Instructor:

Asst. Prof. Onur Kurt

Student Name:

ID:

Date:

ITU

EHB 211E: Basics of Electrical Circuits (Fall 2020)

**Homework 3**

Grading Policy:

- You must upload your homework assignment to Ninova before its due date. Late homework will not be accepted/graded.
- Homework should be written clearly and legibly. Your answers should show step-by-step solution of each question. Messy and illegible homework may not be graded.
- You must not ask for answers directly from any aide.
- Academic dishonesty is unacceptable. Plagiarism and cheating on the homework assignment will result in a zero grade.

Question 1-) The circuit shown below utilizes an ideal op amp.

a-) Find I_1, I_2, I_3, I_L, and V_X.

b-) If V_0 is not to be lower than -13 V, find the maximum allowed value for R_L.

c-) If R_L is varied in the range 100 Ω to 1 kΩ, what is the corresponding change in I_L and in V_0?
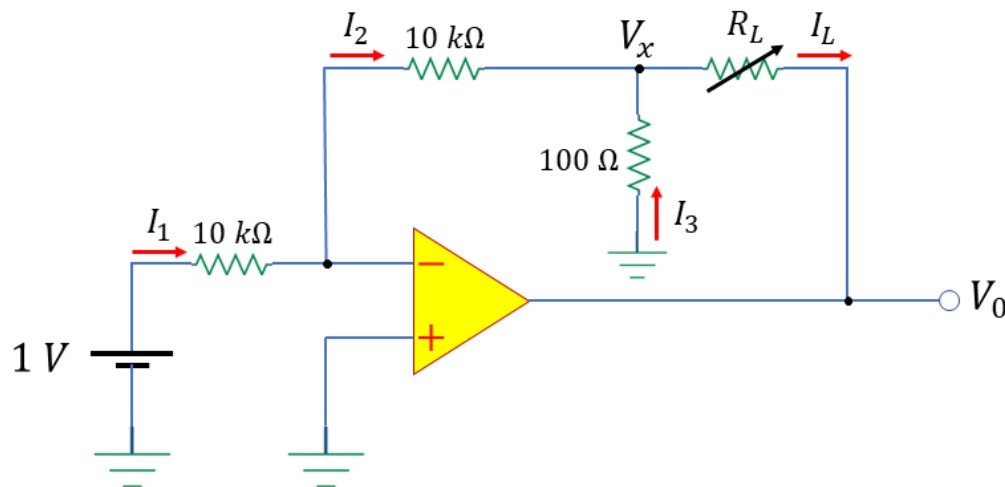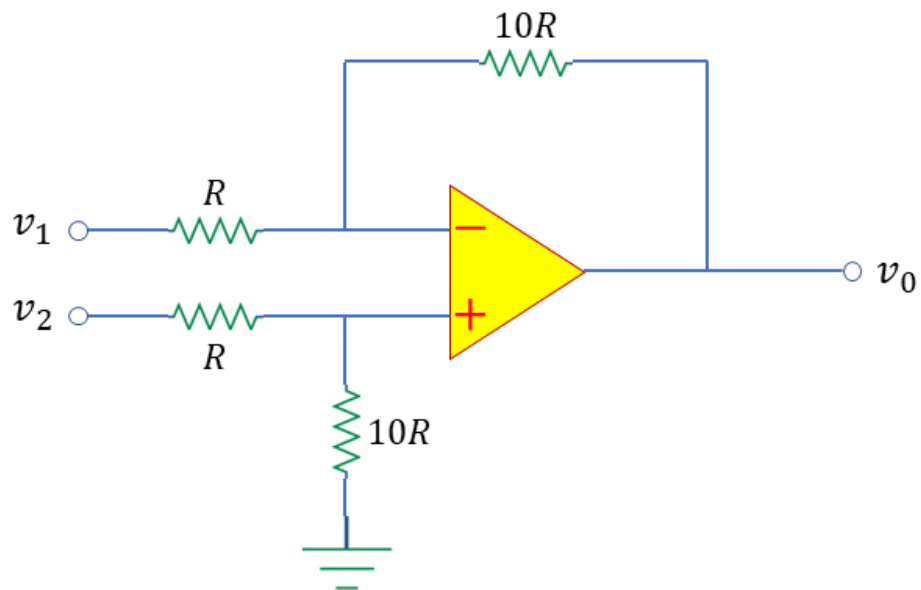
Question 2-) For the op amp circuit shown below, find v_0 in terms of the input voltages v_1 and v_2. Assume the op amp is ideal.
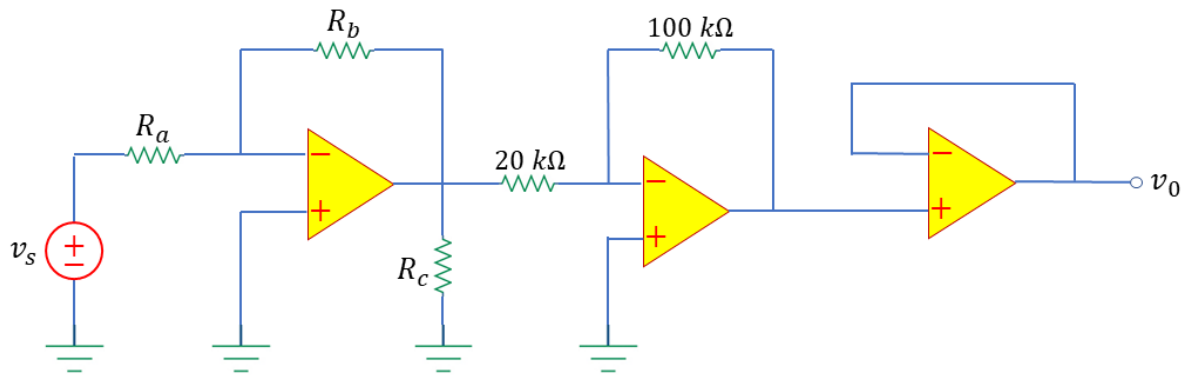
For

