Heat Transfer Questions & Answers

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?

You should always compute α using more fundamental properties k, c, etc, and never use α directly from the tables. This is because in the tables some solids have a range of c, k, etc, and not specific values. The value you choose for k and c at one point in your solution must be the same as those that are used to calculate α, or your solution will be inconsistent. I think I mentioned this in class already, so I'll give you just 0.5 point bonus boost.

Question by Student 201227127

Hi professor, I have a question about not infinite cylinder. in this case, use heisler chart with intersection between infinte cyl. and plane wall. but I think we must find biot and fourier number about cylinder. but in my lecture note, we find fourier number about infinite cyl. and plane wall, saparetely. When I calculate fourier number about total cylinder, Fo<0.2. but Fo in infinite wall and infinite cylinder are satisfied Fo>0.2 saparately. then Can't we use heisler chart about total cylinder?

You can still use the Heisler charts if $\text{Fo} < 0.2$. But keep in mind there will be a more substantial error on the term determined. In this case, the error is on the parameter $(T_0 - T_\infty)/(T_i - T_\infty)$. Thus, if your Fourier number is much less than 0.2, and you have no choice but to use the Heisler chart to solve the problem, you need to make a statement in your solution that there may be significant error on a certain term (don't just say there is error, specify on which term the error is high). I liked your question but it was sloppily typed with no uppercases at the beginning of sentences and some wrong uppercases in the middle of sentences. I'll give you 1 point bonus boost for it.

Question by Student 201600011

I have a question about the exercise 1 in design project. The first idea that came to

me to solve this problem, is to write the temperature equation of the steal as a function of time : $T = 780 - [\frac{22t}{3600}]$ *and then substitute this equation into heat equation, substituting* T *in* $[\frac{d\rho cT}{dt}]$ *and with* $Q_{in} = 0$ *,*$Q_{out} = h(T - T_\infty)$ *and isolate* T_∞ *which is the temperature in the hooven that we are looking for. Is this method correct to solve this kind of problem? Thank you,*