



**Faculty of Engineering and Technology
Electrical and Computer Engineering
Department**

**ENEE2102
CIRCUITS LAB**

Student's name: Anas Abdelhalim Tomaizeh

Student's number: 1152325

Pre lab exp#9

Date 28/11/2017

Eng.: Qais samara

Dr: Hakam shehada

Q1)

Circuit 9.12: $W_c = \frac{1}{C*(Rl/Rs)}$

$\rightarrow \frac{1}{0.1*10^{-6}*5K} = 2000 \text{ rad/s.}$

Circuit 9.13: $W_c = \frac{1}{c*(Rl+Rs)}$

$\rightarrow \frac{1}{0.1*10^{-6}*(10+10K)} = 500 \text{ rad/s}$

Circuit 9.14: $W_c^2 = \frac{2}{L*C}$

$\rightarrow \frac{2}{1*0.1*10^{-6}} = 4472.1 \text{ rad/s}$

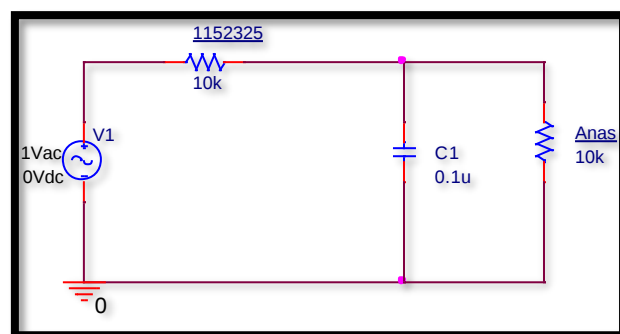
Circuit 9.15: $W_c^2 = \frac{1}{2*L*C}$

$\rightarrow \frac{1}{2*1*0.1*10^{-6}} = 2236.06 \text{ rad/s}$

Q2)

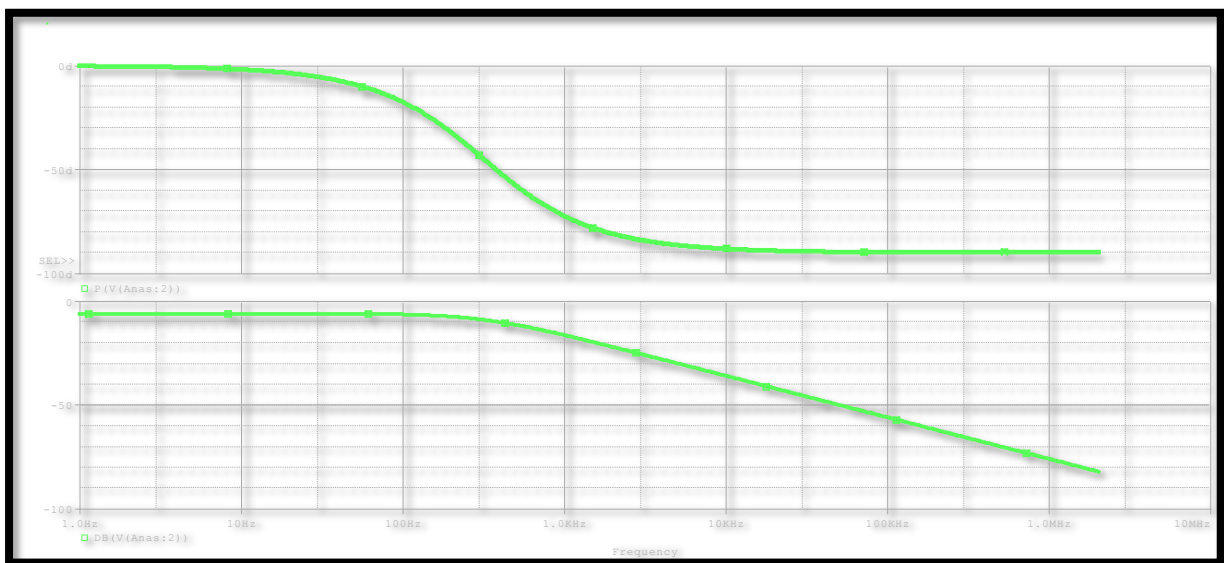
- **First order low pass filter**

The circuit diagram::



