

## {Question 2.A-3}

 $V = 8000 \cdot \text{convert}(\text{cm}^3, \text{m}^3)$ 
 $x_1 = 0.05$ 
 $T_1 = 140[\text{C}]$ 

## {Part A}

 $SV = \text{volume}(\text{Steam}, T=T_1, x=x_1)$  {Specific Volume:  $SV = 0.02645 \text{ m}^3/\text{kg}$ }

 $P_1 = \text{pressure}(\text{Steam}, T=T_1, v=SV)$  {Pressure:  $P_1 = 361.5 \text{ kPa}$ }

 $\text{TEST} = \text{quality}(\text{Steam}, T=T_1, v=SV)$ 

## {Part B}

 $m_{\text{total}} = V/SV$  {Total Mass:  $m_{\text{total}} = 0.3024 \text{ kg}$ }

 $m_{\text{water}} = m_{\text{total}} \cdot (1 - x_1)$  {Water Mass:  $m_{\text{water}} = 0.2873 \text{ kg}$ }

 $m_{\text{vapor}} = m_{\text{total}} \cdot x_1$  {Vapor Mass:  $m_{\text{vapor}} = 0.01512 \text{ kg}$ }

## {Part C}

 $V_{\text{water}} = SV \cdot m_{\text{water}}$  {Water Volume:  $V_{\text{water}} = 0.0076 \text{ m}^3$ }

 $V_{\text{vapor}} = SV \cdot m_{\text{vapor}}$  {Vapor Volume:  $V_{\text{vapor}} = 0.0004 \text{ m}^3$ }

 $T_2 = 200[\text{C}]$ 

## {Part D}

 $P_2 = \text{pressure}(\text{Steam}, T=T_2, v=SV)$  {Pressure:  $P_2 = 1,555 \text{ kPa}$ }

 $x_2 = \text{quality}(\text{Steam}, T=T_2, v=SV)$  {Quality:  $x_2 = 20.07 \%$ }

## {Part E}

 $m_{\text{water}_2} = V/SV \cdot (1 - x_2)$  {Water Mass:  $m_{\text{water}_2} = 0.2418 \text{ kg}$ }

## SOLUTION

## Unit Settings: SI C kPa kJ mass deg

 $m_{\text{total}} = 0.3024$  [kg]

 $m_{\text{water}_2} = 0.2418$  [kg]

 $SV = 0.02645$  [m<sup>3</sup>/kg]

 $T_2 = 200$  [C]

 $V_{\text{water}} = 0.0076$  [m<sup>3</sup>]

 $m_{\text{vapor}} = 0.01512$  [kg]

 $P_1 = 361.5$  [kPa]

 $\text{TEST} = 0.05$ 
 $V = 0.008$  [m<sup>3</sup>]

 $x_1 = 0.05$ 
 $m_{\text{water}} = 0.2873$  [kg]

 $P_2 = 1555$  [kPa]

 $T_1 = 140$  [C]

 $V_{\text{vapor}} = 0.0004$  [m<sup>3</sup>]

 $x_2 = 0.2007$ 

No unit problems were detected.