$v_1 = 10\sin(2\pi \times 60t) - 0.1\sin(2\pi \times 1000t)$, volts

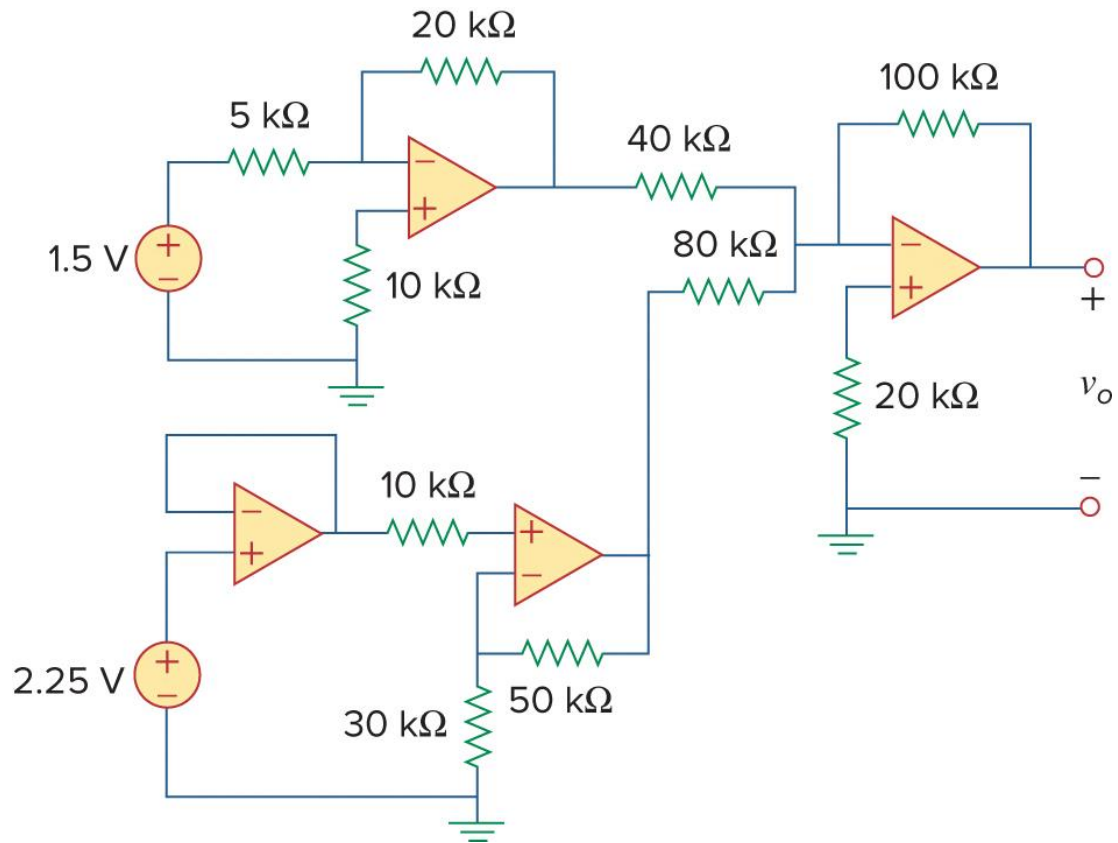$v_2 = 10\sin(2\pi \times 60t) + 0.1\sin(2\pi \times 1000t)$, volts

Question 3-) For the op amp circuit shown below, let $v_s = 10\ V$, and choose proper values for R_a, R_b, and R_c to ensure an output voltage $v_o = 5\ V$. Assume the op amps are ideal.

Question 4-) For the op amp circuit shown below, find the value of v_o.

Question 5-) For the op amp circuit shown below, find the value of v_o using PSpice.