LAWAL SHERIFF. O

CIVIL ENGR

16/ENG05/037

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

$E = 200V$ $\quad R = 8\Omega$

$\Delta E = -5V$ $\quad \Delta R = 0.2\Omega$

$$\Delta P = \frac{dP}{dE} \cdot \Delta E + \frac{dP}{dR} \cdot \Delta R$$

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

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

$$\Delta P = -250 - 125$$

$$\Delta P = -375W$$

Change in P is $-375W$

2.) $y = \frac{K\omega d^4}{t^3}$

$$\Delta\omega = \frac{3}{100}\omega \qquad \Delta d = \frac{2.5}{100}d$$

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

$$\frac{dy}{d\omega} = \frac{Kd^4}{t^3} \qquad \frac{dy}{dd} = \frac{4K\omega d^3}{t^3} \qquad \frac{dy}{dt} = \frac{-3K\omega d^4}{t^4}$$

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

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

$$\Delta y = \frac{K\omega d^4}{t^3} \cdot \frac{43}{100} + \frac{K\omega d^4}{t^3} \cdot \frac{2.5.4}{100} - \frac{K\omega d^4}{t^3} \cdot \frac{12}{100}$$

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

$$\Delta y = \frac{K\omega d^4}{t^3}\left(\frac{1}{100}\right)$$

$$\Delta y = \frac{K\omega d^4}{t^3} \cdot A$$

$\therefore$

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

$$= 1\% y.$$

Change in $y = \pm 1\%$