(3) $I_a(s) = H(s)\, E_a(s)$

$$= \frac{(E_a \times 10M)(1/L_aJ)(Js+B)}{s(s^2+2\zeta\omega_n s+\omega_n^2)}$$

$$\therefore i_a(t) = \mathcal{L}^{-1} I_a(s)$$

$$= \frac{E_a(\times 10M)}{L_aJ}\mathcal{L}^{-1}\left[\frac{J\cancel{s}}{\cancel{s}(s^2+2\zeta\omega_n s+\omega_n^2)} + \frac{B}{s(s^2+2\zeta\omega_n s+\omega_n^2)}\right]$$

$$= \frac{E_a(\times 10M)}{L_aJ}\left[\mathcal{L}^{-1}\frac{J}{s^2+2\zeta\omega_n s+\omega_n^2} + \mathcal{L}^{-1}\frac{B}{s(s^2+2\zeta\omega_n s+\omega_n^2)}\right]$$

$\zeta > 1$ $\quad \dfrac{J}{(s+a)(s+b)}$

$\zeta = 1$ $\quad \dfrac{J}{(s+a)^2}$