2. $y = \frac{kwd^4}{t^3}$ $\partial w = 3\%$ $\partial d = 22\frac{1}{2}\%$ $\partial t = 4\%$

$$\partial y = \frac{\partial y}{\partial w}\partial w + \frac{\partial y}{\partial d}\cdot \partial d + \frac{\partial y}{\partial t}\cdot \partial t$$

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

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

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

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

AGBOOLA PRAISE OLUWALEKE
MECHATRONICS
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1) $P = \frac{\mathcal{E}^2}{R}$ where

$\mathcal{E} = 200V$, $R = 8\Omega$

$\frac{\partial \mathcal{E}}{\partial t} = -5V$, $\frac{\partial R}{\partial t} = 0.2\Omega$

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

$$\frac{\partial \mathcal{E}}{\partial t} = \frac{2\mathcal{E}}{R}, \qquad \frac{\partial R}{\partial t} = \frac{-\mathcal{E}^2}{R^2}$$

$$\therefore \frac{\partial P}{\partial t} = \frac{2\mathcal{E}}{R}\frac{\partial \mathcal{E}}{\partial t} + \left(\frac{-\mathcal{E}^2}{R^2}\right)\frac{\partial R}{\partial t}$$

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

$$\partial P = -375W$$