

EXPERIMENT - 2

OBJECT :

Use of Monostable Multivibrator and find the pulse width by varying the value of base resistance of Q.2.

APPARATUS REQUIRED :

1. Multivibrator set - Up, Model - MV - 12 - 1.
2. Oscilloscope - 1.
3. Connecting heads - 8.
4. Co-axial Cable - 2.

THEORY:

Multivibrator is an Oscillator which produces voltage pulses and extended voltage waveforms, usually occurring periodically. It uses two active devices with positive feedback in such a way that the two devices tend towards opposite states i.e. one ON and other OFF. In principle, it is a two stage R.C. Coupled Amplifier. The output voltage of one stage is feedback to another stage which sustains the oscillations. R.C. constant of the circuit determines the frequency of the multivibrator.

Multivibrators are switching circuit, which form basic blocks of all counting and shaping circuits used in nuclear device. Moreover, they are basis of all digital logicals devices such as high speed computers. Some of the other applications are as follows:

- (i) Generation of pulses occurring periodically
- (ii) Generation of extended waveforms occurring periodically.
- (iii) Synchronized generation of pulses and extended waveforms.
- (iv) Frequency multiplication
- (v) Introduction of time delay.

Multivibrators may be classified in the following three categories:

(A) ASTABLE OR FREE RUNNING MULTIVIBRATOR : Read in Experiment No 1

Now second one i.e.

(B) UNIVIBRATOR OR MONOSTABLE MULTIVIBRATORS :

This generates voltage pulses and extended waveforms but require one driving pulse for generation of each cycle of waveform.

Diagram

CIRCUIT DIAGRAM:

The model uses two p-n-p switching transistor (2N404) T_1 and T_2 . The basic circuit diagram is shown in Fig. 2. The output of the circuit is the pulse of fixed width and amplitude for every input pulse greater than some threshold. As Fig. 2, T_1 is biased through R_4, R_5 divider. The base of T_2 is isolated from -9 Volt line by C_1 and is initially at ground potential. Hence T_2 is OFF. When a positive pulse of sufficient amplitude is applied at the input, T_1 goes to cut off and the potential at the collector of T_1 will rise. The charging of C_1 will increase the base voltage of T_2 which makes T_2 to conduct and the output voltage drops. Regeneration occurs through common emitter connection and T_1 is held OFF as long as T_2 is ON. However, C_1 discharge through T_1 the base-emitter impedance of T_2 and R_2 , the base voltage of T_2 slowly drops until T_2 reaches cut off and at the same time T_1 starts conducting. Thus, unless the input pulse is too long, the output pulse width and amplitude are independent of the output.

PROCEDURE :

1. Connect the Set - Up to the A.C. mains do not switch ON.
2. Connect the power supply terminals to the univibrator and free running multivibrator circuits with proper polarities.
3. Connect the output I of free running multivibrator to the input of univibrator. (Ground terminal of free running to the ground terminal of univibrator). Now switching ON.
4. At the output of the univibrator, connect an oscilloscope and observe the wave form.

OBSERVATIONS :

Sr. No.	Input Square wave pulse width	Frequency (Hz)	Output pulse width of Q1	Output pulse width of Q2	Value of R
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

DISCUSSIONS :