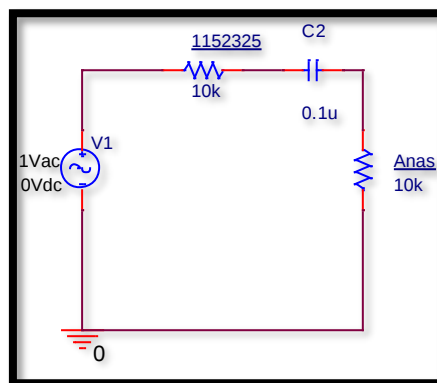
circuit 9.12

The result:



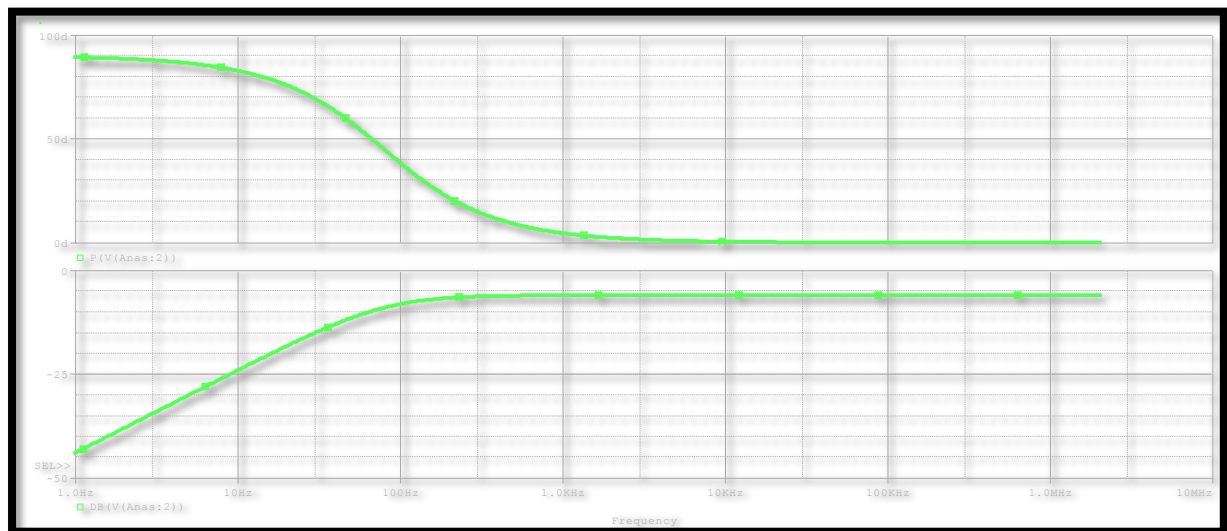
- **First order high pass filter:**

Circuit diagram:



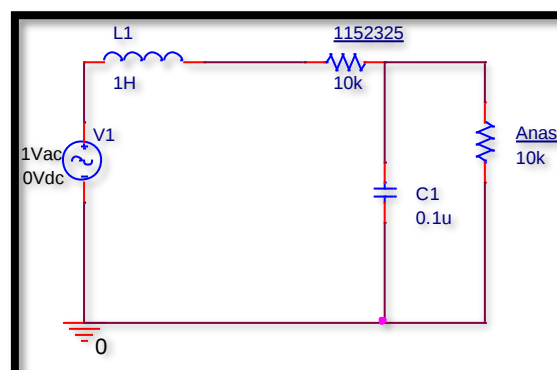
Circuit 9.13

The result:



