

10/2

ECE 301

H.W

9.21

(a)

$$F_1(s) = \frac{6d^2}{(s+d)(s+2d)(s+4d)}$$

$$= \frac{k_1}{s+d} + \frac{k_2}{s+2d} + \frac{k_3}{s+4d}$$

$$k_1 = (s+d)F_1(s) \Big|_{s=-d} = \frac{6d^2}{(s+2d)(s+4d)} \Big|_{s=-d} = \frac{6d^2}{d \cdot 3d} = 2$$

$$k_2 = (s+2d)F_1(s) \Big|_{s=-2d} = \frac{6d^2}{(s+d)(s+4d)} \Big|_{s=-2d} = \frac{6d^2}{(-d) \cdot 2d} = -3$$

$$k_3 = (s+4d)F_1(s) \Big|_{s=-4d} = \frac{6d^2}{(s+d)(s+2d)} \Big|_{s=-4d} = \frac{6d^2}{(-3d)(-2d)} = 1$$

$$f_1(t) = [2e^{-dt} - 3e^{-2dt} + e^{-4dt}] u(t)$$

$$(b) F_2(s) = \frac{6(s+2d)}{(s+d)(s+4d)}$$

$$= \frac{k_1}{s+d} + \frac{k_2}{s+4d}$$

$$k_1 = (s+d)F_2(s) \Big|_{s=-d} = \frac{6(s+2d)}{s+4d} \Big|_{s=-d} = \frac{6d}{3d} = 2$$

$$k_2 = (s+4d)F_2(s) \Big|_{s=-4d} = \frac{6(s+2d)}{s+d} \Big|_{s=-4d} = \frac{-12d}{-3d} = 4$$

$$f_2(t) = [2e^{-dt} + 4e^{-4dt}] u(t)$$