PACAUT Nastasia Group 61

IE of Thermo

(c) 5) It is possible to have water vapor at a temperature lower than 100°C at the atmospheric pressure because the saturating vapor pressure allows a certain amount of water to be in a gaseous state, ~~since the state~~ it even if this amount will be less than at 100°C.

(a) 7) We assume that there is no leeks and no variation of the volume of the tyre. We can use the law: $PV = nRT$

$$\Rightarrow P = \frac{nRT}{V}$$

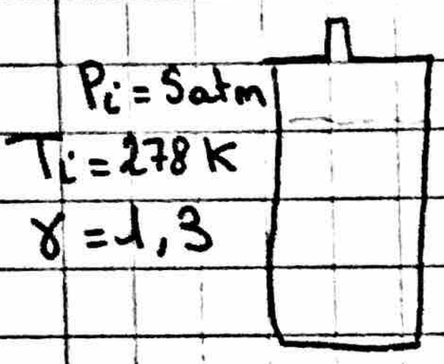
Hence when T is higher, P is higher too. This means that in summer the pressure ~~of the tire~~ of the tyre is higher, since the temperatures are higher. But the relative pressure is the difference between the pressure of the tyre and the atmospheric pressure ~~and since~~, hence if the ~~The~~ temperature of the ~~outside of~~ atmosphere is higher, the temperature of the tyre will also be higher since it is not an isolated system. P_1 = relative pressure at -x°C $= P_{tyre} - P_{atm}$

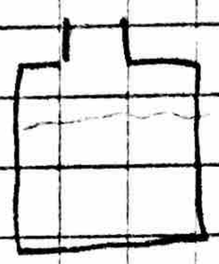
$= \frac{n_1RT_1}{V} - \frac{n_2RT_2}{V}$

V is constant

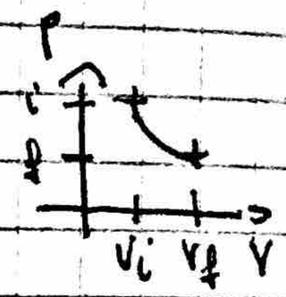
This means that the relative pressure may be a bit higher in summer, but that the variations wont be very big.

(b) a) initial state (i) final state (f)





The process is reversible and adiabatic, hence $Q = 0$.



And since $Q = 0$ we can deduce that $\Delta U = W$, hence $\delta W = dU$ and:

$$P_i V_i^{\gamma} = P_f V_f^{\gamma}$$ why.

hence we have: $V_f = \left(\frac{P_i}{P_f}\right)^{1/\gamma} \times V_i$

$$\Rightarrow \frac{nRT_f}{P_f} = \left(\frac{P_i}{P_f}\right)^{1/\gamma} \times \frac{nRT_i}{P_i}$$

$$\Rightarrow T_f = \left(\frac{P_i}{P_f}\right)^{1/\gamma} \times \frac{P_f}{P_i} \times T_i \quad \text{ok}$$

$$= \left(\frac{5}{1}\right)^{1/1,3} \times \frac{1}{5} \times 278$$

$$= 94,7 K \quad \text{ok}$$

Clearly the result is not coherent since the temperature ~~outside the~~ bottle of the gas after opening isn't lower than its temperature inside the bottle (it is obvious). Hence there is a problem somewhere in the reasoning. No

⊙ think about an aerosol can.