3. A coil that has an inductance L and a resistance of 8 Ω is in parallel with a variable capacitor. At $\omega = 1.5 \times 10^6$ rad/s, resonance is achieved when $C = 0.0037$ μF. What is the inductance of the coil ? [L = **120 μH**]

4. An inductor for which $L = 40$ mH is to be used in parallel with a 1 μF capacitor in a circuit that must have Q-factor at least as large as 25 when the frequency is 1 KHz. What is the minimum amount of resistance the coil may have ? What will the input impedance be when the minimum R is used ? [R = **12.56 Ω** ; Z = **3185 Ω**]

5. A coil has a resistance of 400 Ω and inductance of 318 μH. Find the capacitance of a capacitor which, when connected in parallel with the coil, will produce resonance with a supply frequency of 1 MHz. If a second capacitor of capacitance 23.5 pF is connected in parallel with the first capacitor, find the frequency at which resonance will occur. [**76.5 pF** ; **870 KHz**]

SUMMARY OF FORMULAS

1. $Y = \dfrac{1}{Z}$

2. $Y = \sqrt{G^2 + B^2}$

3. $G = \dfrac{R_1}{Z_1^2}$; $B = \dfrac{X_1}{Z_1^2}$

4. Capacitive susceptance is positive while inductive susceptance is negative.

5. The resonant frequency of a coil (R-L) in parallel with a capacitor (C) is given by ;

$$f_r = \frac{1}{2\pi}\sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}$$

6. At parallel resonance, impedance is given by ;

$$Z_r = L/CR$$