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① $P = \frac{E^2}{R}$

$E = 200V$, $R = 8\Omega$ $\quad dE/dt = -5V$, $\quad dR/dt = 0.2$

$$\frac{dP}{dt} = \frac{dP}{dE} \cdot \frac{dE}{dt} + \frac{dP}{dR} \cdot \frac{dR}{dt}$$

$$\frac{dE}{dt} = \frac{2E}{R}, \quad \frac{dR}{dt} = \frac{-E^2}{R^2}$$

$$\therefore -\frac{dP}{dt} = \frac{2E}{R} \cdot \frac{dE}{dt} + \left(\frac{-E^2}{R^2}\right)\frac{dR}{dt}$$

$$= \frac{2 \times 200 \times (-5)}{8} - \left[\frac{200^2}{8^2} \times 0.2\right]$$

$$= -250 - 125$$

$$dP = -375W$$

② $y = \frac{Kwd^4}{t^3}$ $\quad dw = 3\%$ $\quad dd = 2\frac{1}{2}\%$, $\quad dt = 4\%$

$$dy = \frac{dy}{dw}dw + \frac{dy}{dd} \cdot dd + \frac{dy}{dt} \cdot dt \Rightarrow \frac{kd^4}{t^3} dw^3$$

$$= \frac{kd^4}{t^3}(3w\%) + \frac{4kwd^3}{t^3}\left(\frac{5d\%}{2}\right) - \frac{3kwd^4}{t^4}(4t\%)$$

$$= \frac{3}{100}\frac{kwd^4}{t^3} + \frac{10}{100}\frac{kwd^4}{t^3} - \frac{12kwd^4}{100t^3}$$

$$\Rightarrow \frac{Kwd^4}{t^3}\left(\frac{3}{100} + \frac{10}{100} - \frac{12}{100}\right)$$

$$= \frac{1}{100}\frac{kwd^4}{t^3} = 1\%y$$