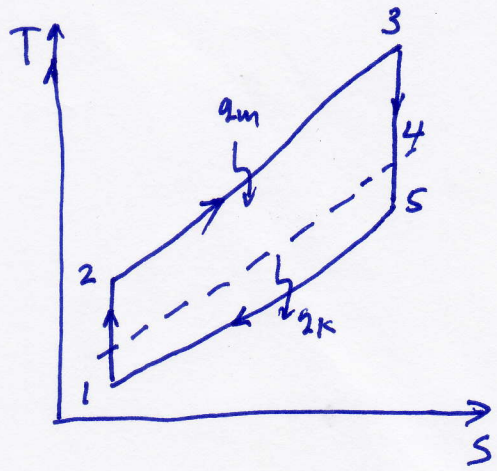
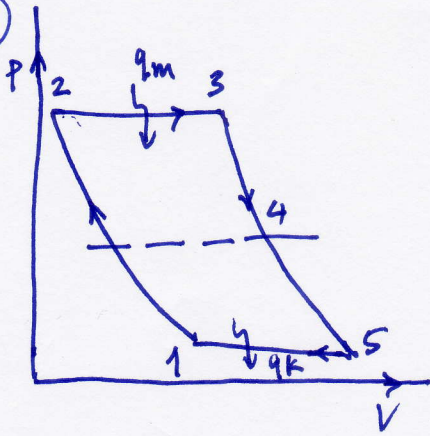


5.10



diket:

$$P_1 = 100 \text{ kPa}$$

$$T_1 = 300 \text{ K}$$

$$r_p = 5,5$$

$$T_3 = 1320 \text{ K}$$

$$P_5 = 100 \text{ kPa}$$

diminta

a) T_4, P_4

b) V_5

c) F jika $\dot{m}_a = 180 \text{ kg/s}$

Solusi

$$P_2 = r_p \cdot P_1 = 5,5 \times 100 = 550 \text{ kPa}$$

$$T_2 = T_1 r_p^{\left(\frac{\gamma-1}{\gamma}\right)} = 300 \cdot (5,5)^{0,286} = 488,5 \text{ K}$$

$$P_3 = P_2$$

$$T_5 = \frac{T_3}{r_p^{\left(\frac{\gamma-1}{\gamma}\right)}} = \frac{1320}{(5,5)^{0,286}} = 810,64 \text{ K}$$

$$\begin{aligned} \text{a) } T_4 &= T_3 - T_2 + T_1 \\ &= 1320 - 488,5 + 300 \\ &= 1131,5 \text{ K} \end{aligned}$$

$$P_4 = \frac{P_3}{\left(\frac{T_3}{T_4}\right)^{\frac{\gamma}{\gamma-1}}} = \frac{550}{\left(\frac{1320}{1131,5}\right)^{\frac{1,4}{0,4}}} = 320,74 \text{ kPa}$$

$$\text{b) } V_5 = \sqrt{2000 C_p (T_4 - T_5)} = \sqrt{2000 \cdot 1,0035 (1131,5 - 810,64)} = 802,48 \text{ m/s}$$

$$\begin{aligned} \text{c) } F &= \dot{m}_a V_5 = 180 \cdot 802,48 \left(\frac{\text{kg m}}{\text{s}^2}\right)^{\text{N}} \\ &= 144,45 \text{ kN} \end{aligned}$$