ORUMWENSE   OSASUYI   ERNEST

16/ENG06/061

MECHANICAL

ENG 281

①

$$P = \frac{\varepsilon^2}{R} \quad ; \quad P = \varepsilon^2 R^{-1}$$

$$\delta P = \frac{\partial P}{\partial \varepsilon} \cdot \delta \varepsilon + \frac{\partial P}{\partial R} \cdot \delta R$$

$$\frac{\partial P}{\partial \varepsilon} \quad 2\varepsilon R^{-1} = \frac{2\varepsilon}{R} \quad , \quad \frac{\partial P}{\partial R} = -\varepsilon^2 R^{-2} = \frac{-\varepsilon^2}{R^2}$$

$$\delta P = \frac{2\varepsilon}{R} \cdot \delta \varepsilon + \frac{-(\cdot \varepsilon^2)}{R^2} \cdot \delta R$$

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

$$\delta P = \frac{-2000}{8} \quad \not{\neq} \quad \frac{8000}{64} \quad = \quad -250 \neq 125 \quad = \quad - 125$$

$$\therefore \quad \delta P \, (\text{change in } P) = -375 \text{ watts}$$

) $\quad y = \dfrac{kwd^4}{t^3} \quad ; \quad y = kwd^4 t^{-3}$

$$\delta y = \dfrac{\partial y}{\partial k}\cdot \delta k + \dfrac{\partial y}{\partial w}\cdot \delta w + \dfrac{\partial y}{\partial d}\cdot \delta d + \dfrac{\partial y}{\partial t}\cdot \delta t$$

$\dfrac{\partial y}{\partial k} = \dfrac{wd^4}{t^3}, \qquad \dfrac{\partial y}{\partial w} = \dfrac{kd^4}{t^3}, \qquad \dfrac{\partial y}{\partial d} = \dfrac{4d^3 kw}{t^3}, \qquad \dfrac{\partial y}{\partial t} = -3t^{-4}$

$\dfrac{\partial y}{\partial t} = -3kwd^4 t^{-4} = \dfrac{-3kwd^4}{t^4}$

$\delta w = \dfrac{3}{100}$ of $w = \dfrac{3w}{100}$

$\delta d = 5/2 \div 100$ of $d = \dfrac{5}{2}\times\dfrac{1}{100} = \dfrac{5}{200} = \dfrac{5d}{200}$

$\delta t = \dfrac{4}{100}$ of $t = 4t/100$

$\delta y = 0 + \dfrac{kd^4}{t^3}\times\dfrac{3w}{100} + \dfrac{4d^3 kw}{t^3}\times\dfrac{5d}{200} + \dfrac{-3kwd^4}{t^4}\times\dfrac{4t}{100}$

$\delta y = \dfrac{kd^4 w}{t^3}\times\left(\dfrac{3}{100}\right) + \dfrac{d^4 kw}{t^3}\times\left(\dfrac{20}{200}\right) - \dfrac{kwd^4}{t^3}\times\left(\dfrac{12}{100}\right)$

$\delta y = \dfrac{kwd^4}{t^3}\left(\dfrac{3}{100} + \dfrac{20}{200} - \dfrac{12}{100}\right)$

$\delta y = \dfrac{kwd^4}{t^3}\left(\dfrac{2}{250}\right) = \dfrac{kwd^4}{t^3}\left(\dfrac{1}{100}\right)$

$\delta y = y\left(\dfrac{1}{100}\right)$

percentage change in $y = \pm 1$ percent of y