

TM:

$$kJ := 10^3 J$$

$$MJ := 10^6 J$$

$$GJ := 10^9 J$$

$$cSt := 10^{-6} \frac{m^2}{s}$$

Diverse:

$$kr := \alpha$$

EL:

$$kVar := kW$$

$$kVA := kV \cdot A$$

$$MV := 10^6 \cdot V$$

$$MVA := MV \cdot A$$

$$m\Omega := 10^{-3} \Omega$$

Rsjdyh#5#xq#5345

$$P_k := 17.5 \text{ bar}$$

$$P_f := 1.25 \text{ bar}$$

$$P_m := \sqrt{P_k \cdot P_f} = 4.677 \text{ bar}$$

Ghg#7lnhdjh#hqwds lwjqlj #yhg#DWnrp suhvrw

$$h_7 := 1420 \frac{kJ}{kg}$$

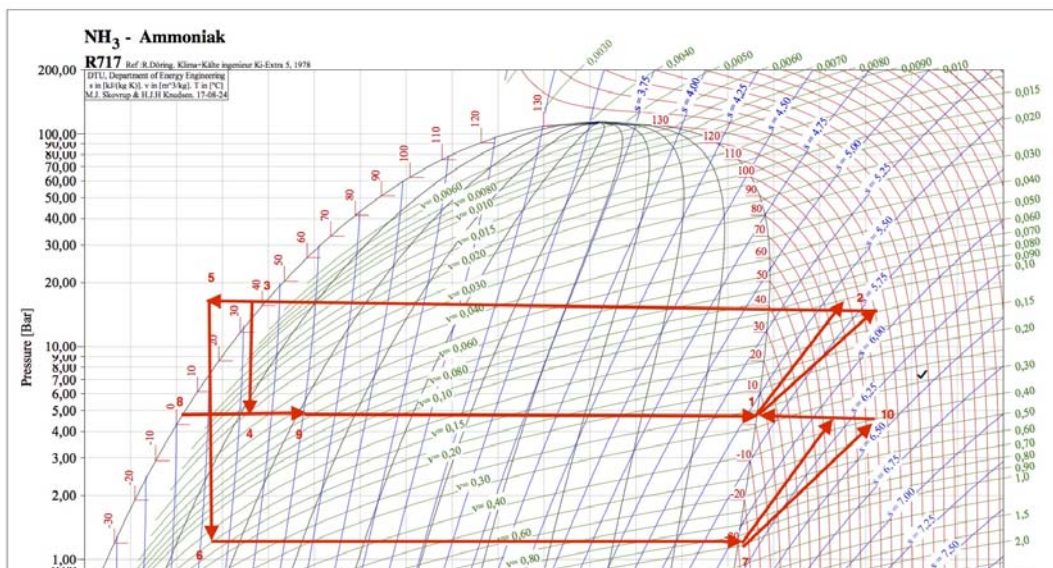
$$h_{10.is} := 1600 \frac{kJ}{kg}$$

$$h_{\Delta is.lt} := h_{10.is} - h_7 = (1.8 \cdot 10^5) \frac{m^2}{s^2}$$

$$n_{is} := 0.74$$

$$h_{\Delta.lt} := \frac{h_{\Delta is.lt}}{n_{is}} = (2.432 \cdot 10^5) \frac{m^2}{s^2}$$

