



BERZIET UNIVERSITY
FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ENEE 2110

Circuits Laboratory

Experiment #10 Pre-lab

Frequency selective circuit

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Teaching Assistance:

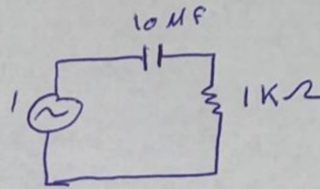
Eng. Mohammad Deek

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Cutoff f for 10, 13

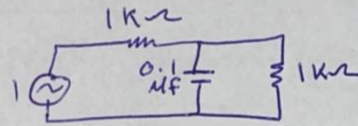
High pass



$$f = \frac{1}{2\pi CR} = \frac{1}{2\pi \times 0.1 \times 10^{-6} \times 1000} = 1591.55 \text{ Hz}$$

Cutoff f for 10, 14

low pass

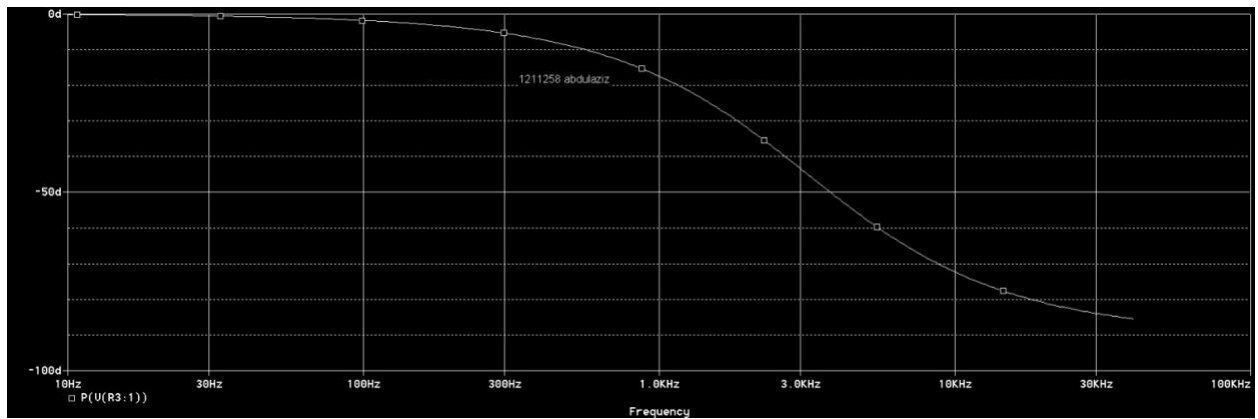
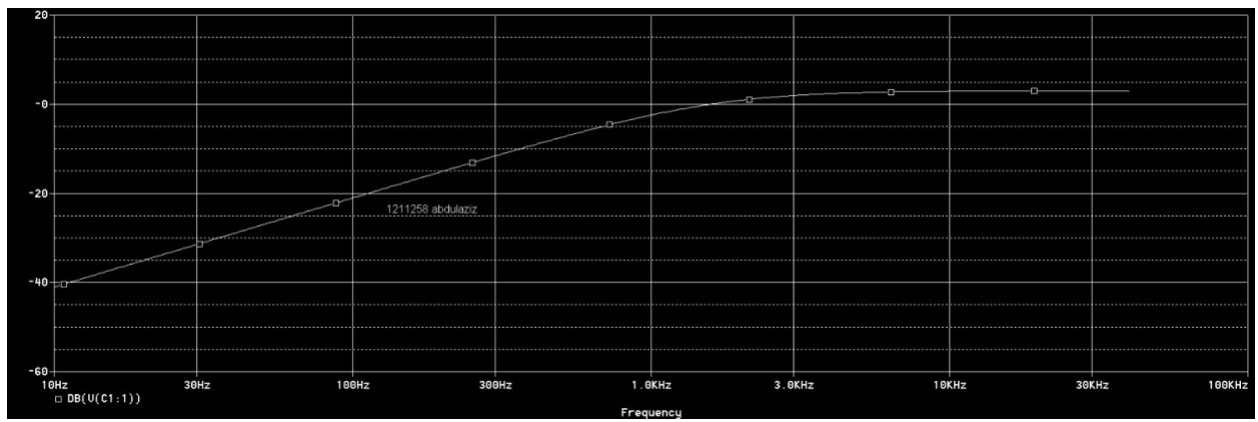
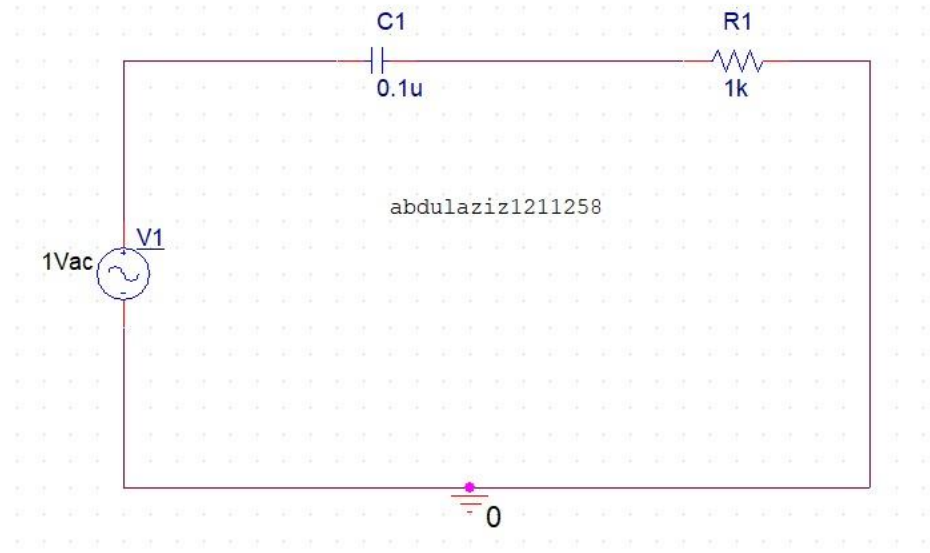


