Unified Engineering II   **Spring 2004**

Problem S7 (Signals and Systems)

For each of the functions below, find the Laplace transform of the function, as well as the region of convergence. Do not use any outside reference (table of transforms or the Unified bible) to find the answer. You may use a table of Laplace transforms to *check* your work. However, show the derivation of the result, *i.e.*, work out the Laplace integral. Make sure that you include the region of convergence.

1.

$$g(t) = \begin{cases} te^{-at}, & t \geq 0 \\ 0, & t < 0 \end{cases}$$

2.

$$g(t) = \begin{cases} t^2 e^{-at}, & t \geq 0 \\ 0, & t < 0 \end{cases}$$

3.

$$g(t) = \begin{cases} t^n e^{-at}, & t \geq 0 \\ 0, & t < 0 \end{cases}$$

where n is a positive integer.

4.

$$f(t) = e^{-(t-a)^2/2b^2}, \quad \text{for all } t$$