

This experiment is a combination of a pulse width modulation generator circuit (Lab 5) and a transistor switch circuit (Lab 4.) Assemble the circuit shown in Fig. 1:

Notice that an additional power supply is needed to power the motor. The positive and negative supplies are located on the quadruple supply. Use the variable supply also on the quadruple supply for the higher voltage that is connected only to the D.C. motor. Be sure to connect all the grounds together. Use the oscilloscope to observe the output of the pulse width modulation generator. Also notice that the output of the pulse width modulation generator is connected through a 10k resistor to the base of the transistor switch. The oscilloscope may be connected to any point along the connection between the output of the op-amp and the base of the transistor.

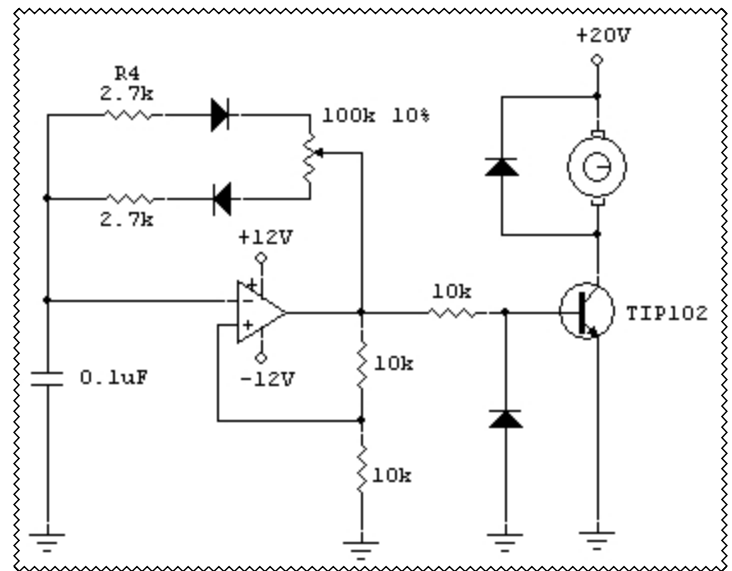


Fig.1

What is the shape of the waveform when the motor turns the fastest? Draw the waveform in Fig.2; label the axes with the appropriate units.

What is the collector current (I_C) at maximum speed?

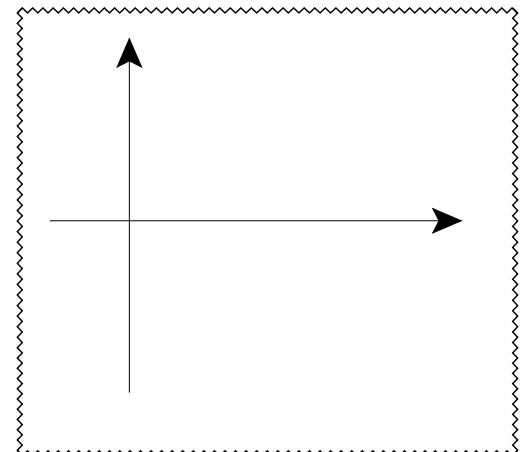


Fig.2 Maximum Speed

What is the shape of the waveform when the motor speed is the slowest? (Draw the waveform in Fig.3.)

What is the collector current (I_C) at the minimum speed?

What is the function of the transistor?

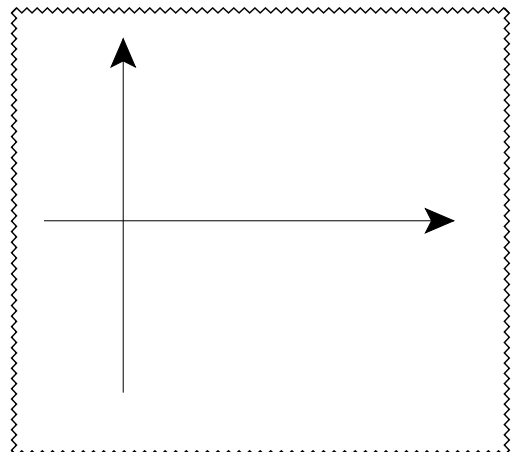


Fig. 3 Minimum Speed