

$$\Delta y = \frac{kwd^4}{f^3} \left(\frac{1}{100} \right)$$

$$y = \frac{kwd^4}{f^3}$$

∴

$$\Delta y = \frac{1}{100} y$$

$$= 1\% y$$

$$\Delta y = \pm 1\%$$

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

$E = 200V$ $R = 8\Omega$
 $\Delta E = -5V$ $\Delta R = 0.2\Omega$

$\Delta p = \frac{dp}{dE} \cdot \Delta E + \frac{dp}{dR} \cdot \Delta R$

$\frac{dp}{dE} = \frac{2E}{R}$ $\frac{dp}{dR} = \frac{-E^2}{R^2}$

$\Delta p = \frac{2(200)(-5)}{8} + \frac{-(200)^2}{8^2} \cdot (0.2)$

$\Delta p = -250 - 125$

$\Delta p = -375W$

Or Δp is $-375W$

(2.) $y = \frac{Kwd^4}{t^3}$

$\Delta w = \frac{3}{100} w$

$\Delta d = \frac{2.5}{100} d$

$\Delta t = \frac{4}{100} t$

$\frac{dy}{dw} = \frac{Kd^4}{t^3}$ $\frac{dy}{dd} = \frac{4Kwd^3}{t^3}$ $\frac{dy}{dt} = \frac{-3Kwd^4}{t^4}$

$\Delta y = \frac{dy}{dw} \cdot \Delta w + \frac{dy}{dd} \cdot \Delta d + \frac{dy}{dt} \cdot \Delta t$

$\Delta y = \frac{Kd^4}{t^3} \cdot \frac{3}{100} w + \frac{4Kwd^3}{t^3} \cdot \frac{2.5}{100} d - \frac{3Kwd^4}{t^4} \cdot \frac{4}{100} t$

$\Delta y = \frac{Kwd^4}{t^3} \cdot \frac{3}{100} + \frac{Kwd^4}{t^3} \cdot \frac{2.5 \cdot 4}{100} - \frac{Kwd^4}{t^3} \cdot \frac{12}{100}$

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