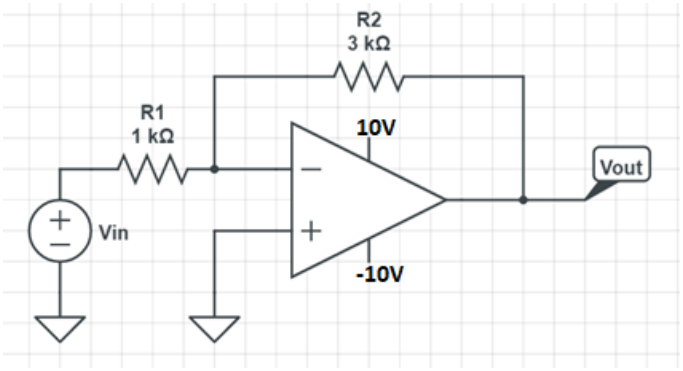
DEZG516/DMZG511 – S1-22
Assignment 2

Due date: April 27th, 11.59 pm
(No Late Submissions Accepted)
Total Points – 40 scaled to 5%

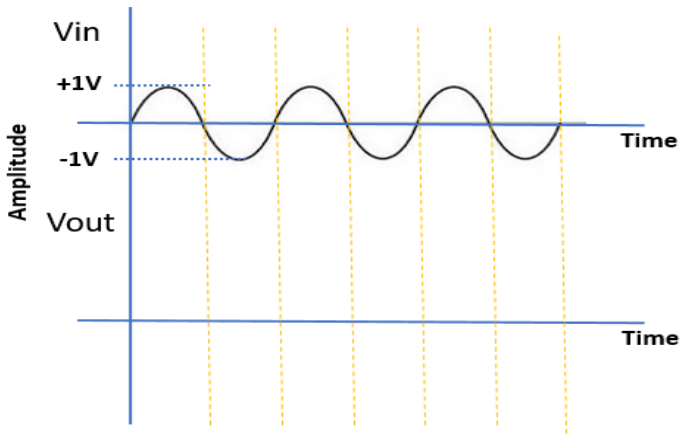
1) **Referring to the datasheet provided (File Name: "Sensor Datasheet"), answer the following questions:**

   a) What type of sensor is this? (1 pt)
   b) Describe in simple words the working principle of the given type of sensor. (2 pts)
   c) Which model specified in the datasheet would you choose if you want to measure 900 kPa? (1 pt)
   d) Can this sensor be operated at 160˚C? (1 pt)
   e) What are the manufacturer recommendations if you want to solder the sensor onto the PCB? (2 pts)
   f) In the application circuit shown in the datasheet, what are the op-amp configurations used? (2 pts)
   g) What is the maximum pressure load in the model KPF201G03? (1 pt)

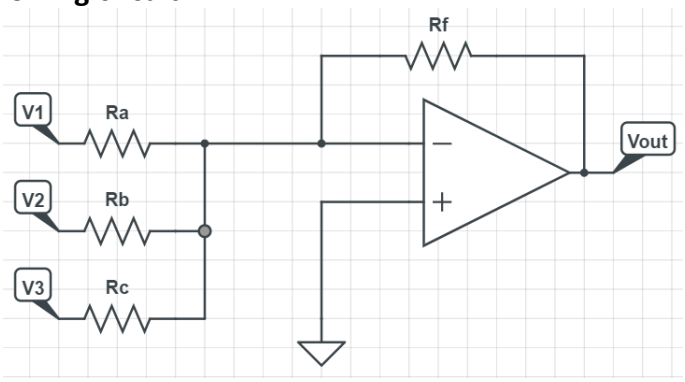
2) **For the circuit shown, answer the following questions:**



a) What is the type of op-amp configuration in the above circuit? (2 pts)
b) What are the minimum and maximum output voltage possible as per this circuit assuming an ideal op-amp? (2 pts)
c) What is the gain in the above circuit? (2 pts)
d) What are the minimum and maximum input voltage values the can be provided to the above circuit without saturating the output? (2 pts)
e) Sketch the output waveform for the given input waveform. Mark the amplitude values. (2 pts)



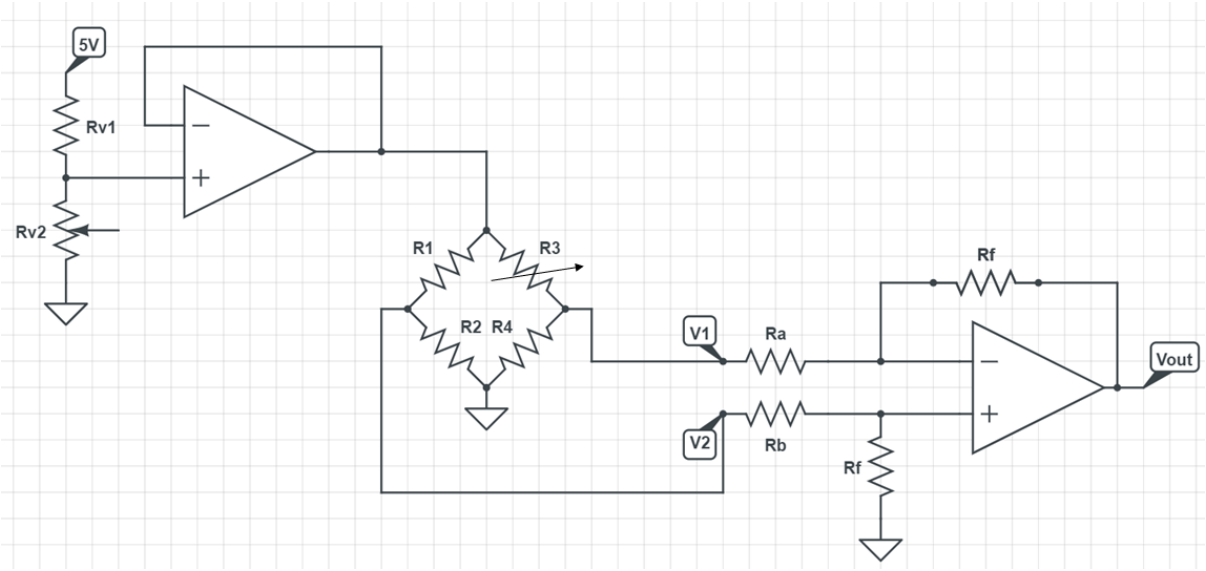
3) Consider the following circuit:



a) Write an expression for Vout in the above circuit. (2 pts)

b) Provide resistor values such that the weightage of V1, V2 and V3 are 0.2, 0.3 and 0.5 respectively. (3 pts)

4) In the below circuit:



a) What are the two types of op-amp configurations in the above circuit? (2 pts)
b) Derive the expressions for V1, V2 and Vout in terms of Ra, Rb, Rf, R1, R2, R3, R4, Rv1 and Rv2. (6 pts)
c) If Rv1 = 40 kΩ and Rv2 = 10 kΩ; R1 = R2 = R4 = 100 Ω, R3 = 150 Ω; calculate the values of V1 and V2. (4 pts)
d) Based on question 3c, if Vout should be 2V, calculate the values of Ra, Rb and Rf. (Note: Ra and Rb values can be equal). (3 pts)