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18/ENG04/081

EEE 316 CIRCUIT THEORY

ASSIGMENT II

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A) R = 100kΩ, L = 20mH, C = 5nF

i) $w_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{20\times10^{-3}\times5\times10^{-9}}}$

$= 100000$ rad/s

$= 100k$ rad/s

ii) $w_1 = w_0 - \frac{B}{2}$

$Q = \frac{R}{w_0 L} = \frac{100\times10^3}{100\times10^3\times20\times10^{-3}}$

$= 50$

$B = \frac{w_0}{Q} = \frac{100\times10^3}{50}$

$= 100.0$ rad/s

$w_1 = 100\times10^3 - \frac{2000}{2}$

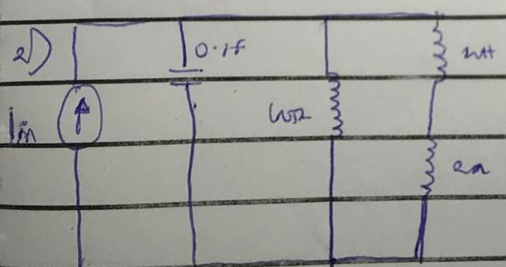
$w_1 = 99000$ rad/s

$w_2 = w_0 + \frac{B}{2}$

$= 100\times10^3 + \frac{2000}{2}$

$= 101000$ rad/s

$Q = 50$, $B = 2000$ rad/s

2) 

Sol

admittance input

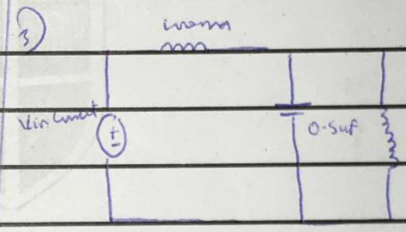
$y = jw0.1 + \frac{1}{10} + \frac{1}{2 + jw2}$

$= 0.1 + jw0.1 + \frac{2 - jw2}{4 + 4w^2}$

At resonance $Im(y) = 0$ and

$w_0 0.1 - \frac{2w_0}{4 + 4w_0} = 0$

$w_0 = 2$ rad/s.

3) 

$Z_L = jwL$

$= jw(10\times10^{-7})$

$= jw0.07$

$Z_C = \frac{1}{jwC}$

$= \frac{1}{jw(0.5\times10^{-3})}$

$= 1/jw5\times10^{-4}$

$Y = jw0.07 + 1/10 + 1/jw5\times10^{-4}$

$Y = 0.2 + jw0.01 + \frac{1}{jw5\times10^{-4}}$

At resonance $Im(y) = 0$

$w_0 = jw5\times10^{-4} - 0.2$

$w_0 = 2.179$ rad/s