$$h_{10} := h_{\Delta.lt} + h_7 = (1.663 \cdot 10^3) \frac{kJ}{kg}$$



Mdqdud#5345#csjdyh#1#
 onnhw#p hõp nõdu#j #irugdp sqljvnrqghqvdrul

Rsjdyh#5#mdqdud#5345

Wu|nnhw#p hõp nõduhq#lqghv-

$$P_k := 12 \text{ bar} \quad P_f := 0.7 \text{ bar}$$

$$P_m := \sqrt{P_k \cdot P_f} = 2.898 \text{ bar}$$

Ghq#ylndj#h#hqwds #w#j qlj #iru#DWOnrp #c# #KWOnrp #lqghv#kg#ud#ghq#lvhqwurs lnh

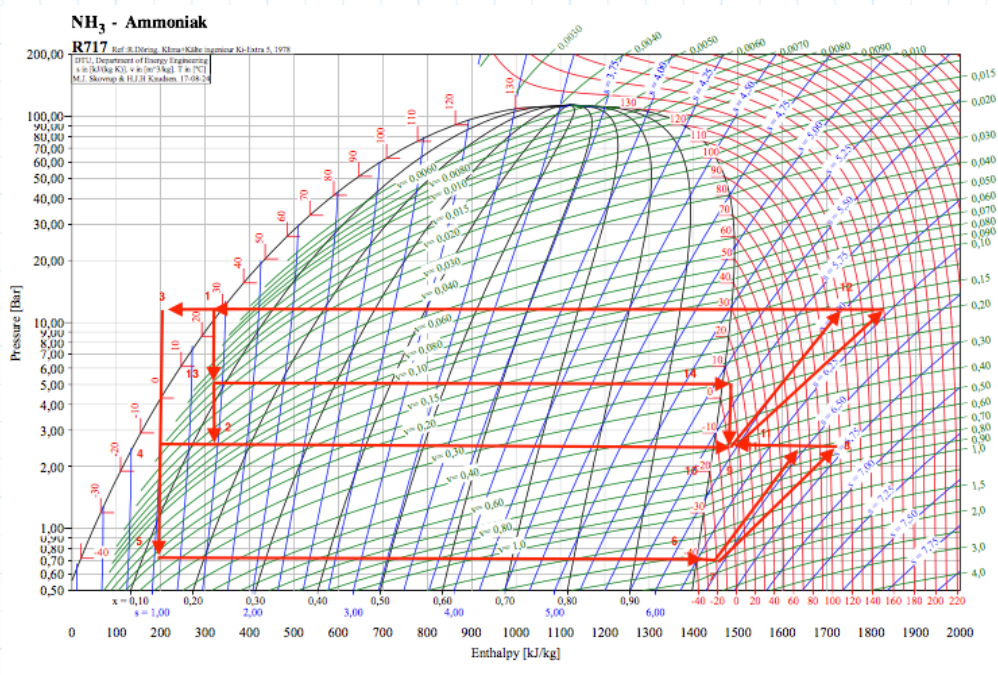
$$h_{11} := 1450 \frac{\text{kJ}}{\text{kg}} \quad h_{12.is} := 1700 \frac{\text{kJ}}{\text{kg}}$$

$$\eta_{is} := 0.7$$

$$h_{12} := \frac{h_{12.is} - h_{11}}{\eta_{is}} + h_{11} = (1.807 \cdot 10^3) \frac{\text{kJ}}{\text{kg}}$$

$$h_7 := 1450 \frac{\text{kJ}}{\text{kg}} \quad h_{8.is} := 1600 \frac{\text{kJ}}{\text{kg}}$$

$$h_8 := \frac{h_{8.is} - h_7}{\eta_{is}} + h_7 = (1.664 \cdot 10^3) \frac{\text{kJ}}{\text{kg}}$$



$$m_{sv} := m_{ht} - m_{frys} - m_{køl} = 0.245 \frac{\text{kg}}{\text{s}}$$

4.5 Û p ½ qj ghq#hõdp lggh#j hqghp #kõw|nvrp suhwruhq#lqj lyhw##h j 2k

$$m_{ht} := \frac{P_{køl} + P_{frys} - P_{lt}}{h_{12} - h_1} = 0.413 \frac{\text{kg}}{\text{s}}$$

4.6 Û ghq#dp dgh#dõw#hnhw#h#hrp suhwruhgh

$$p_{11} := 2.6 \text{ bar} \quad p_{12} := 12 \text{ bar}$$

$$\pi p := \frac{p_{12}}{p_{11}} = 4.615 \quad \eta_{vol} := 0.65$$

$$P_{tilført} := \frac{P_{lt} + P_{ht}}{\eta_{vol} \cdot \eta_{is}} = 162.485 \text{ kW}$$

4.7 Û dqç j j hw#hnhwidnrw#FR S,

$$COP = \frac{Ud}{tilført} \quad COP := \frac{P_{køl} + P_{frys}}{P_{tilført}} = 1.231$$

