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DEPT: ELECTRICAL & ELECTRONICS
MAT NO: 16/ENG04/035

② $y = \frac{Kwd^4}{t^3}$

$w = 3\% = \frac{3}{100}$; $d = 2\frac{1}{2}\% = \frac{5}{200}$ $t = 4\% = \frac{4}{100}$

$dy = \frac{dy}{dw}\partial w + \frac{dy}{dd}\partial d + \frac{dy}{dt}\partial t$

But; $\partial w = \frac{3}{100}$ of $w \Rightarrow \frac{3w}{100}$

$\partial d = \frac{5}{200}$ of $d \Rightarrow \frac{5d}{200}$

$\partial t = \frac{4}{100}$ of $t \Rightarrow \frac{4t}{100}$

$\frac{dy}{dw} = \frac{Kd^4}{t^3}$

$\frac{dy}{dd} = \frac{4Kwd^3}{t^3}$

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

$dy = \frac{Kd^4}{t^3}\left(\frac{3w}{100}\right) + \frac{4Kwd^3}{t^3}\left(\frac{5d}{200}\right) + \frac{-3Kwd^4}{t^4}\left(\frac{4t}{100}\right)$

$dy \Rightarrow \frac{Kwd^4}{t^3} \cdot \frac{3}{100} + \frac{Kwd^4}{t^3} \cdot \frac{20}{200} - \frac{Kwd^4}{t} \cdot \frac{12}{100}$

$$dy \Rightarrow \frac{kw\,d^q}{t^3}\left[\frac{3}{100} + \frac{10}{100} - \frac{12}{100}\right]$$

$$\Rightarrow \frac{kw\,d^q}{t^3}\left[\frac{1}{100}\right]$$

But $y = \frac{kw\,d^q}{t^3}$

$\therefore dy = y\left[\frac{1}{100}\right] \Rightarrow y\,1\%$

$\therefore$ y increases by 1%

(2) $P = \frac{E^2}{R}$ [where $E = 200V$; $R = 8\Omega$, $\partial E = -5V$; $\partial R = 0.2\Omega$, $dP = ?$]

$$dP = \frac{dP}{dE}\partial E + \frac{dP}{dR}\partial R$$

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

$$dP = \frac{2E}{R}\partial E + \frac{-E^2}{R^2}\partial R$$

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

$$dP = \frac{400}{8}(-5) + \frac{-40000}{64}(0.2) \Rightarrow 50(-5) + -625(0.2)$$

$$dP = -250 + (-125) \Rightarrow dP = -250 - 125$$

$\therefore dP = -375W$ i.e. P decreases by 375 Watts.