(c)

$$F(s) = \frac{8}{s^2(s^2+2)} = \frac{A}{s} + \frac{B}{s^2} + \frac{Cs+D}{s^2+2}$$

$$B = s^2 \cdot \frac{8}{s^2(s^2+2)}\Big|_{s=0} = \frac{8}{2} = 4$$

$$F(s) = \frac{8}{s^2(s^2+2)} = \frac{A(s^3+2s) + 4(s^2+2) + Cs^3 + Ds^2}{s^2(s^2+2)}$$

$$\begin{aligned} s^3: \quad & 0 = A + C \quad \Rightarrow A = -C = 0 \\ s^2: \quad & 0 = 4 + D \quad \Rightarrow D = -4 \\ s: \quad & 0 = 2A \quad \Rightarrow A = 0 \\ 1: \quad & 8 = 8 \end{aligned}$$

$$F(s) = \frac{4}{s^2} - \frac{4}{s^2+2} = \frac{4}{s^2} - \frac{4}{\sqrt{2}}\frac{\sqrt{2}}{s^2+2}$$

$$f(t) = \left(4t - \frac{4}{\sqrt{2}}\sin(\sqrt{2}t)\right)u(t)$$