Problem: 8-18

Find: Enthalpy of water at various conditons.

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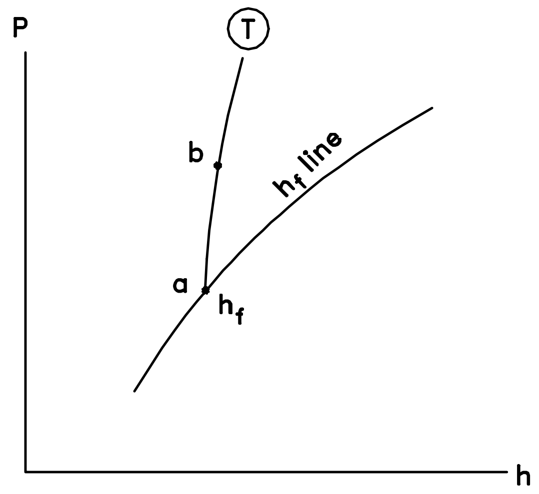
a) saturated liquid @ 150 °C

$$\boxed{h_f = 632.2\ kJ/kg} \quad \text{(from B.1a)}$$

b) subcooled liquid @ 150 °C and 1.7 MPa



v_f is constant - incompressible and along an isotherm

$$\begin{aligned} h &= h_f + v_f \int_a^b dP \\ &= 632.2 + 0.001090\ \frac{m^3}{kg}\ \ (1700 - 475.8)\ \frac{kN}{m^2} \\ &= \boxed{633.5\ kJ/kg} \end{aligned}$$

c) subcooled liquid @ 150 °C and 24 MPa

$$h = h_f + v_f(P_c - P_a)$$

$$
\begin{aligned}
&= \quad 632.2 + 0.001090 \ \frac{m^3}{kg} \quad (24000 - 475.8) \ \frac{kN}{m^2} \\
&= \quad \boxed{657.84 \ kJ/kg}
\end{aligned}
$$