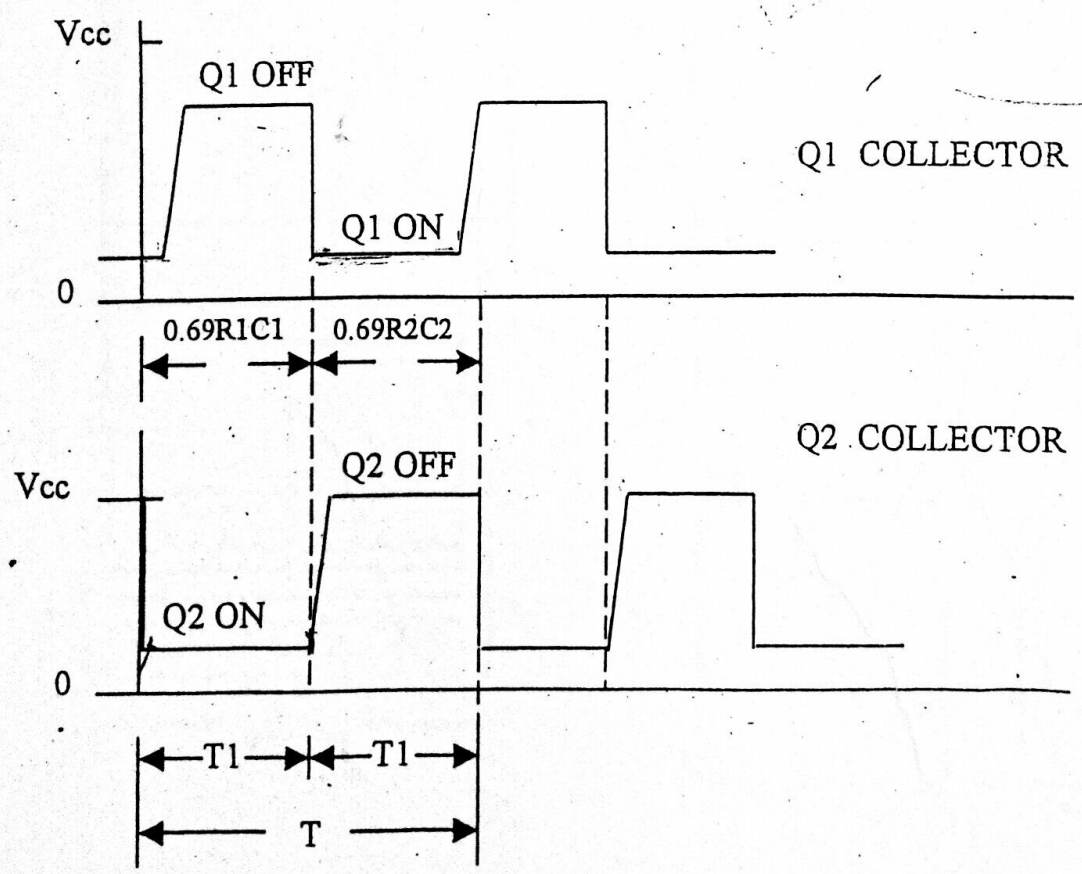
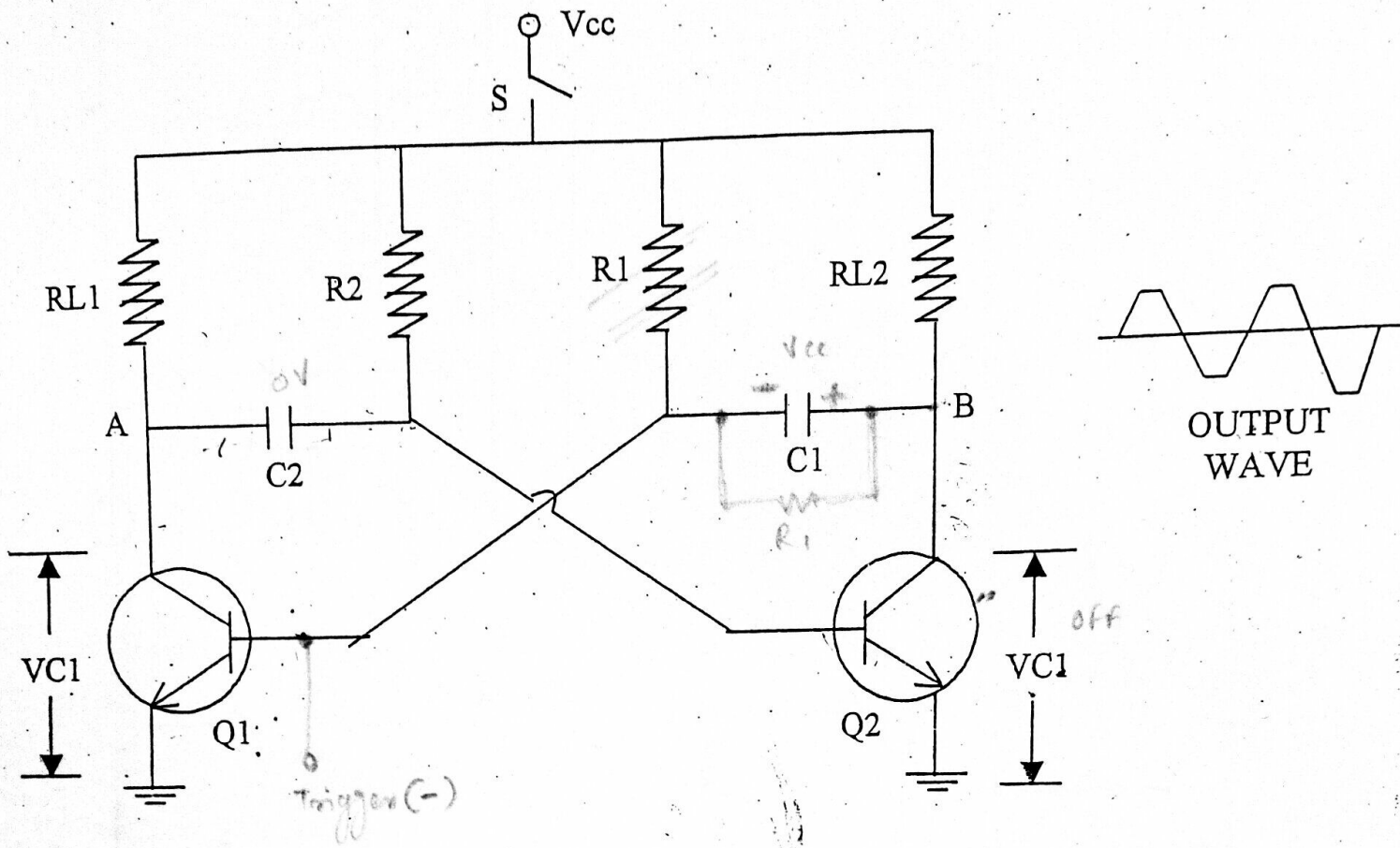
If rectangular waveform is not observed discuss the reasons of not getting the rectangular waveform.

