

الصحيح لنموذجنا لا يمكن
التمديد هنا

1]

$$uL \rightarrow 1,3g \quad \Rightarrow \quad V = \frac{0,5 \times 10^3}{1,31} = 381 L$$

عند $\frac{1}{3}$ كرات

$$n = \frac{381}{22,4} \approx 17$$

2]

المعادلة الأولى هي $C_p - C_v = R$

$$C_p - C_v = R, \quad C_p/C_v = \gamma$$

$$\Rightarrow C_p = \frac{R}{1 - 1/\gamma} = \frac{7}{2} R \Rightarrow$$

$$C_p = n C_p = 17 \times \frac{7}{2} \times R = \underline{493,85 J/K}$$

3] • $P_1 = 10^5 Pa, T_1 = 300 K, \Rightarrow$

$$P_1 V_1 = n R T_1 \Rightarrow V_1 = \frac{n R T_1}{P_1} = 423 L$$

• $T_2 = T_1, P_2 = 6 P_1 \Rightarrow$

$$P_1 V_1 = P_2 V_2 \Rightarrow V_2 = \frac{P_1}{P_2} V_1 = \frac{V_1}{6}$$

$$V_2 = 0,0705 L$$

• $P_3 V_3 = n R T_3 = n R 4 T_1 = 4 P_1 V_1$

$$\Rightarrow V_3 = \frac{4 P_1 V_1}{P_3} = 0,282 m^3 = 282 L$$

$$\bullet P_3 V_3^\gamma = P_4 V_4^\gamma \quad \neq P_4 = P_1$$

$$V_4 \neq \left(\frac{P_2}{P_1}\right) \quad P_2 V_3^\gamma = P_1 V_4^\gamma$$

$$V_4 = \left(\frac{P_2}{P_1}\right)^{1/\gamma} V_3 = 1,01 \text{ m}^3$$

$$P_4 V_4 = nRT_4 \Rightarrow T_4 = P_1 V_4 / nR = 718 \text{ K}$$

$$\bullet 4) Q_1 = nRT_1 \ln v_2/v_1 = -P_1 V_1 \ln 6$$

$$Q_1 = -75791 \text{ J} < 0$$

$$Q_2 = C_p \Delta T = 493,8 \text{ J/K} \times 900 = 444468 \text{ J}$$

$$Q_3 = 0$$

$$Q_4 = C_p \Delta T = C_p (T_1 - T_4) \\ = -C_p (418) = -206429,3 \text{ J}$$

$$Q_n = 444468 \text{ J}$$

$$Q_c = -75991 - 206429,3 = \\ = -282220,3 \text{ J}$$

$$e = 1 - \frac{|Q_c|}{Q_n} = 1 - \frac{282220,3}{444468} \\ = 0,36$$

$$d - \frac{T_{\min}}{T_{\max}} = 1 - \frac{300}{450} = 1 - 2/3 \\ = 1/3 = 0,33$$

$$0,36 > 1 - \frac{T_{\min}}{T_{\max}}$$

