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COMPUTER ENGINEERING
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ENG 2[illegible]

1) $P = \frac{E^2}{R}$

$E = 200V,\ R = 8\Omega,\ \partial E/\partial t = -5V,\ \partial R/\partial t = 0.2\Omega$

$$\frac{\partial P}{\partial t} = \frac{\partial P}{\partial E}\cdot\frac{\partial E}{\partial t} + \frac{\partial P}{\partial R}\cdot\frac{\partial R}{\partial t}$$

$$\frac{\partial P}{\partial E} = \frac{2E}{R}, \quad \frac{\partial P}{\partial R} = \frac{-E^2}{R^2}$$

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

$$= \frac{2\times 200\times(-5)}{8} - \left[\frac{200^2}{8^2}\times 0.2\right] = -250 - 125$$

$dP = -375W$

2) $y = \frac{kwd^4}{t^3}$ $\quad \partial w = 3\%,\ \partial d = 2\tfrac{1}{2}\%,\ dt = 4\%$

$$\partial y = \frac{\partial y}{\partial w}\partial w + \frac{\partial y}{\partial d}\cdot\partial d + \frac{\partial y}{\partial t}\partial t \Rightarrow \frac{kd^4}{t^3}dw^3 +$$

$$= \frac{kd^4}{t^3}\left(\frac{3w}{100}\right) + \frac{4kwd^3}{t^3}\left(\frac{5d\%}{2}\right) - \frac{3kwd^4}{t^4}(4t\%)$$

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

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

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