$$f = \frac{1}{2\pi C R_{eq}}$$

$$R_{eq} = \frac{1000 \times 1000}{2000}$$

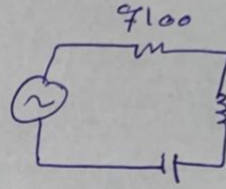
$$\frac{1}{2\pi \times 10^{-7} \times 500} = 3183.1 \text{ Hz}$$

$$= 500 \Omega$$



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$$f_0 = \frac{1}{2\pi \sqrt{LC}}$$
$$= 1497.2 \text{ Hz}$$



$$R = \frac{R}{L} \rightarrow \frac{7100}{1.13} = 6283.18 \text{ Hz}$$

$$\omega_{C1} = -\frac{R}{2L} + \sqrt{\left(\frac{R}{2L}\right)^2 + \frac{1}{LC}}$$
$$= -\frac{7100}{2.26} + \sqrt{\left(\frac{7100}{2.26}\right)^2 + \frac{1}{1.13 \times 10^{-8}}}$$
$$= 6976.3$$

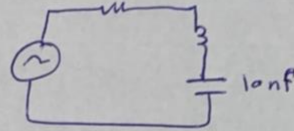
$$f_{C1} = 1098.5 \text{ Hz}$$

$$f_{C2} = 2098.5$$

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$$f_0 = \frac{1}{2\pi \sqrt{LC}}$$