4.8 Û nuxp wsdnvhdqv#hrp guhm lqj vkdwlj khg##kõw|nvrp suhwruhq

$$c := 8 \quad s := 100 \text{ mm} \quad d := 100 \text{ mm} \quad n_{rpm} := 1 \text{ rpm}$$

$$V_{kom} := \left(c \cdot \left(\frac{d}{2} \right)^2 \cdot \pi \cdot s \right) = 0.006 \text{ m}^3$$

$$m_{køl} = 0.07 \frac{\text{kg}}{\text{s}}$$

$$\rho := 0.5 \frac{\text{m}^3}{\text{kg}}$$

$$V_{køl} := m_{køl} \cdot \rho = 0.035 \frac{\text{m}^3}{\text{s}}$$

$$\eta_{vol} := 0.7$$

$$n := \frac{V_{kol}}{V_{kom} \cdot \eta_{vol}} = 474.499 \text{ min}^{-1}$$

Iggwhj q=

4 19 #J nuhgvsur fhvwhq#iru#nõdndqç j j hw#s -#e løj #7 #p hg#w|ghdj
 dqj lyhovh#li#g#s -#e løj #4 #ylwh#s rvlw#r qvqxp uh

Nxghehkry#iru#nõdnc kky#iul#v#uxp #vdp p hqv½ whv#li#irunhøj h
 e løj 1

Ehvnuly=

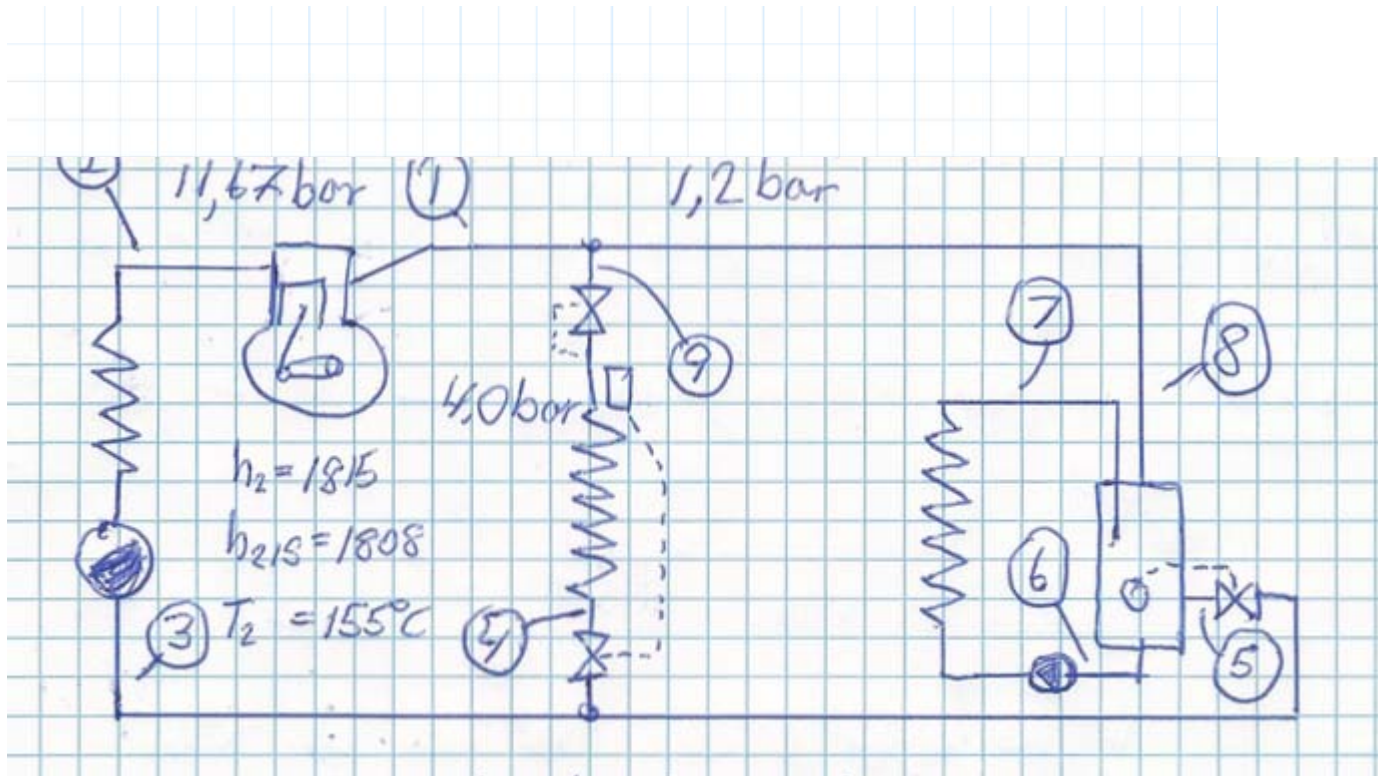
4 1: #J rj #irunøj #p hg#egne ord kyrugdq#gh#irunhøj h#e løj #dq#r sghdv#vdp w#kydg#
 gh#qgj -u#gh#hvshwlyh#e løj

