ASSIGNMENT #12

Boiling & Condensation Problems

12-1 Water at atmospheric pressure is boiling in a pot with a flat-copper bottom on an electric range that maintains the surface temperature at 115°C. Calculate the boiling heat transfer coefficient.

12-2 Calculate the maximum heat flux attainable in nucleate boiling with saturated water at 2 atm pressure in a gravitational field equivalent to one-tenth that of the earth.

12-3 A thin-walled, horizontal copper tube of 0.5-cm OD is placed in a pool of water at atmospheric pressure and 100°C. Inside the tube an organic vapor is condensing, and the outside surface temperature of the tube is uniform at 232°C. Calculate the average heat transfer coefficient on the outside of the tube.

12-4 A horizontal, 2.5-cm-OD tube is maintained at a temperature of 27°C on its outer surface. Calculate the average heat transfer coefficient if saturated steam at 12 kPa is condensing on this tube.

12-5 Saturated steam at 34 kPa condenses on a 1-m-tall vertical plate whose surface temperature is uniform at 60°C. Compare the average heat transfer coefficient and the value of the coefficient 1/3m, 2/3m, and 1 m from the top. Also, find the maximum height for which the condensate film will remain laminar.