$$= \frac{1}{2\pi \sqrt{1.13 \times 10 \times 10^{-9}}} = 1497.2 \text{ Hz}$$

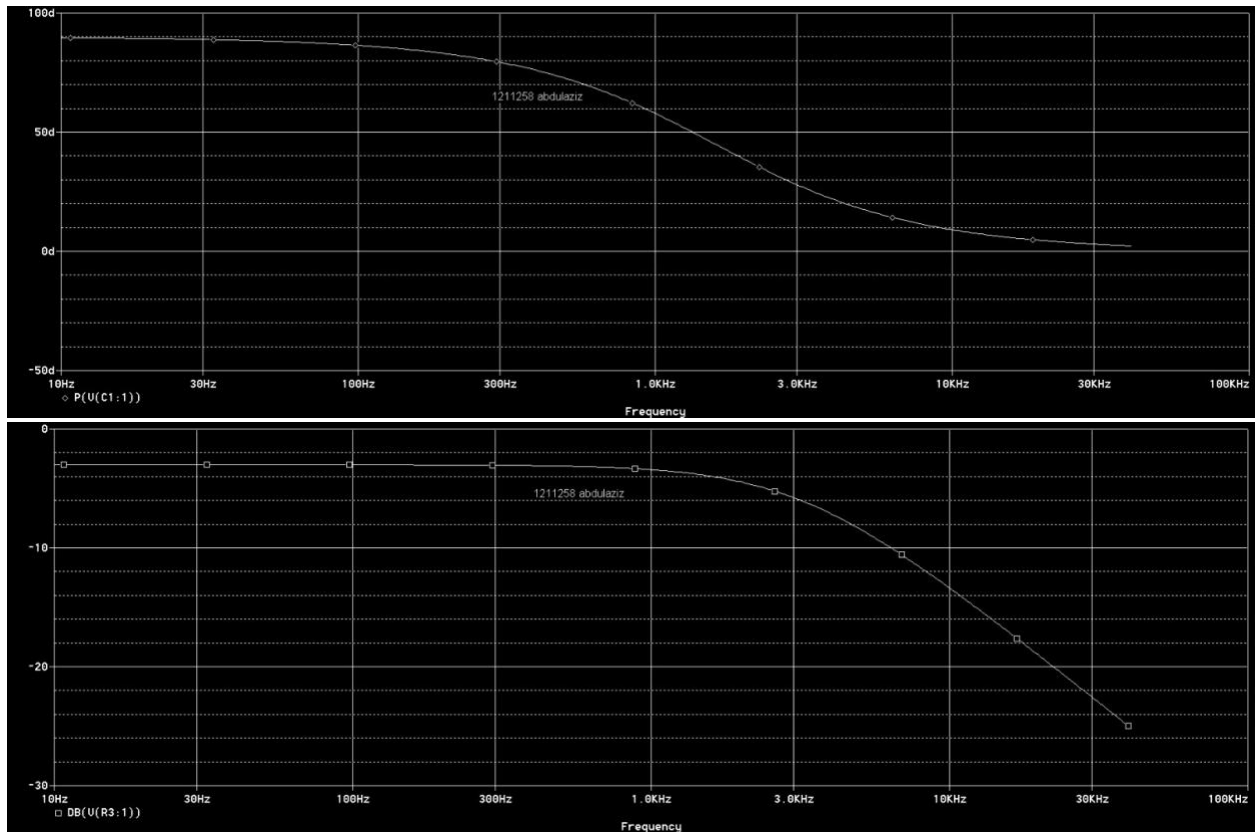
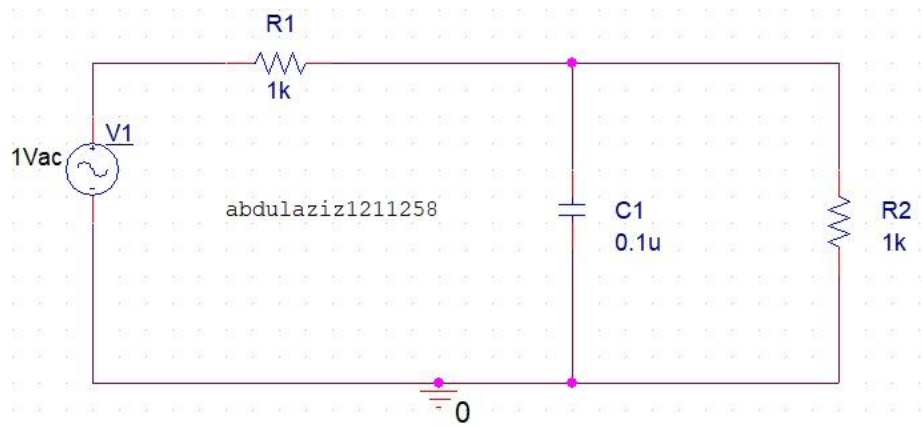
$$\beta = \frac{R}{L} \Rightarrow \frac{3500}{1.13} = 3097.35 \text{ Hz}$$