Ghw#wõuwh#hghuj #div½ wqlj #nhu#iul#v#uxp p hw#E hu#khu#khu#ghw#p hwh#li#
 nrp suhvvrurughv#hghuj #div½ whv#nõdnu#p p hw#irueukjh#grj #rjv-#h#p ½ qjgh#
 hghuj l#iul#v#uxp p hw#u#s -e | j j hw#r#p #h#q#v#v#n#wud#uhgv#

I{#dq#r p guhmqlj wdohw#s -#Kw#r#p suhvvrughq#k½ yhv#-dghv#p h#h#hghuj #dq#
 div½ whv#hrqghqvdwruhq#p hq#Dw#r#p suhvvrughq#e løj hu#rjv-#w#ghwh#d#ehgh#k#d#
 gh#wul#n#ghq#hghu#ryhu#p h#p nõdnuh

Vxj j dv#ydp hyhnvdnhq#j õu#ghw#p xdj#w#w#ryhukhgh#nõdnp løjw#ghu#r#p p hu#kg#li#
 iul#v#irugdp shuhq#vdp w#l#j #p hg#ghq#nõdnu#nõdnp løjw#qg#irugdp shuhq#ghudj hu#
 Ghw#dq#xq#dgh#v#j #j õuhgd#ghu#nu#h#q#y#df#fxp #hyhnvdnhq#s -#r#p suhvvr#v#ghq1

Test opgave 2 TM
Opgave 1



R sjdyh#4 16

$$h_4 := 300 \frac{\text{kJ}}{\text{kg}} \quad h_6 := 1390 \frac{\text{kJ}}{\text{kg}}$$

$$P_{\text{frost}} := 200 \text{ kW}$$

$$m_{\text{frost}} := \frac{P_{\text{frost}}}{h_6 - h_4} = 0.183 \frac{\text{kg}}{\text{s}}$$

R sjdyh#4 17

$$h_3 := 300 \frac{\text{kJ}}{\text{kg}} \quad h_5 := 1420 \frac{\text{kJ}}{\text{kg}}$$

$$P_{\text{køl}} := 300 \text{ kW}$$

$$m_{\text{køl}} := \frac{P_{\text{køl}}}{h_5 - h_3} = 0.268 \frac{\text{kg}}{\text{s}}$$

$$h_6 := \frac{h_5 \cdot m_{\text{køl}} + h_6 \cdot m_{\text{frost}}}{m_{\text{køl}} + m_{\text{frost}}} = (1.408 \cdot 10^3) \frac{\text{kJ}}{\text{kg}}$$

