(i)

(a) $T = 150°C$, $v = 0.35\ m^3/kg$. FIND p in bar.

SLVM because $v < v_{sat}$ (of vapor)

$p = 4.76$ bar

(b) $p = 25\ MPa = 250$ bar, $T = 100°C$. FIND v, in m^3/kg

According to the saturation table @ $T = 100°C$ $p_{sat} = 1.01$ bar and because $p > p_{sat}$ so it is CL instead thus

$v = 1.03 \times 10^{-3}\ m^3/kg$

(c) $p = 20\ MPa$, $T = 485°C$. FIND v, in m^3/kg

According to saturation table we have $p_1 = 186.66$ bar and $p_2 = 215.5$ bar, which are 360°C and 373.1°C respectively. Since these two temp.s are both smaller than 485°C, we take a look at ($T_{sat} < T$) SHV thus, we have

$T_1 = 440°C$ & $T_2 = 500°C$

$v_1 = 0.16109\ m^3/kg$ & $v_2 = 0.17568\ m^3/kg$

we interpolate

$$v = [(485 - 440)°C]\frac{(0.17568 - 0.16109)\ m^3/kg}{(500 - 440)°C} + 0.16109\ \frac{m^3}{kg}$$

$v \cong 0.172033$

$v = 0.172\ m^3/kg$

(d) $T = 80°C$, $x = 0.75$. FIND p, in bar & v in m^3/kg

According to saturation table @ $T = 80°C$

because $H_2O(l)$ & $H_2O(g)$ coexist - SLVM

$p = 0.474$ bar

and $v_f = 1.0291 \times 10^{-3}\ m^3/kg$, $v_g = 3.4052\ m^3/kg$

thus

$$v = (1-x)v_f + xv_g = 0.25 \times 1.0291 \times 10^{-3}\ \frac{m^3}{kg} + 0.75 \times 3.4052\ \frac{m^3}{kg}$$

$\cong 2.55416$

$v = 2.55\ m^3/kg$