$$L^{-1}\left\{\frac{\omega_n^2 e^{-st_1}}{s(s^2+2\xi\omega_n s+\omega_n^2)}\right\} = ?$$

we can use the shifting property theorem:

if $L^{-1}G(s) = g(t)$, then $L^{-1}\left\{e^{-st_1}G(s)\right\} = u(t-t_1)\cdot g(t-t_1)$

In this case we have:

$$L^{-1}\left\{\frac{\omega_n^2 e^{-st_1}}{s(s^2+2\xi\omega_n s+\omega_n^2)}\right\} = \left[1 - e^{-(t-t_1)/2RC}\left(\cos\omega_0(t-t_1) + \frac{\xi}{\sqrt{1-\xi^2}}\sin\omega_0(t-t_1)\right)\right] \cdot u(t-t_1)$$

$$\xi = \frac{1}{2R}\sqrt{\frac{L}{C}} \qquad \omega_0 = \frac{1}{\sqrt{LC}}\sqrt{1-\frac{L}{4R^2C}}$$

$$u(t-t_1) = \begin{cases} 0 & t \le t_1 \\ 1 & t \ge t_1 \end{cases}$$