CHG 2314
HEAT TRANSFER

Professor: **B. Kruczek** **2005/04/05**

Assignment No. 10

1. The outer surface of a spherical container of O.D. = 60 cm is maintained at 85^{o}C while exposed to quiescent air at 25^{o}C. Neglecting radiation effects, what is the rate of heat transfer from the container? To minimize burn hazard it is proposed to install a thin-walled spherical surface over the container to create an intervening cavity, to be filled with air at atmospheric pressure. Neglecting radiation effects, what should be the minimum diameter of the outer sphere to ensure that its temperature does not exceed 45^{o}C? What is the reduction in the rate of heat transfer from the container resulting from installation of the outer spherical surface?

2. Fluid A, available at 10^{o}C is to be heated in a one-shell-pass four-tube-pass exchanger, heat using fluid B available at 180^{o}C. When the mass flow rates of fluids A and B are m_A and m_B, the respective outlet temperatures are, $T_{A,out}$ = 100^{o}C and $T_{B,out}$ = 125^{o}C. To increase $T_{A,out}$ it is proposed to double the mass flow rate of fluid B ($2m_B$) while keeping the mass flow rate of fluid A unchanged. If as a result of doubling the mass flow rate of fluid B the overall heat transfer coefficient (U) in the exchanger increases by 20%, what is the new outlet temperature of fluid A.

3. Problem 11.60 a). Do not do part b).

Due Date: **April 12, 2005 at 4:00 p.m. in the assignment box.**