**Abstract:**

1. The aim of the experiment :is to determine the shape of the shape of the frequency of the cases and to measure the bandwidth for the resonance curves and also to determine the resonance frequency and quality factor in each case.
2. The method used: by connecting a circuit that contains a resistor(1&2 KΩ)and capacitor and inductor and a generator to a CRO and we obtained the values and graphs we wanted to see .
3. The main results :

**R = 1 KΩ R = 2 KΩ**

$f=5.2 KHz$ $f=5 KHz $

$Q=1.84 $ $ Q=0.78$

**Calculation :**

From the graph :

 For R= 1 KΩ

$f=5.2 KHz \rightarrow ω\_{0}=2πf=3.46 ×10^{4} rad/sec $

$$\left|∆ω\_{1}+∆ω\_{2}\right|=18.8 KHz$$

$$\rightarrow Q=\frac{ω\_{0}}{\left|∆ω\_{1}+∆ω\_{2}\right|}=\frac{3.46 ×10^{4}}{18.8×10^{3}}=1.84$$

For R= 2 KΩ

$f=5 KHz \rightarrow ω\_{0}=2πf=3.14 ×10^{4} rad/sec $

$$\left|∆ω\_{1}+∆ω\_{2}\right|=40.32 KHz$$

$$\rightarrow Q=\frac{ω\_{0}}{\left|∆ω\_{1}+∆ω\_{2}\right|}=\frac{3.14 ×10^{4}}{40.32×10^{3}}=0.78$$

**Results And Conclusion :**

 **R = 1 KΩ R = 2 KΩ**

$f=5.2 KHz$ $f=5 KHz $

$Q=1.84 $ $ Q=0.78$

As wee can see that the formula of the quality factor that it is proportional to 1/R and the square root of L/C and so how this affect the shape of the quality factor:

as we can see from the two graphs when we change R to a larger (Q) become smaller and the sharpness of the graph become smaller and has less amplitude than the graph of the first resistance and this is the same thing that will happened if we decrease the value of  and keep the resistance constant and we can do that by decreasing the value of the L or by increasing the value of C, and this is true if we reverse this process by decreasing R or increasing the value of **.**

 But if we even change the value of Q the heads of the graphs must be in the same line that if we move the graph perpendicular on the screen of the OSC the heads must pass through each other.

 The graphs of I vs. f means that the value of the current will increase as we increase the value of the frequency of the source to reach the frequency that equal to the natural frequency of the circuit then the current will start to decrease and it will never pass the value of the I max in the same circuit.

The value of the maximum current in the circuit is proportional to the voltage of the source and to the value of  so if we increase the resistance the current will become small (ohm’s law) and the same thing for the value in brackets. And if we make R constant and then we change that value we will have the maximum value of the current when this value equal zero.

**Question :**

$$Q=\frac{ωL}{R} ,but ω=\frac{1}{\sqrt{LC}}$$

$$\rightarrow Q=\frac{L}{R\sqrt{LC}}=\frac{1}{R}\sqrt{\frac{L}{C}}$$