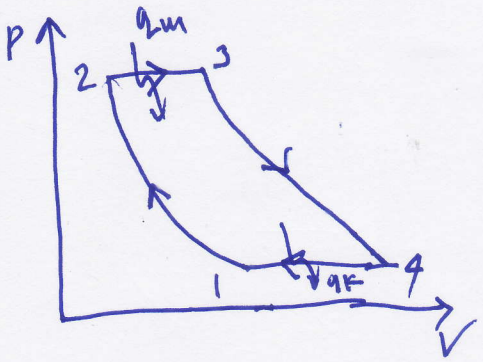
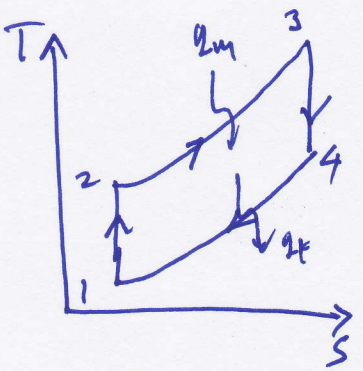
5.8




diket. $P_{output} = 16000\ kW$

$T_{max} = T_3 = 1150\ K$

$T_{min} = T_1 = 305\ K$

$P_{max} = P_2 = P_3 = 400\ kPa$

$P_{min} = P_1 = P_4 = 95\ kPa$

ditanya

a). $\dot{m}_a$

b). $P_{Turbin}$ , $P_{comp}$

solusi.

$$T_2 = T_1 \cdot r_p^{\left(\frac{k-1}{k}\right)} = T_1 \cdot \left(\frac{P_2}{P_1}\right)^{\left(\frac{k-1}{k}\right)}$$

$$= 305 \cdot \left(\frac{400}{95}\right)^{0,286}$$

$$= 460,11\ K$$

$$T_4 = \frac{T_3}{r_p^{\left(\frac{k-1}{k}\right)}} = \frac{1150}{\left(\frac{400}{95}\right)^{0,286}} = 762,32\ K$$

$w_T = c_p(T_3 - T_4) = 1,0035(1150 - 762,32) = 389,04\ kJ/kg$

$w_C = c_p(T_2 - T_1) = 1,0035(460,11 - 305) = 155,65\ kJ/kg$

$w_{net} = w_T - w_C = 389,04 - 155,65 = 233,387\ kJ/kg$

(a) $\dot{m}_a = \dfrac{P_{out}}{W_{net}}$

$= \dfrac{16000 \left(\frac{kJ}{s}\right)}{233,387 \left(\frac{kJ}{kg}\right)}$

$= 68,55 \ kg/s$

(b) $P_{Tur} = \dot{m}_a \cdot W_T$

$= 68,55 \cdot 389,04$

$= 26668,7 \ kW$

$P_{comp} = \dot{m}_a \cdot W_C$

$= 68,55 \cdot 155,65$

$= 10669,8 \ kW$