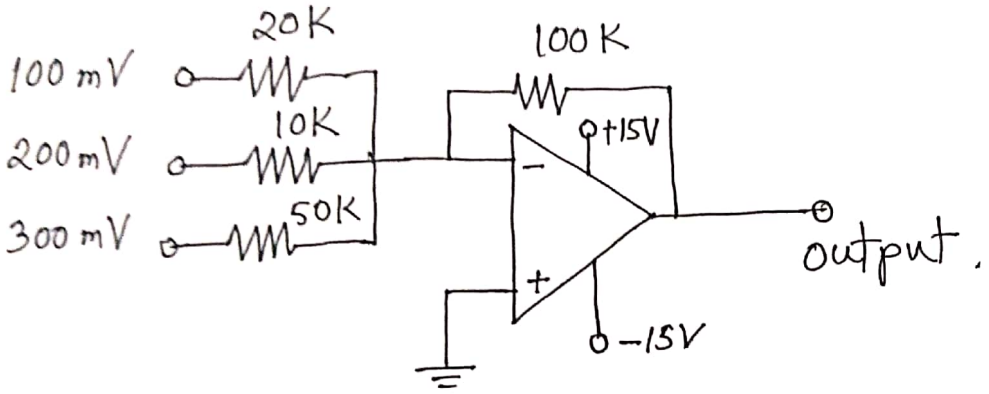
Problem: The audio signals drive a summing amplifier. as shown in the following circuit. What is the output voltage of the amplifier?



Soln: We know the output voltage for a inverting summing amplifier is:

$$V_o = -R_f \left(\frac{V_1}{R_1} + \frac{V_2}{R_2} + \frac{V_3}{R_3} \right)$$

$$= -100 \left(\frac{100}{20} + \frac{200}{10} + \frac{300}{50} \right)$$

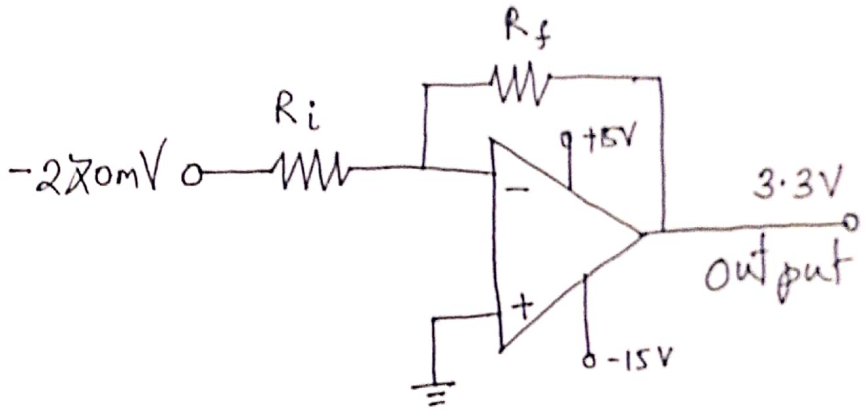
$$= -100(5 + 20 + 6)$$

$$= -100 \times 31 \text{ mV}$$

$$= -3.1 \text{ V}$$

Problem: Design an amplifier circuit using Op-amp to produce 3.3 v output ~~for~~ from a −270 mV input signal.

Soⁿ: The input signal is (−ve) and we need to produce a positive output. So, we will be required an inverting amplifier circuit. The possible circuit is as follows:



From the ratio of output and input voltage we get gain as:

$$A_v = \frac{3.3\ V}{220\ mV} = \frac{3.3}{0.27} \cong 12$$

For an inverting amplifier gain is:

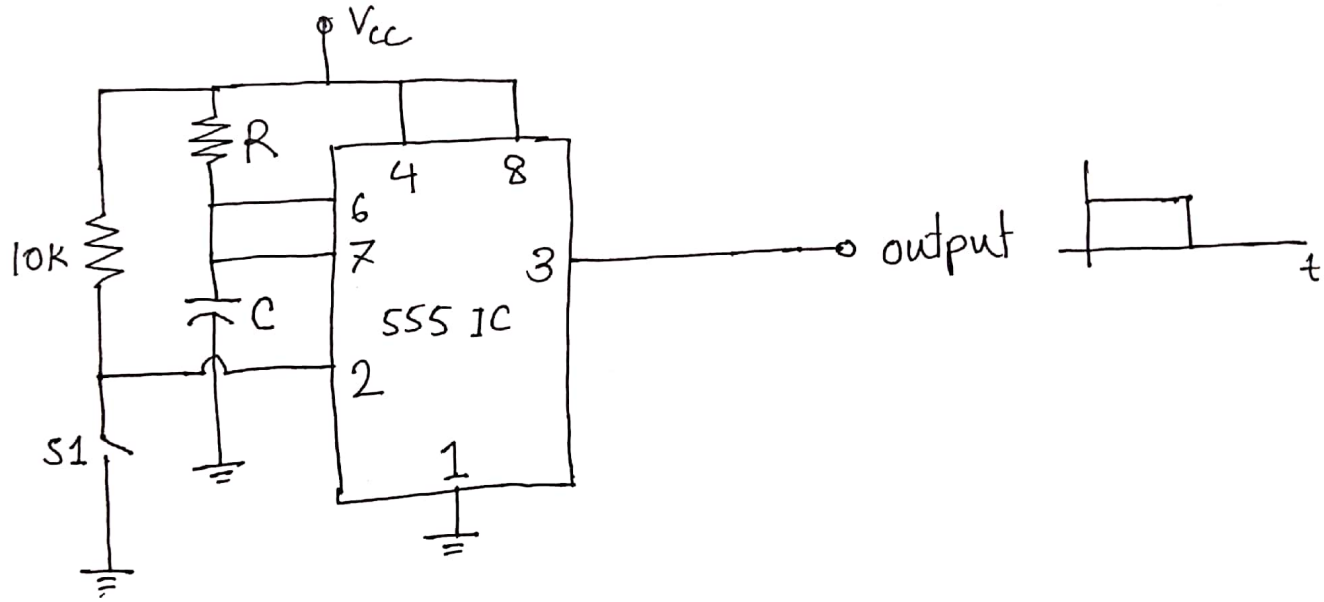
$$A_V = \frac{R_f}{R_i} \Rightarrow \frac{R_f}{R_i} = 12$$

As we have two unknown parameters we need to assume one.

Let, $R_i = 1K$, So, $R_f = 12K$

problem: Design a monostable multivibrator using 555 timer IC to produce a pulse with a width of 100 μS.

Sol^{n}. A 555 monostable circuit will be as follouse:



The width of the output pulse depends on the value of R and C and the relation is

$$t = 1.1RC$$

Let, $C = 15nF$ [it is totaly arbitrary. Try to choose a practical value]

So, $$R = \frac{T}{1.1C} = \frac{100 \times 10^{-6}}{1.1 * (15 \times 10^{-9})} = 6.06K\Omega$$