$$\begin{aligned} \omega_{C1} &\rightarrow \frac{-R}{2L} + \sqrt{\left(\frac{R}{2L}\right)^2 + \frac{1}{LC}} \\ &= 1548.7 + \sqrt{\left(\frac{3500}{2.26}\right)^2 + \frac{1}{1.13 \times 10^{-8}}} \\ &= 7985 \end{aligned}$$

$$f_{C1} = 1270.8 \text{ Hz}$$

$$\begin{aligned} \omega_{C2} &= 1548.7 + \sqrt{\left(\frac{3500}{2.26}\right)^2 + \frac{1}{1.13 \times 10^{-8}}} \\ &= 11082.5 \end{aligned}$$

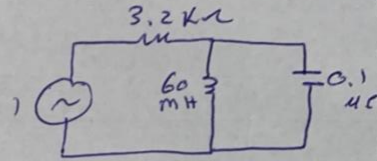
$$f_{C2} \rightarrow 1763.84 \text{ Hz}$$



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$$f_0 = \frac{1}{2\pi\sqrt{LC}}$$
$$= \frac{1}{2\pi\sqrt{906 \times 10^{-4}}}$$
$$= 2054.9 \text{ Hz}$$



$$\beta = \frac{1}{R_c} = 3125 \text{ Hz}$$

$$\omega_1 = \sqrt{\left(\frac{1}{R_c}\right)^2 + \frac{1}{L_c}} = \frac{1}{2R_c}$$

$$\omega_1 = \sqrt{(1562.5)^2 + 1666666.66} = 1562.7$$
$$= 11441.6 \text{ rad/s}$$

$$f_{c1} = 1820 \text{ Hz}$$

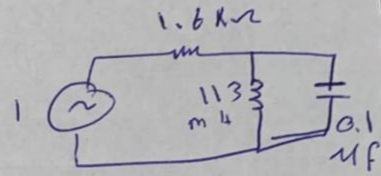
$$f_{c2} = 2318.3 \text{ Hz}$$

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$$f_0 = \frac{1}{R_C} =$$

$$\frac{1}{1600 \times 10^{-9}} = 6250 \text{ Hz}$$



$$\omega_1 = \sqrt{\left(\frac{1}{2R_C}\right)^2 + \frac{1}{L_C} - \frac{1}{2R_C}}$$

$$= \sqrt{\left(\frac{1}{2 \times 1600 \times 10^{-9}}\right)^2 + \frac{1}{0.113 \times 10^{-3}} - \frac{1}{2 \times 1600 \times 10^{-9}}}$$

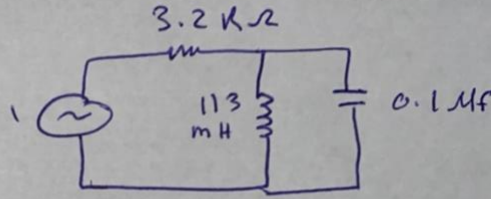
$$= 6787.6 \text{ rad/s}, \quad f_{C1} = \underline{\underline{1080.3 \text{ Hz}}}$$

$$\omega_2 = 13037.6 \text{ rad/s}$$

$$f_{C2} = \underline{\underline{2075 \text{ Hz}}}$$

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$$f_0 = \frac{1}{2\pi\sqrt{LC}}$$
$$= \frac{1}{2\pi\sqrt{0.113 \times 10^{-9}}} = 1497.2 \text{ Hz}$$



$$\beta = \frac{1}{R_L} = 3125 \text{ Hz}$$

$$\omega_{1,2} = \sqrt{\left(\frac{1}{2R_L}\right)^2 + \frac{1}{L_C}} \pm \frac{1}{2R_L}$$

$$\omega_1 = 11098.5$$

$$\omega_2 = 7973.6$$

$$f_{c1} = 1766 \text{ Hz}$$

$$f_{c2} = 1269 \text{ Hz}$$

