{O_2} = \frac{m_{O_2}}{M_{O_2}} = \frac{16}{32} = 0.5 \text{ mol}$

$\frac{V_i}{V_f} = ?$

$PV = nRT \rightarrow P = \frac{nRT}{V}$

$\frac{n_i R T_i}{V_i} = \frac{n_f R T_f}{V_f} \Rightarrow \frac{V_i}{V_f} = \frac{n_i}{n_f} \times \frac{T_i}{T_f} = \frac{1}{0.5} \times \frac{400}{300} = \frac{8}{3} = 2.67$

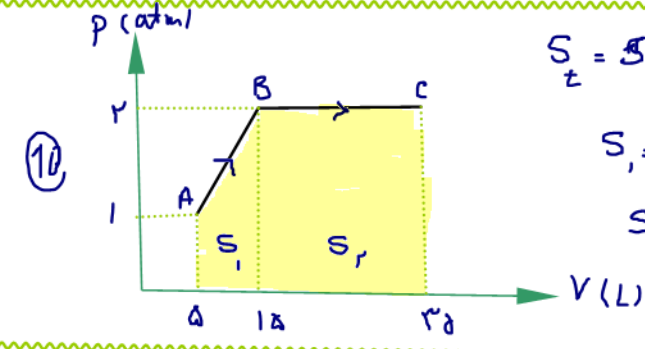


$\Delta U = W + Q$

$\Delta U \propto \Delta T$

$\Delta U_a = \Delta U_b = \Delta U_c$

$\Delta T_a = \Delta T_b = \Delta T_c$



$S_z = S_1 + S_r = |W|$

$S_1 = \frac{(1+2)(10-5) \times 10^{-5}}{r} = \frac{3 \times 10^{-5}}{r} = 10^{-5} \text{ J} \rightarrow W_1 = -10^{-5} \text{ J}$

$S_2 = 2 \times 10^{-5} \times (20-10) \times 10^{-5} = 2 \times 10^{-5} \times 10^{-5} = 2 \times 10^{-10} \text{ J}$

$W_2 = -2 \times 10^{-10} \text{ J}$

$W_z = -2 \times 10^{-10} + (-10^{-5}) = -10^{-5} \text{ J}$

$W = -10^{-5} \text{ J}$   
 $\Delta U = +10^{-5} \text{ J}$

$\Delta U = Q + W$   
 $10^{-5} = Q - 10^{-5} \rightarrow Q = 2 \times 10^{-5} \text{ J}$

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