Heat Transfer Questions & Answers

Question by Student 201900067

Hello professor,I have a question about Assignment #8 question #4. In this question, it is said that pipe walls oppose negligible resistance to heat flow. However we must still consider the contact resistance between the pipe and the ground, if I'm not mistaken. The problem is that there is no indication about the material that makes up the pipe, so we shouldn't be able to use the tables to determine the contact resistance. In that case, can we neglect this resistance?

If you can't find the resistance, then list in your assumptions you assume no resistance.

Question by Student 201427129

Prefessor, I have a question on assignment 8 for problem 4. To have shape factor of Isothermal cylinder of radius r buried in semi-infinite medium having isothermal surface, there are three shape factor. Each of them have restrictions. However, given values are D = 2m, r= 0.15m and they satisfy the restriction in each case. Also, they have the same value, 191 m. which shape function should be chosen?

Any one is fine as long as the conditions are satisfied.

Question by Student 201312147

Professor, i have a question in table. In "Summary of convection correlations for internal flow in a circular tube of length L and diameter D", What is the difference between "Fully-developed turbulent flow (smooth and rough tubes)" and "Fully-developed turbulent flow (rough tubes)"? One is "smooth and rough tubes" and the other is "rough tubes", but I don't know the difference.

Well, as is written, one can be applied to either smooth and rough tubes, while the other can only be applied to rough tubes. Explain better what you don't understand.

Question by Student 201542124

Professor, I have a question on assignment 8 for question 1. We don't know T_{b2} *and only know* T_{b1} *. Should I assume average* $T = 343K$ *because the wall temperature is* $344K$*, pipe is long compared to radius and it is fully developed*

flow?

No, you have to follow the instructions associated with the correlation. If it's specified the properties need to be determined at the average bulk temperature, then you need to do so.

Question by Student 201312147

For example assignment#8 Q1, pipe is rough pipe. because pipes have eddis. So, I think this problem "Fully-developed turbulent flow (rough tubes)" should be applied to this problem. But in solving this problem, I found that Reynolds number is "0.5 < Pr < 2000, 3000 <Re < 5E6". This condition enables "Fully-developed turbulent flow (smooth and rough tubes)" to be applied to the problem. So I don't know which of the two should apply to this problem.

Whether there are eddies or not has nothing to do with surface roughness. You can have lots of eddies (turbulence) in a tube with perfectly smooth walls.

Question by Student 201312147

So assignment#8 Q1, pipe is having a relative roughness. Then, can I apply either of the equation in the table?

As long as all the conditions specified are met, you can use any correlation you wish.