$$h_1 := 1800 \frac{\text{kJ}}{\text{kg}}$$

$$P_{komp} := (m_{køl} + m_{frost}) \cdot (h_1 - h_6) = 177.015 \text{ kW}$$

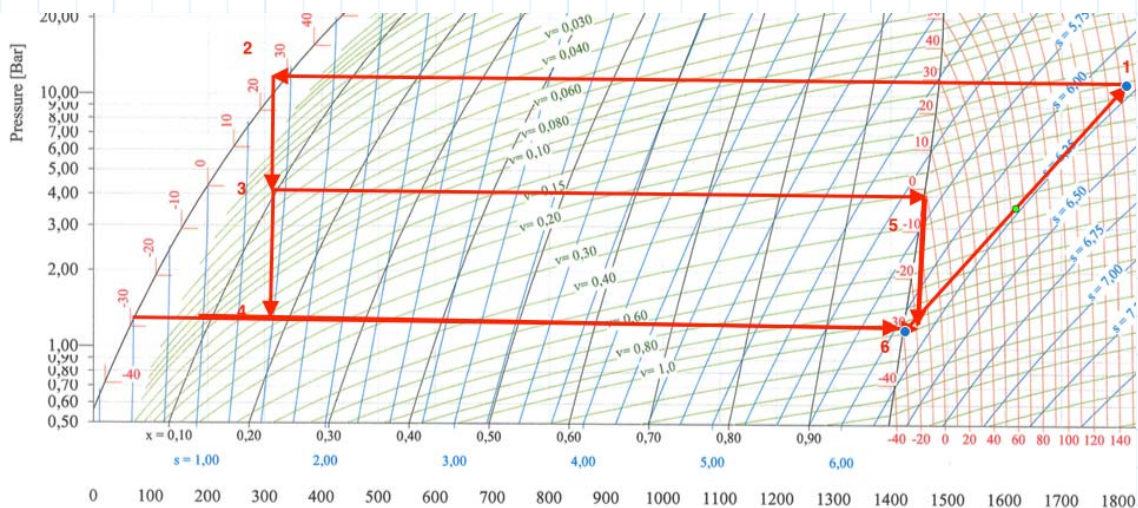
R sjdyh#18

$$h_{1is} := 1790 \frac{\text{kJ}}{\text{kg}}$$

$$\eta_{is} := \frac{h_{1is} - h_6}{h_1 - h_6} = 0.975$$

R sjdyh#19

$$COP = \frac{\text{afleveret}}{\text{tilført}} \quad COP := \frac{P_{køl} + P_{frost}}{P_{komp}} = 2.825$$



JUNi 2009 eksamen

R sjdyh#

1.1 Euhjq# dvhwõp p hq#i#õdp lgghj hqghp #

vyõp p huyhqwõhqs-

p hõp nõõuhq1

$$P_k := 12 \text{ bar} \quad P_f := 0.95 \text{ bar} \quad \eta_{is} := 0.7 \quad h_1 := 1400 \frac{\text{kJ}}{\text{kg}} \quad h_{2is} := 1575 \frac{\text{kJ}}{\text{kg}}$$

$$P_m := \sqrt{P_k \cdot P_f} = 3.376 \text{ bar}$$

$$h_2 := \frac{h_{2is} - h_1}{\eta_{is}} + h_1 = (1.65 \cdot 10^3) \frac{\text{kJ}}{\text{kg}}$$

$$h_3 := 1420 \frac{\text{kJ}}{\text{kg}} \quad h_{4is} := 1600 \frac{\text{kJ}}{\text{kg}}$$

$$h_4 := \frac{h_{4is} - h_3}{\eta_{is}} + h_3 = (1.6771 \cdot 10^3) \frac{\text{kJ}}{\text{kg}}$$

η_{is} kg

$$m_{sv} = m_{ht} - m_{fordamper}$$

$$P_{ht} = P_{fordamper} - P_{lt} - P_{kondensator}$$

$$P_{fordamper} := 165 \text{ kW} \quad h_8 := 200 \frac{\text{kJ}}{\text{kg}} \quad h_1 = (1.4 \cdot 10^3) \frac{\text{kJ}}{\text{kg}}$$

$$m_{fordamper} := \frac{P_{fordamper}}{h_1 - h_8} = 0.1375 \frac{\text{kg}}{\text{s}}$$

$$h_4 = (1.677 \cdot 10^3) \frac{\text{kJ}}{\text{kg}} \quad h_3 = (1.42 \cdot 10^3) \frac{\text{kJ}}{\text{kg}}$$

$$P_{lt} := m_{fordamper} \cdot (h_2 - h_1) = 34.375 \text{ kW}$$

$$h_4 = (1.677 \cdot 10^3) \frac{\text{kJ}}{\text{kg}} \quad h_5 := 320 \frac{\text{kJ}}{\text{kg}}$$

$$h_3 = (1.42 \cdot 10^6) \frac{\text{m}^2}{\text{s}^2}$$

$$m_{ht} := \frac{P_{fordamper} + P_{lt}}{h_3 - h_5} = 0.181 \frac{\text{kg}}{\text{s}}$$

$$m_{sv} := m_{ht} - m_{fordamper} = 0.044 \frac{\text{kg}}{\text{s}}$$

1.2 Ehhjg#hrp sühvrudéhghw#iruk#Ömw|nvnrp sühvrudhql

$$P_{ht} := m_{ht} \cdot (h_4 - h_3) = 46.607 \text{ kW}$$