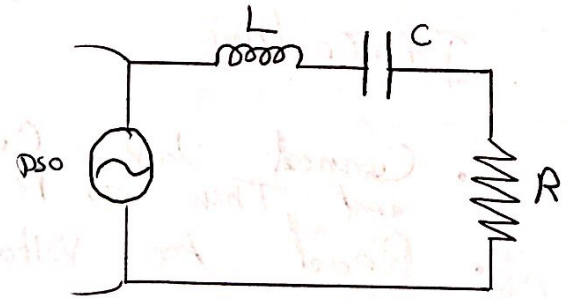
Expirement 9 :

Resonance

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



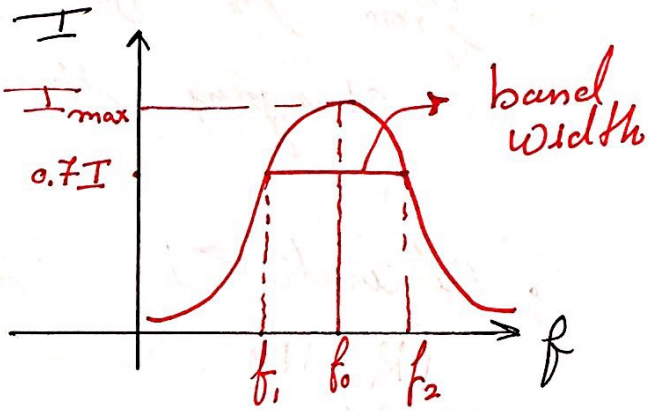
$$X_L = X_C$$

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

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

$$\Delta f = f_2 - f_1$$

= band width



Quality factor

• A measure of the sharpness of the Resonance Curve

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

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

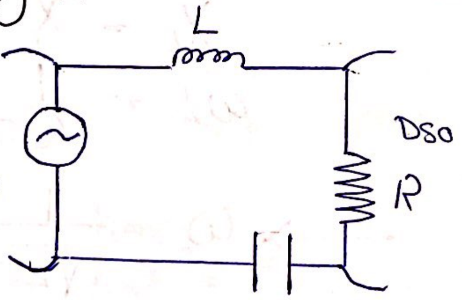
Alaa Hairi

What we use :-

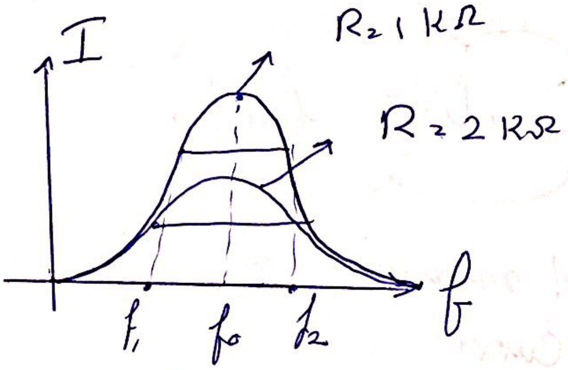
- L, C, R
- signal Generator & DSO

Procedure :-

- Connect this Circuit :- Using R once as R = 1 KΩ and Then as R = 2 KΩ
- Read the voltage values from the DSO when changing the frequency.



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



- f_0 = resonance frequency

$Q = \frac{f_0}{\Delta f}$

- 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_0

Alaa Itaiwi