2h.4 • Q Magnification • 000 • hQ5vWwHT

Calculation steps:

1. calculate $X_C = 1/2\pi fC = 500\Omega$ and $X_L = 2\pi fL = 500\Omega$
2. The combined reactance of X_L and X_C is zero, so that leaves only the circuit resistance to oppose the flow
3. $I = \frac{2mV}{2\Omega} = 1mA$
4. Both L and C will be passing the 1mA of current, so there will be a voltage across each reactive component of $1mA \times 500\Omega = 500mV$
5. RADIO MAGIC: 250 times input voltage, and MAGNIFICATION Q at work
6. A shorter path to finding Magnification $Q = \frac{X_L}{R}$ or $\frac{X_C}{R} = \frac{500}{2} = 250$

2h.4 • Q factor • • SIT3M950

see IRTS Harec manual

The Q FACTOR (QUALITY FACTOR) determines the bandwidth of resonant circuits, including antennas. A circuit with a high Q has a narrow bandwidth, while low Q represents a wide bandwidth, see Figure 8-xxvi.

There are no ideal inductors and capacitors, therefore, there are no ideal, lossless tuned circuits. All tuned circuits have some loss resistance and lose some power to heat. Similarly, there are no ideal crystals, and they also lose some power to mechanical friction.

Q factor of an inductor and a capacitor can be calculated from its reactance and resistance:

$$Q = \frac{X_L}{R_L} \qquad Q = \frac{-X_C}{R_C}$$

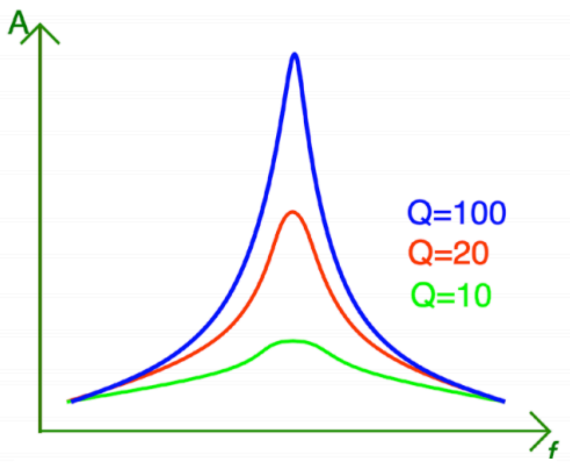

Figure 8-xxvi: Bandwidth of different Q factors, frequency on horizontal axis, amplitude on the vertical axis. [EI9ILB]

2h.4 • Tuned circuit • 000 • TuDkF5TC

stuff

2h.4 • Tuned circuit • 000 • bSZoHasf

stuff

2h.4 • Tuned circuit • 000 • `ck-ql2VL`

stuff

2h.4 • Tuned circuit • 000 • `pnYosChc`

stuff