

EECE 2210 - Electrical Engineering

Quiz 6

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25 October 2021

Student Name: _____

The circuit shown is an inverting amplifier, with $R_1 = 1 \text{ k}\Omega$, $R_2 = 15 \text{ k}\Omega$, $R_3 = 2 \text{ k}\Omega$. In this case, the positive power supply for the amplifier is $V_{CC} = 1.5 \text{ V}$, and the negative supply is grounded, so that $V_{EE} = 0$. We connect an ideal voltage source, $V_{in} = V_{DC} + v_{AC} \cos \omega t$ the input.

1. What is the voltage gain of the amplifier?

$$A_v = \underline{\hspace{2cm}}$$

2. What will be the two possible output voltages that will result when the amplifier is saturated?

$$V_o = \underline{\hspace{2cm}} \text{ and } \underline{\hspace{2cm}} \text{ V.}$$

3. If $V_{DC} = 0$ what is the maximum of V_{AC} that can be input such that the output will still be a sine wave? By this I mean that the output will not be saturated or "clipped."

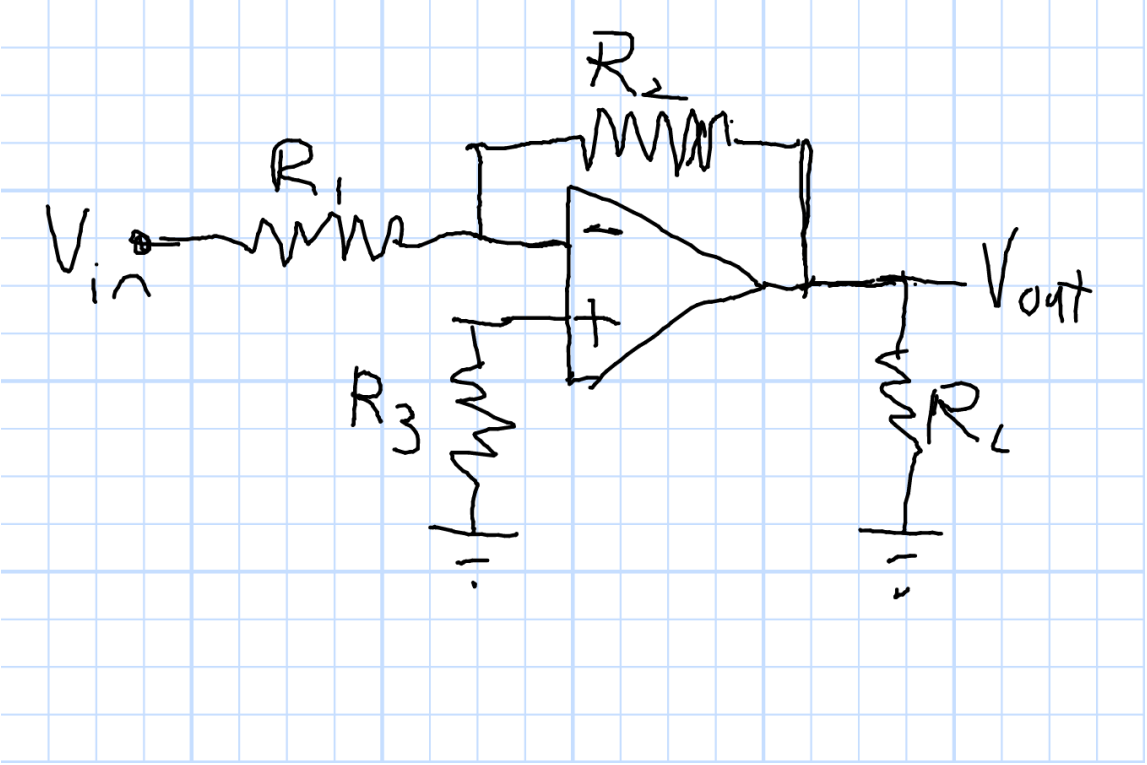
$$V_{ACmax} = \underline{\hspace{2cm}} \text{ V.}$$

3. What value of V_{DC} will allow the largest V_{AC} such that the output will still be a sinusoid?

$$V_{DC} = \underline{\hspace{2cm}} \text{ V.}$$

4. What is the largest value of V_{AC} in part 3?

$$V_{ACmax} = \underline{\hspace{2cm}} \text{ V.}$$



1. What is the voltage gain of the amplifier?

$$A_v = -\frac{15 \text{ k}\Omega}{1 \text{ k}\Omega} = -15$$

2. What will be the two possible output voltages that will result when the amplifier is saturated?

$$V_o = 0 \text{ and } 1.5 \text{ V}.$$

3. If $V_{DC} = 0$ what is the maximum of V_{AC} that can be input such that the output will still be a sine wave? By this I mean that the output will not be saturated or “clipped.”

$$V_{ACmax} = 0 \text{ V}. \text{ The amplifier will always saturate on any positive input.}$$

3. What value of V_{DC} will allow the largest V_{AC} such that the output will still be a sinusoid?

$$\text{Put the DC output in the middle of its range } V_o = 1.5 \text{ V}/2. \\ V_{DC} = 1.5 \text{ V} \frac{1}{A_v} = -100 \text{ mV}.$$

4. What is the largest value of V_{AC} in part 3?

$$V_{ACmax} = 100 \text{ mV}.$$