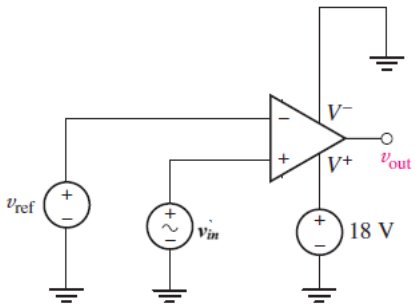
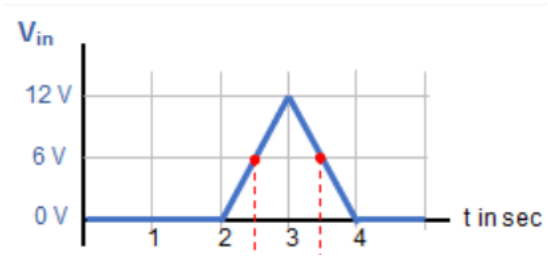
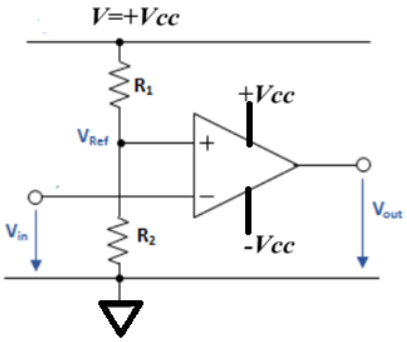
1. For the circuit depicted in below Fig. the input signal v_{in} signal varies continuously between -5 V to + 5 V. Sketch the expected output voltage v_{out} as a function of vin for -5 V ≤ v_{in}≤ +5 V, if v_{ref} is equal to (a) −3 V; (b) +3 V. Assume positive saturation voltage level equal to + supply and negative saturation voltage equal to ground (-Vcc).

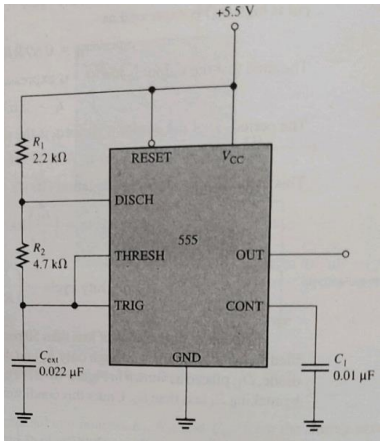


2. Draw the out-put voltage wave form in response to the given input wave. Given +Vcc=12 V, -Vcc=0 V and R_1=R_2.





3. A 555 timer configured to run in the astable mode is shown in Figure below. Determine the frequency of the output and the duty cycle =T_{ON}/(T_{ON}+T_{OFF}). Also draw the output voltage waveform and C_{ext} voltage waveform. Next, a dc supply of 2.8V is applied to control pin (PIN-5), now recalculate the output waveform frequency and duty cycle.



4. A 555 IC is connected as Monostable multivibrator (one shot) with C_{ext}=0.1 μF and R_{ext}= 10 k-ohm.

What is the pulse width of the output?