Engineering Tripos Part IIA: Module 3C2
Manufacturing Engineering Tripos Part I: Paper P4B
Materials process modelling and failure analysis
Numerical Answers - 2004/5

2 (a) (i) $t_p = \frac{r^2}{4a}$ $\Delta t_{8-5} = \frac{(q/v)}{2\pi\lambda}\left(\frac{1}{(500 - T_o)} - \frac{1}{(800 - T_o)}\right)$

3 (b) (i) $\frac{\partial T}{\partial t} = -(T - T_0)\ (\frac{\pi^2 a}{4l^2})$, (ii) 0.236, 106mm

4 (b) $T \approx \frac{DY}{2}\left(R(t_i - t_o) + \frac{\mu(R(t_i - t_o))^{3/2}}{(t_i + t_o)}\right)$, (d) (i) 5.3K