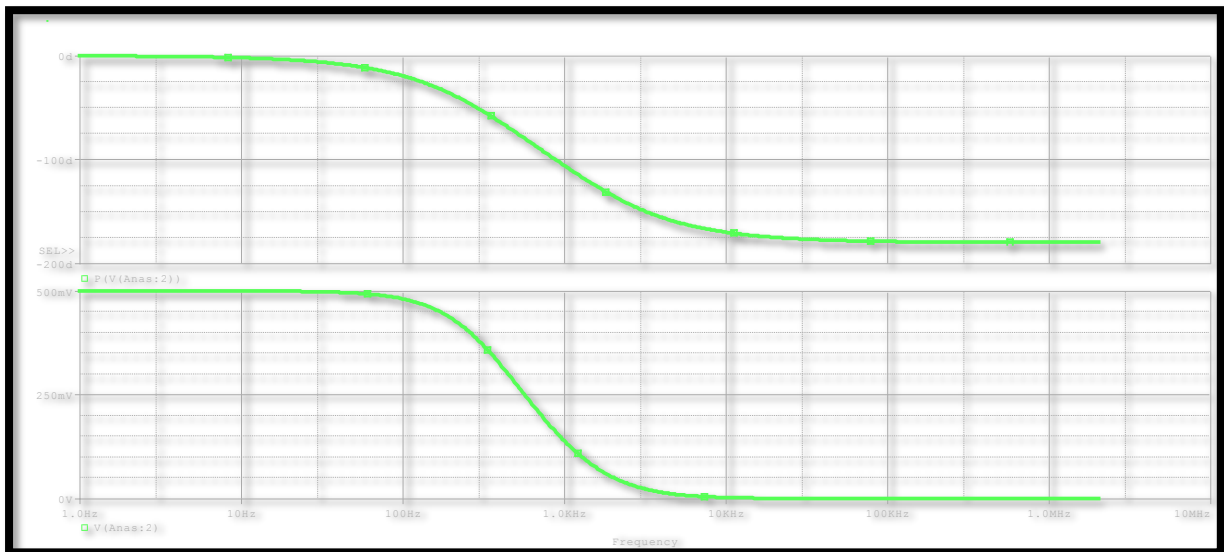
- **Second order low pass filter:**

Circuit diagram:



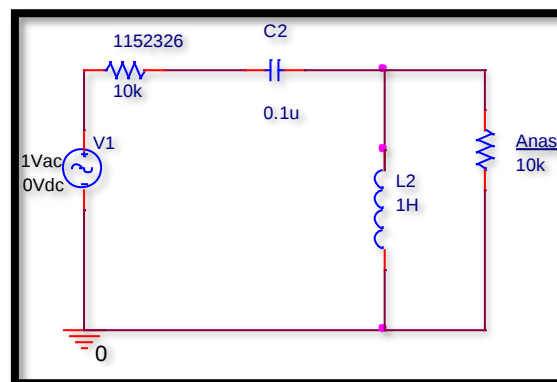
The result:

circuit 9.14



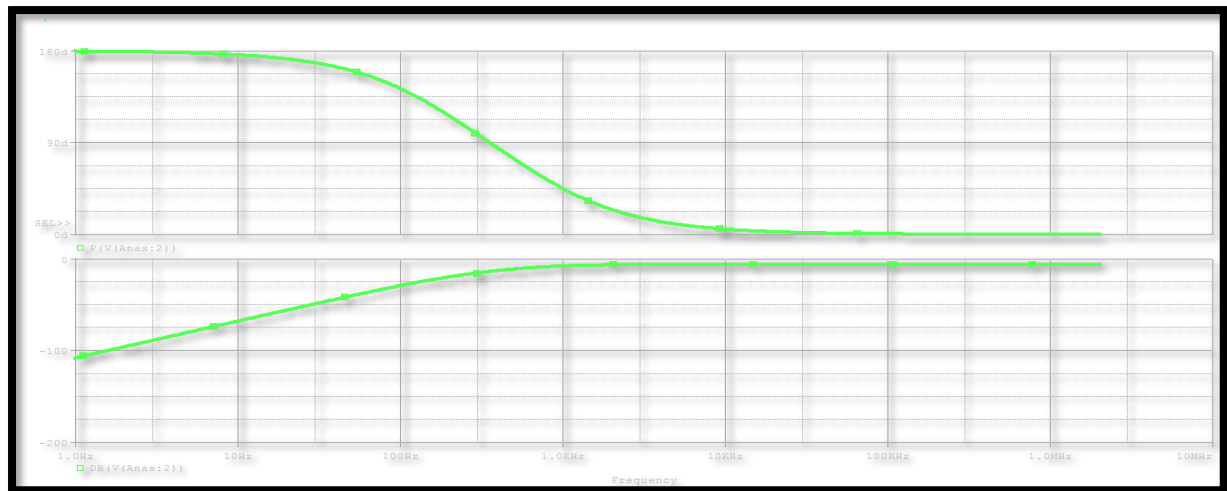
- **Second order high pass filter:**

Circuit diagram:



The result:

circuit 9.15



Q5)

