Heat Transfer Questions & Answers

Hmm, there is no “geometrical meaning” I can think of.. As for the normal fins, the circumferential fins were derived from the heat equation. Thus, the equations listed in the tables were simply derived making the standard fin assumptions. The question is not so clear, so I’ll give you just 1 point bonus boost for it.

Question by Student 201027112

Hello professeur, I have a question about problem #2 of assignment #3. To solve this problem, I used resistance analogy between surface of pipe and ground surface. Therefore, I had to find shape factor when considering conductive resistance over ground. But I found the table, there is three shape factors about problem’s condition.

$$\frac{2\pi L}{\cosh^{-1}(D/r)}$$

$$\frac{2\pi L}{\ln(2D/r)}$$

$$\frac{2\pi L}{\ln \frac{L}{r}[1-\frac{\ln(L/2D)}{\ln(L/r)}]}$$

Of course, each shape factor has each restrictions. In these restrictions, I’m not clear that how much bigger or lower value makes the sign ” $\ll$ ” or ” $\gg$ ”. For example, $A \gg B$ means that A is 10 times bigger than B ? or 100 times? If it has some typical references or criteria? I’ll wait your answer/:)

This is a good question. When they derived these shape factors, they had to make some assumptions and those are indicated in the rightmost column. When they indicate $L \gg D$ it means that L should be infinitely greater than D for the given exact solution to be valid. I’ll give you 2 points bonus boost for your question.

Question by Student 201427130

Sir, I want to ask a question. In today class, we didn’t use assumption in water jet problem. We just solve it without any assumption. In that problem ’ $\frac{\partial pct}{\partial x} = \frac{\partial}{\partial x}(\frac{K \partial T}{\partial x})$ ’. I think it is width and we must think about radiation. But Professer didn’t use assumption. Why? I want to know.

Of course, you need to list your assumptions (as for any other problem), but I went quickly to give you a hint on how to solve the problem. I’ll give you 0.5 point bonus boost for this question.

Question by Student 201427130

Sir, I have a question for class. When we solve the Design problem which is find ε, we use $[kr^2 \frac{\partial T}{\partial r} = -Sr^3/3]$. In this equation, S is term of volume. But heat generation by electric is term of surface . I confused. Because s's term is not equal. I want to ask what is my error and how we can decided S. If S's term is not equal to function term, how can we do?

What is given is not the heat generation per surface area but the power in W. Thus, the heat generation per unit volume S is the power divided by the volume. I'll give you 0.5 point bonus boost for your question because it's not really a question but a misunderstanding of the problem statement.

Question by Student 201327557

Hello professor, I have a simple question about Heisler chart example for cylinder. You told that using the Heisler chart with interaction between infinite cylinder and the "plane wall". Thus Equation below,

$$(\frac{T-T_\infty}{T_i-T_\infty}) = (\frac{T-T_\infty}{T_i-T_\infty})_{Vol1}(\frac{T-T_\infty}{T_i-T_\infty})_{Vol2}$$

In this example, I can't understand how 2 volumes are considered. Clearly, cylinder is just "one" volume. And What the "plane wall" is designated?

You need to fix your question before I can answer it. Please typeset your mathematics better by making the parentheses as large as the terms within them are. Also, phrase your question better. I can not understand what you don't understand. Explain in more detail what you don't understand with additional information and example(s) if necessary.

Question by Student 201600011

Professor, I have a question about Heisler charts use. In order to compute the time needed to reach a temperature at the center of the body (for instance a cylinder) Do we need to use the chart "temperature distribution in a cylinder" because of at centerline x=r? In the example that we have made in class, we have computed the temperature on the surface of the cylinder using "temperature distribution in a cylinder" and "mid plane temperature as a fonction of time", what if we need to compute the centerline temperature of the cylinder? Thank you,

If you're seeking the center temperature in a cylinder, sphere or plane wall, then there's no need to use the "temperature distributions" charts. Just use the chart "centerline temperature" or "midplane temperature". I think I mentioned this in class, so I'll give only 1 point bonus boost for this question.

Question by Student 201227124

Professor, I have a porblem about finding α of concrete. To solve Assignment 4 q#1, I have to know α of concrete but in table there are two concrete property(concrete cinder and stone 1-2-4 mix). In two case, α of concrete was not certain value or not written. how can I solve this problem?