$y\dot{m}_7 h_9 + (1-y)\dot{m}_7 h_2 = \dot{m}_7 h_3 \Rightarrow y = \frac{h_3 - h_2}{h_9 - h_2}$ $\quad z = \frac{h_4 - h_5}{h_{10} - h_2}$

$y = \frac{(676 - 458)}{(3154 - 458)} = \frac{218}{2629} = \boxed{0.083}$ $\quad w =$

$z = \frac{676 - 458}{2799 - 458} = \frac{218}{2341} = \boxed{0.09}$

$w = \frac{676 - 458}{3900 - 458} = \frac{218}{3442} = 0.063$

$$\Delta T = \frac{(\dot{m}_7)(1 - w - y - z)h_{11} + (y + w)h_{14} - (1 - y - z - w)h_{14}}{(C_p)(\dot{m}_c)}$$

$$\Delta T \quad \frac{(100)(1 - 0.063 - 0.083 - 0.09)(2478) + (0.083 + 0.063)(458) - (1 - 0.083 - 0.09 - 0.063)(251)}{(4.18)(4200)}$$

$\boxed{\Delta T = 10.77\,^\circ C}$

$\dot{Q}_R = (\dot{m}_c)(C_p)(\Delta T) \Rightarrow (4200)(4.18)(10.77) = \boxed{189078.12\ kW}$

$\dot{Q}_{in} = (h_7 - h_6) \Rightarrow (3900 - 898) = \boxed{3002\ kW}$

$W_T = (h_7 - h_{11}) + (1 - y)(h_8 - h_9 + h_{10}) = 4319.72$

$W_p = 4.9404$ * from previous page in states.

$W_{net} = 4.9404 + 4319.72 = 4324.66$

$\eta_{th} = \frac{W_{net}}{\dot{Q}_{in}} = \frac{4324.66}{3002} = 144\,\%$

Summary

- The fraction of mass y is 0.083
- The fraction of mass z is 0.09
- The temperature difference in the condenser is 10.77°C
- The rate of heat rejected is 189078.12 kW
- The net power is 4324.66 kJ/s
- The thermal efficiency is 144%