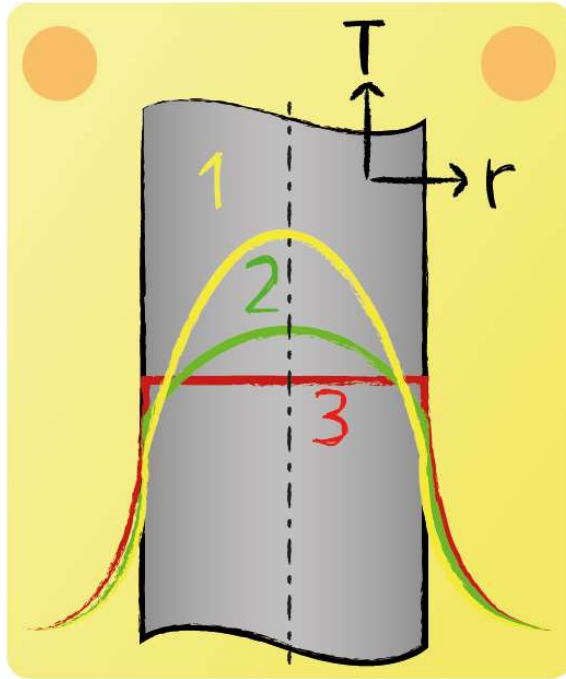


Lecture 14 - Question 5



For which of these temperature profiles is the lumped capacity model best used?

Temperature profile 3

The lumped capacity model is a common approximation in transient conduction, which may be used whenever heat conduction within an object is much faster than heat transfer across the boundary of the object.



For temperature profile 3, the difference between the surface and center temperature is negligible compared to the difference between the surface and the environmental temperature. This is due to the fact that heat conduction within the body is much faster. For that reason temperature profile 3 will give the most accurate results when using the lumped capacity model.