Circuit 9.16 for R=10K: $\omega_o = \frac{1}{\sqrt{L \cdot C}}$

$$\rightarrow \frac{1}{\sqrt{100 \cdot 10^{-3} \cdot 10 \cdot 10^{-9}}} = 31622.7 \text{ rad/s}$$

$$\omega_{c,1,2} = \sqrt{\left(\frac{R}{2 \cdot L}\right)^2 + \frac{1}{L \cdot C}} \pm \frac{R}{2 \cdot L}$$

$$\rightarrow 32.015 \pm 5000 \text{ Krad/s}$$

For R=5.6K

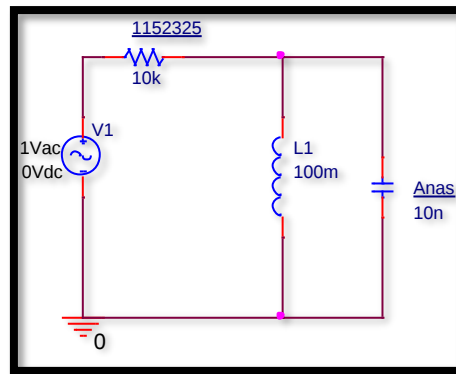
$$\omega_o = 31622.7 \text{ rad/s}$$

$$\omega_{c,1,2} = 32.856 \pm 8.928 \text{ K rad/s.}$$

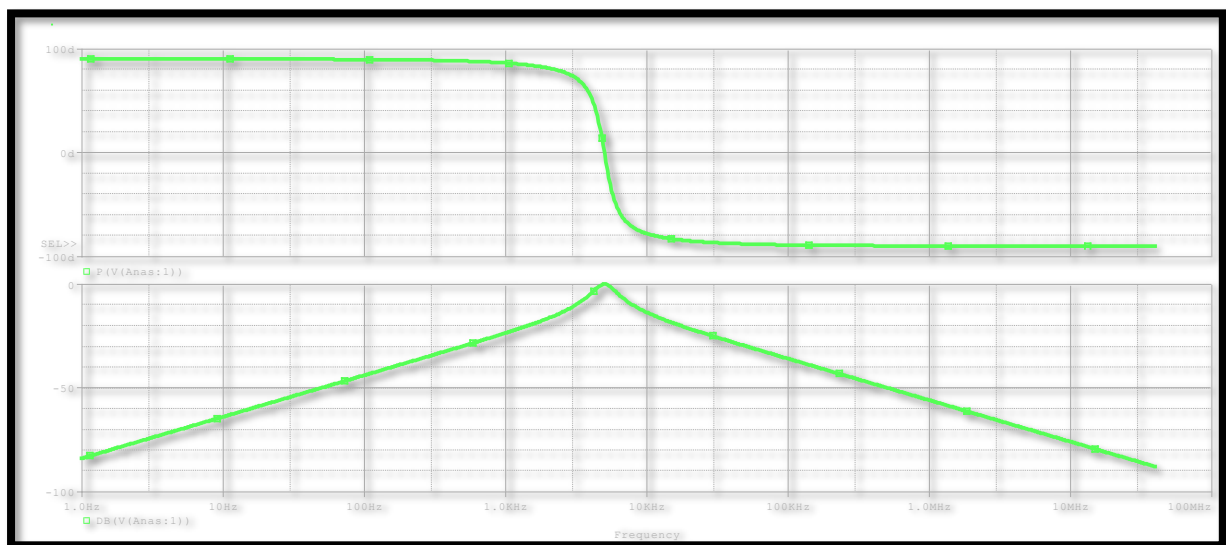
Q6) Band pass filter:

For R=10K:

Circuit diagram:

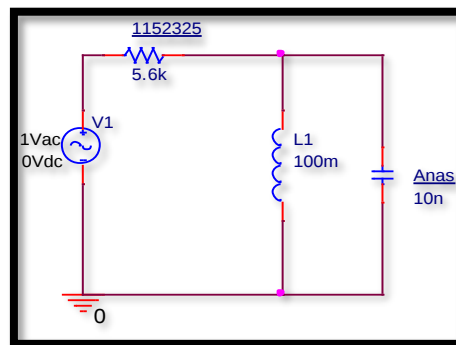


The result:

