EXERCISES ON LAPLACE TRANSFORM

I. Find the Laplace transform of $f(t) = t^n e^t$, $n \in \mathbb{N}$.

II. Solve the O.D.E.
$$y'' - 2y' + 7y = e^t, \quad y(0) = y'(0) = 1$$
by using Laplace transform.

III. Solve the O.D.E.
$$y'' + 4y = 2\sin 5t, \quad y(0) = y'(0) = 1$$
by using Laplace transform.

IV. Compute the inverse Laplace transform of
   (a) $F(s) = \frac{4s+5}{(s-2)^2(s+3)}$,
   (b) $F(s) = \frac{1}{s^2(s^2+3s-4)}$.