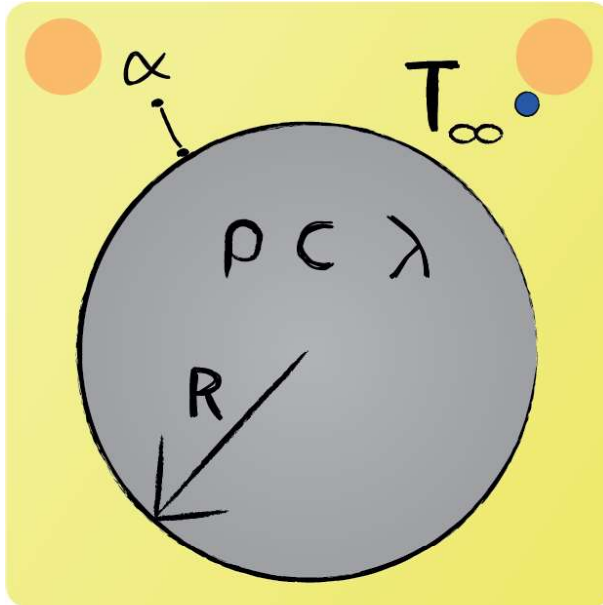


## Exam Preparation - Conduction 17



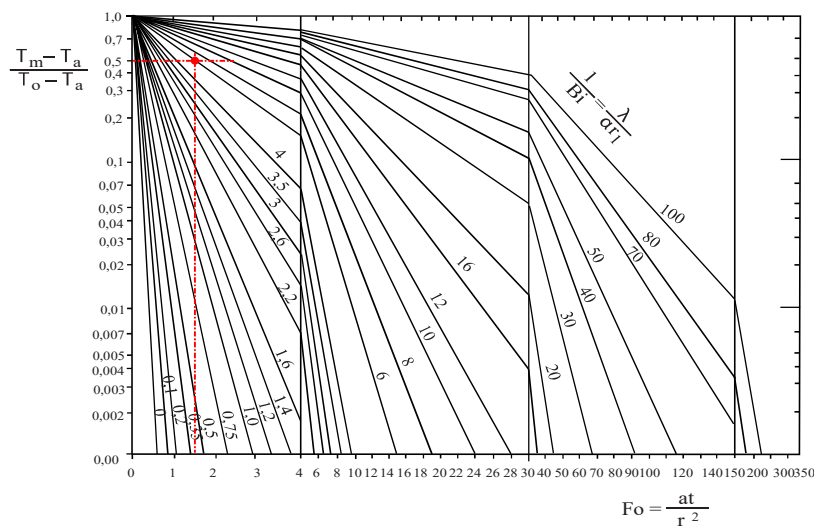
A sphere with radius  $R = 1$  cm with initial homogeneous temperature  $T(r, t = 0) = 293$  K, is suddenly exposed to a medium of temperature  $T_A = 353$  K. Determine the time  $t_1$  at which  $T(r = 0, t_1) = 323$  K is reached.

Problem type:

One-dimensional, unsteady-state heat conduction that does penetrate.

$$\frac{1}{Bi} = \frac{\lambda}{\alpha \cdot r_1} = 6$$

$$\frac{T_m - T_a}{T_o - T_a} = 0.5$$



$$\rightarrow Fo = 1.49$$

$$t = 668.44 \text{ s}$$