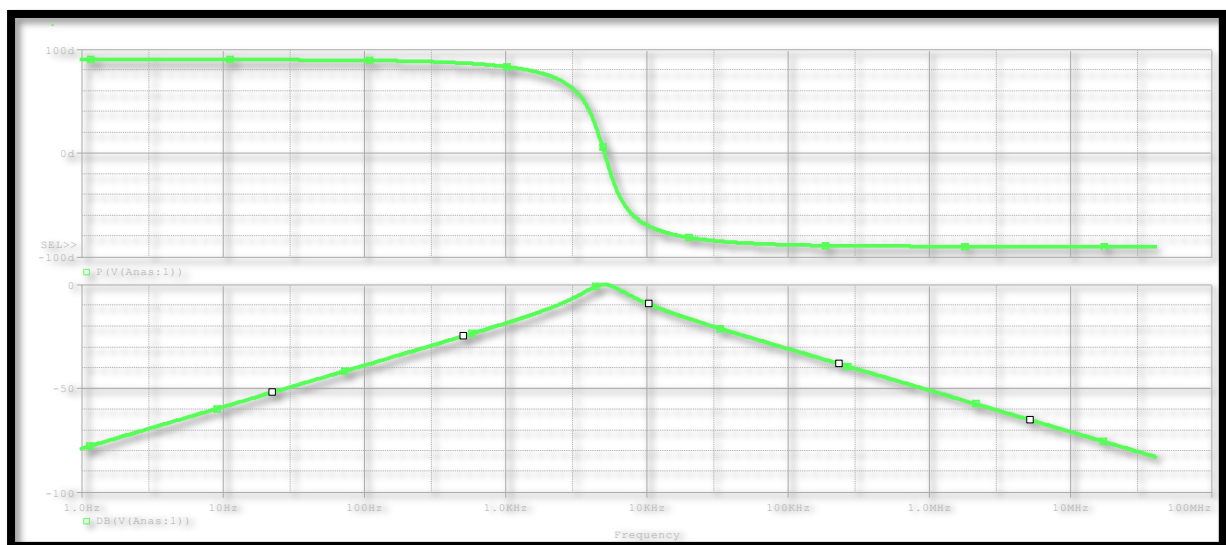


For $R=5.6K$:

Circuit diagram:



The result:



Q7)

Circuit 9.17:

✓ For R=820

$$W_o = \frac{1}{\sqrt{L \cdot C}}$$

$$\Rightarrow W_o = 28.867 \text{ K rad/s}$$

$$W_{c1} = \frac{R}{2 \cdot L} + \sqrt{\left(\frac{R}{2 \cdot L}\right)^2 + \frac{1}{L \cdot C}} \Rightarrow 32.484 \text{ K rad/s}$$

$$W_{c2} = \frac{R}{2 \cdot L} - \sqrt{\left(\frac{R}{2 \cdot L}\right)^2 + \frac{1}{L \cdot C}} \Rightarrow 25.625 \text{ K rad/s}$$

✓ For R=2.2K

$$W_o = 28.867 \text{ K rad/s}$$

$\omega_{c1} = 39.453 \text{K rad/s}$

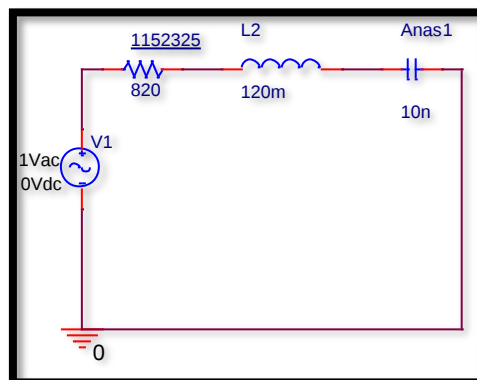
$\omega_{c2} = 21.121 \text{K rad/s}$

Q8)

