CHG 2314
HEAT TRANSFER

<u>**Professor:**</u>   **B. Kruczek**   **2005/03/29**

Assignment No. 9

1. Problem 8.41

2. Air at 5°C enters at the rate of 0.04 kg/s a 0.2-m square air conditioning duct. The duct is horizontal, uninsulated and exposed to quiescent air at 35°C. If the total length of the duct is 8 m, determine the outlet temperature of the air.

    In these preliminary calculations (i) evaluate the properties of air for the determination of the inside coefficient at the inlet temperature of 5°C, (ii) neglect entrance effects, (iii) assume that the average surface temperature of the duct is 10°C, (iv) neglect the radiation effects. Comment on the effect of these assumptions on the calculated outlet temperature of air.

3. An 80 liter covered tank full of water at 300 K is to be heated to 360 K by steam at 1.1 atm pressure condensing inside a 1 cm-O.D. copper tube coil having 12 turns of 0.4 m diameter. If the steam-side thermal resistance is negligible and the tank is well insulated, estimate the required time for heating, and the total amount of steam condensed.

    1 cm–diameter
    copper tube
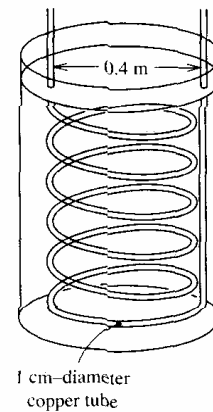
<u>**Due Date:**</u>   **April 5, 2005 at 4:00 p.m. in the assignment box.**