Heat Transfer Questions & Answers

Question by Student 201427135

Professor, I have a question.
A5Q2, the question is "What is the rate of heat transfer from the bearing, and how much power is needed to rotate the journal?"
Does the rate of heat transfer from the bearing mean rate of heat transfer at journal ? or at bearing?
If I took at journal, it's perfectly same with answer but at bearing, it's not. But they said there is no heat transfer into journal. So I'm really wondering. Thank you.

I don't understand your question. As written in the problem statement there is no heat transfer to the journal.

Question by Student 201312147

Professor, i have a question in couette flow. Is the couette flow assumed to be a laminar flow? in class, we din't consider Reynolds numbers. If the couette flow is the turbulent flow, should other conditions be considered?

Couette flow is laminar generally because the short distance between the plates makes it difficult for turbulent eddies to form. In this course, always assume Couette flow is laminar. Other types of viscous flows can be either laminar or turbulent as we will see shortly.

Question by Student 201527143

I have question about A5Q2-b. When I calculate the heat transfer from the bearing, I took Area term as bearing's area. And I took Area term for power as journal's area. Then, these results are not same. You neglected 0.25mm? Or any problem for my calculation process?

If you unroll the bearing into xy coordinates, you have to give the same area to the bearing and the journal: otherwise this wouldn't be consistent. If you don't unroll the bearing and solve it in cylindrical coordinates, then you should use two different areas for the bearing and the journal.

Question by Student 201527130

I have a question about adiabatic wall temperature.(EG. H-T over plate with V.D)

T_infinity = 290K T_wall = 300K so first, I think heat flux(q") goes wall to infinity. but using T_aw(=360K), heat flux goes infinity to wall. (q"=h(300K-360K)) I think this phenomenon is occurred by viscous heating. Is my think right?

I'm not sure what is confusing you. As you mention, when V.D. is important,
$q'' = h(T_{\mathrm{w}} - T_{\mathrm{aw}})$.

Question by Student 201428239

Professor, I have a question about Assignment 6 Q3. In this problem, there is liquid(water) flowing over plate. In 'Summary of Equations for flow over Flat plates' Tabel, there are only two informations about liquids (Laminar, local and Laminar-TURB average). Should I only use these two informations?? or It doens't need to consider about it?? Thank you

You can use other correlations too unless they specifically say they are not applicable to liquids.

Question by Student 201527130

professor, I have a question about Tube banks (staggered). Is minimum area lcated at between 1st line to 2nd line? If that's right, I think Is my thinking right?

You're on the right track, but this is not correct still. Work on it more — the diameter of the tubes should be somewhere in your areas.. Also, use the PREVIEW command and make sure your math show up clearly: your expressions are too close to each other and hard to read. Separate them on different lines.