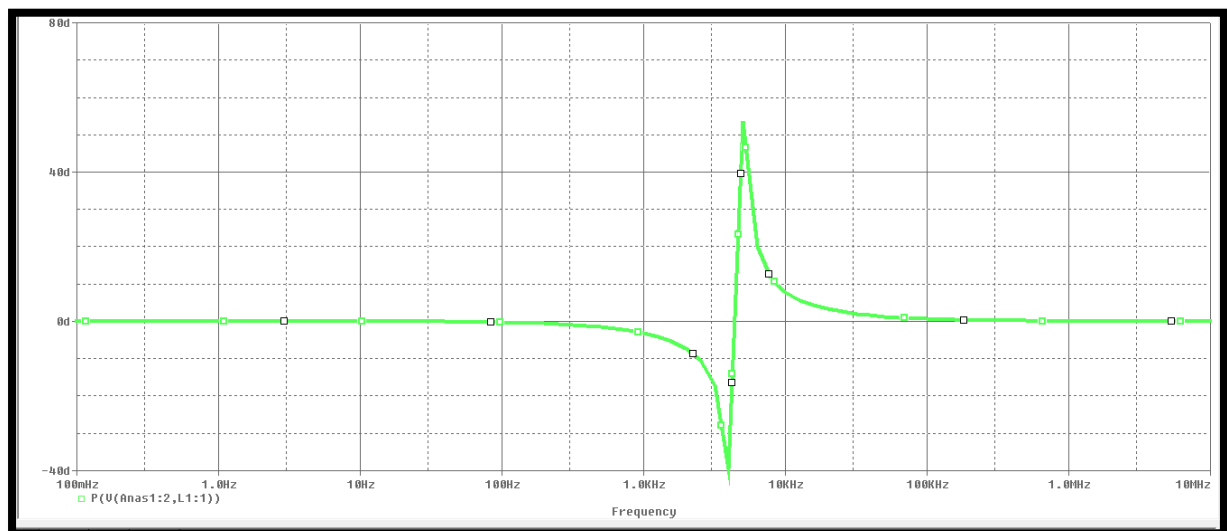
Band reject filter:

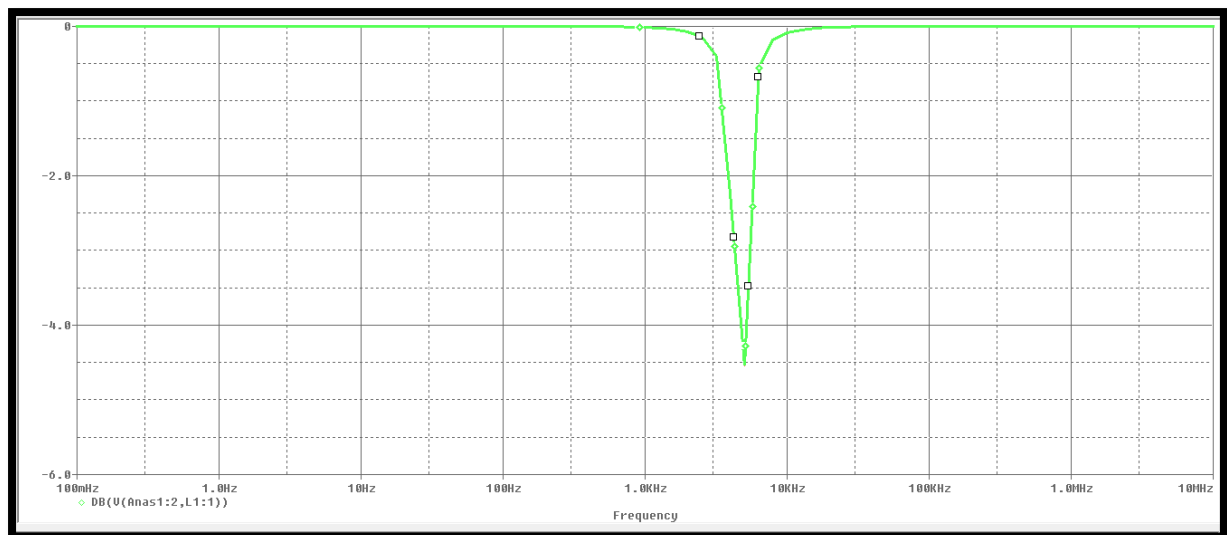
For $R=820$:

Circuit diagram:



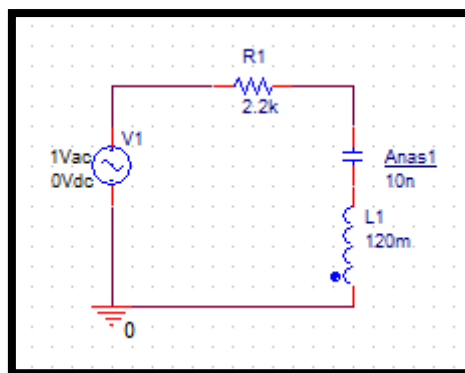
The result:





For $R=2.2K$

Circuit diagram:



The result:

