

ChE 306: HEAT TRANSFER

FALL 2010 QUIZ #7: 10 points

WEDNESDAY, NOVEMBER 10 *NAME:*

1. (5 pts) For a shell and tube heat exchanger, there are five (5) resistance terms that make up "UA". List those terms in words (i.e., not variables).

convective resistance of the tubeside fluid, tubeside fouling factor, conduction resistance of tubes, shellside fouling factor, convective resistance of the shellside fluid.

2. (3 pts) TRUE / FALSE

TRUE In a double pipe heat exchanger, ΔT_{lm} for counter-flow is always greater than or equal to ΔT_{lm} for co-current flow.

TRUE $U_o A_o = U_i A_i$

FALSE In a retrofit heat exchanger problem, the inlet temperatures and desired outlet temperatures are known, and specifications of length, tube diameter and material of construction must be found.

3. (2 pts) For a shell and tube heat exchanger, the LMTD method uses $q = U_o N_T N_p \pi D_o L F \Delta T_{lm,CF}$

a. Define N_T number of tubes per pass

b. What is the physical significance of the term "F"?

accounts for imperfect counter flow in a shell & tube heat exchanger (F < 1)

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