

ChE 306: HEAT TRANSFER
FALL 2010 - QUIZ #6: 10 points
WEDNESDAY, NOVEMBER 3

NAME: SOLN

1. (2 pts)

- A For correlations to estimate the heat transfer rate for film boiling of water, the latent heat of vaporization is modified by $h_{fg}' = h_{fg} + 0.8 c_p (T_s - T_{sat})$. Why?
- A. to account for a superheated vapor film layer
 - B. the water becomes pressurized requiring more energy to boil
 - C. to account for a subcooled liquid water layer
 - D. to correct for a scored surface vs. a smooth one.

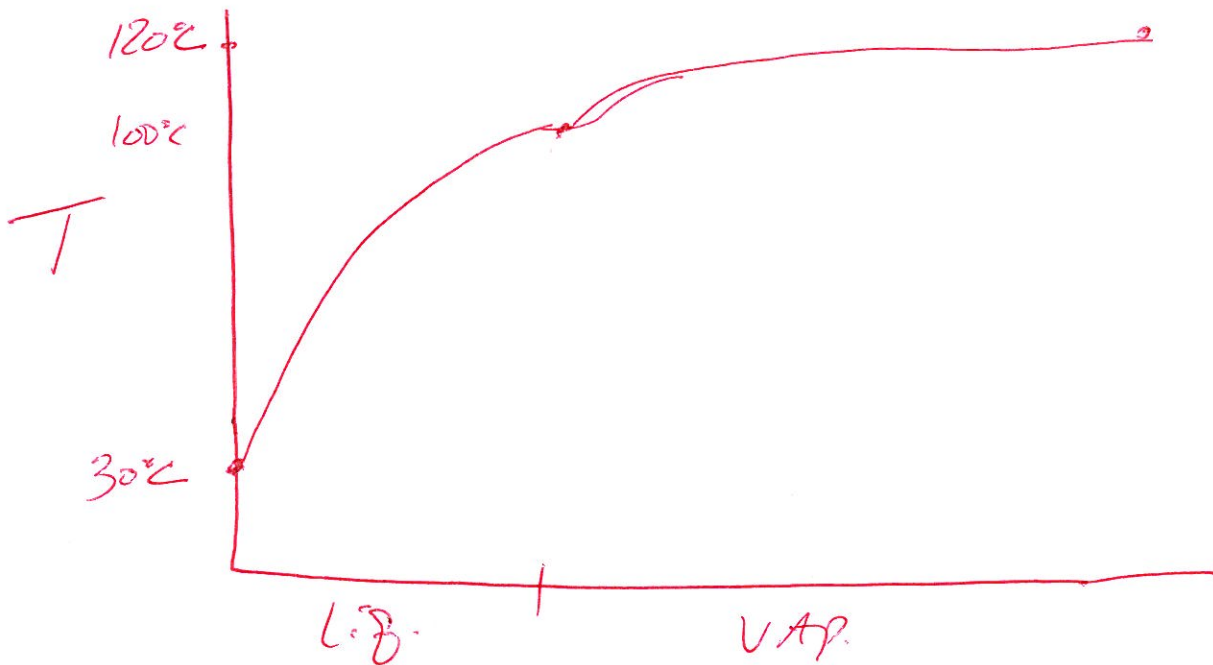
2. (2pts) TRUE/FALSE

- F For pool boiling, heat transfer is optimized at the Leidenfrost point, when a stable vapor film forms directly above the heated surface.

3. (2 pts)

- D Given a stainless steel vertical wall maintained at $T_s = 30^\circ\text{C}$ positioned at $x = 0$ and exposed to water vapor at 120°C and 1 atm. What type of phase change process will likely occur?
- A. Nucleate Boiling
 - B. Film Boiling
 - C. Dropwise Condensation
 - D. Film Condensation
 - E. Direct Contact Condensation

4. (4 pts) For the situation in #3, draw a qualitative curve representing $T(x)$ from $x = 0$ to $x = \infty$. Label the graph to show where water will be in the LIQUID and VAPOR phases.



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Name: Sean

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C For correlations to estimate the heat transfer rate for film boiling of water, the latent heat of vaporization is modified by $h_{fg}' = h_{fg} + 0.8 c_p (T_s - T_{sat})$. Why?

- A. the water becomes pressurized requiring more energy to boil
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- C. to account for a superheated vapor film layer
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3. (2 pts)

C Given a stainless steel vertical wall maintained at $T_s = 30^\circ\text{C}$ positioned at $x = 0$ and exposed to water vapor at 120°C and 1 atm. What type of phase change process will likely occur?

- A. Film Boiling
- B. Nucleate Boiling
- C. Film Condensation
- D. Dropwise Condensation
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