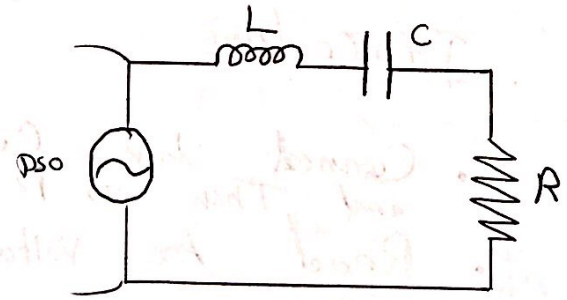
Expirement 9 :

Resonance

• **Def:-** Resonance is a phenomen that occurs when the Reactance of the capacitor & inductor is the same



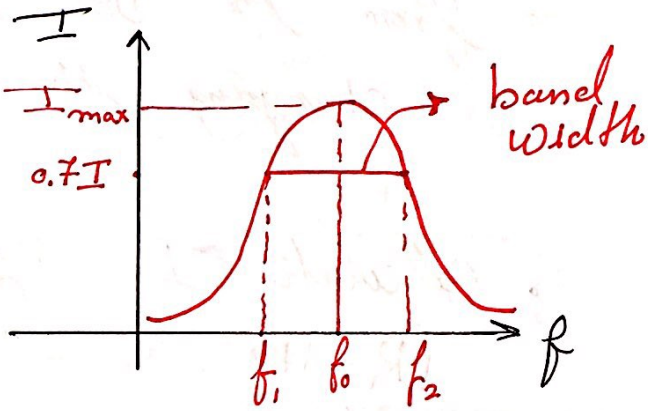
$$X_L = X_C$$

$$\omega L = \frac{1}{\omega C}$$

$$\rightarrow \omega_0 = \frac{1}{\sqrt{LC}}$$

$$\Delta f = f_2 - f_1$$

= band width



Quality factor

• A measure of the sharpness of the Resonance Curve

$$\rightarrow Q = \frac{f_0}{\Delta f} \quad \text{(expirementally)}$$

$$\rightarrow Q = \frac{1}{R}\sqrt{\frac{L}{C}} \quad \text{(theoritically)}$$

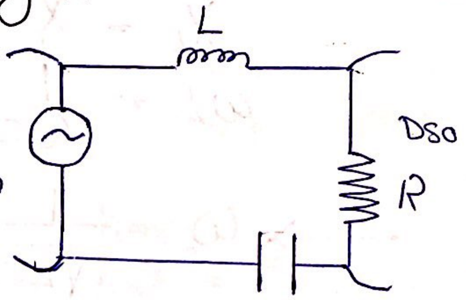
Alaa Hairi

What we use :-

- L, C, R
- signal Generator & DSO

Procedure :-

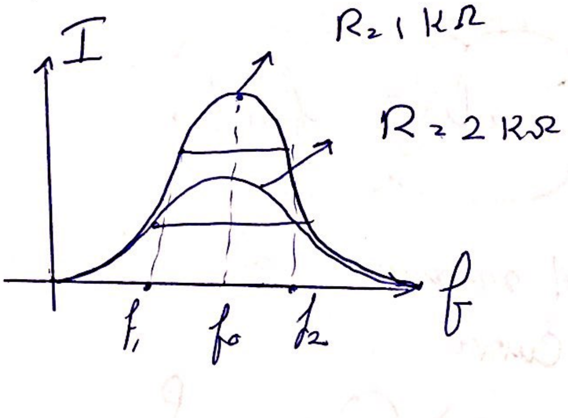
- Connect this Circuit :- Using R once as $R = 1K\Omega$ and Then as $R = 2K\Omega$



- Read the voltage values from the Dso when changing the frequency.

- Calculate I_o By dividing each value on R ($R_1 = 1K\Omega$, $R_2 = 2K\Omega$)

- Plot I_o vs f



- f_o = resonance frequency

$$Q = \frac{f_o}{\Delta f}$$

- قم بوصل الدارة كما هو موضح بحيث تكون قيم R :- 1KΩ ثم 2KΩ
- قم بقراءة قيم V من Dso عند كل قيمة لـ f
- قم بحساب التيار بقسمة قيم V على R
- ارسم I vs f واوجد Q و f_o

Alaa Etaiwi