AE331 HEAT TRANSFER
Online Quiz, No 4
November 25, 2020
(open notes and books)

Rules for the quiz

1. Your camera and microphone should be open during the quiz (you can reduce your speaker's volume if the voice is bothering you but you should not reduce the volume of your microphone)
2. You should not communicate with anybody during the quiz.
3. You should sit in front of your computer where the assistants can clearly see you even if you finish the quiz earlier.
4. You should be alone during the quiz.
5. Please sign the following statements and upload this page with your solution papers.

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I affirm that all the work done on this quiz is my own; have obeyed the rules indicated above and I have not given or received any help during this quiz. I understand that any indication of violation of this word of honor may lead to a zero grade on this quiz and to a disciplinary action.

Name: ID number: Date/Signature:

Question
Duration: 15 min for solution + 10 min for uploading

Assume that an object which has a uniform initial temperature of 7ab K is suddenly dropped into a pool which has a liquid at 3ab [K]. Implement the Lumped Capacitance method to calculate the time required for the object to reach 4ab [K]. Assume that the convective heat transfer coefficient is 6ab [W/m^2K], the thermal conductivity coefficient of the object is 2a [W/mK], the density of the object is 50ab [kg/m^3], and the specific heat of the object is 4ab [J/kgK]. Do the calculation for the following geometries.

a) A sphere which has a radius of 0.001a [m]
b) A long cylinder which has a radius (characteristic length) of 0.001a [m].
c) A plane wall which has a half thickness (characteristic length) of 0.001a [m].

Where "a" and "b" are the symbols that represent the last two digits of your id number. For example, if your id number is 7134251 = 71342ab, then a=5, b=1. (If any of these symbols has a zero value and cause difficulties in the solution, you can replace this value with the third digit of your id number)