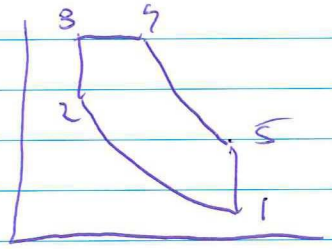
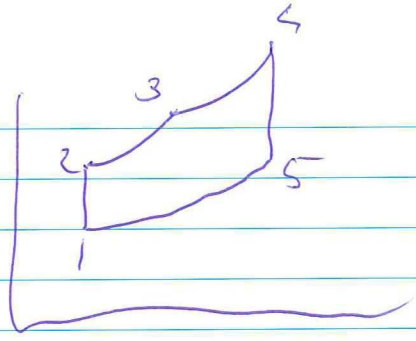
2 a





$\kappa = \frac{c_p}{c_v} = 1.4$

b $\frac{v_{r2}}{v_{r1}} = \frac{V_2}{V_1}$ $\quad v_{r1} = 738$ $\quad v_{r2} = 738/9 = 82$

$T_2 = 660\ K$

$pV^\kappa = c$ $\quad p = \frac{RT}{V}$

$TV^{\kappa-1} = c \Rightarrow T_2 = T_1 \left(\frac{V_1}{V_2}\right)^{\kappa-1}$ $\quad (1.4-1)$ $= 290 \cdot (9)$ $= 674\ K$

c $T_3 = 1.8\, T_2 = 1213\ K$; $\frac{T_4}{V_4} = \frac{T_3}{V_3} \Rightarrow T_4 = 1820\ K$

$T_5 = T_4 \left(\frac{V_4}{V_5}\right)^{0.4} = T_4 \left(\frac{V_4}{V_3}\frac{V_3}{V_5}\right)^{0.4} = T_4 \left(\frac{V_4}{V_3}\frac{V_2}{V_1}\right)^{0.4}$

$T_5 = 880\ K$

d $Q_{12}/m = 0$ ~~$Q_{23}/m = c_p(T_3 - T_2) = 394\ kJ/kg$~~

~~$Q_{34}/m = c_v(T_4 - T_3) = 433\ kJ/kg$~~

~~$Q_{45}/m = 0$~~

~~$Q_{51}/m =$~~ $Q_{23}/m = c_v(T_3 - T_2) = 385\ kJ/kg$

$Q_{34}/m = c_p(T_4 - T_3) = 607\ kJ/kg$

$Q_{45}/m = 0$ $\quad Q_{51}/m = c_v(T_5 - T_1) = 435\ kJ/kg$

e $\frac{W}{m} = Q_{in} - Q_{uit} = 385 + 607 - 435 = 557\ kJ/kg$

$\eta = \frac{557}{385 + 607} = 56\%$

f 3000 rpm = 50 omw/s $\quad$ Vermogen $= \dot{m}\, W \frac{50}{2}$

$\dot{m} = \frac{80}{557 \cdot 25} = 0{,}006\ kg/s\ (0{,}0055)$

$V_1 = \frac{mRT}{P} = 4.46$ liter

als je de '2' van verlaat vergeet kost dat geen punt