PRECAUTIONS :

1. Before connecting the power supply, check the output voltage with the help of Multimeter, it should be -9 Volt.
2. Ground of the power supply must be connected to the grounds of the other circuits.

QUESTIONS AND EXERCISE :

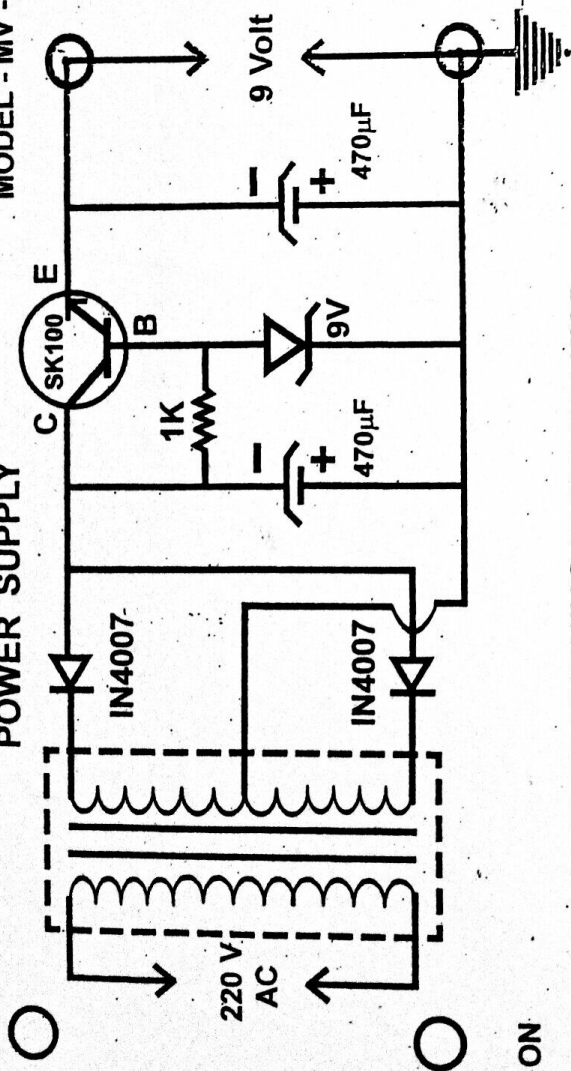
1. Can we get any output from univibrator, if the output of free running multivibrator is not connected. If no, why ?
2. Why do we get only one pulse for each trigger ?
3. Explain the working of the univibrator.



STUDY OF MULTIVIBRATORS

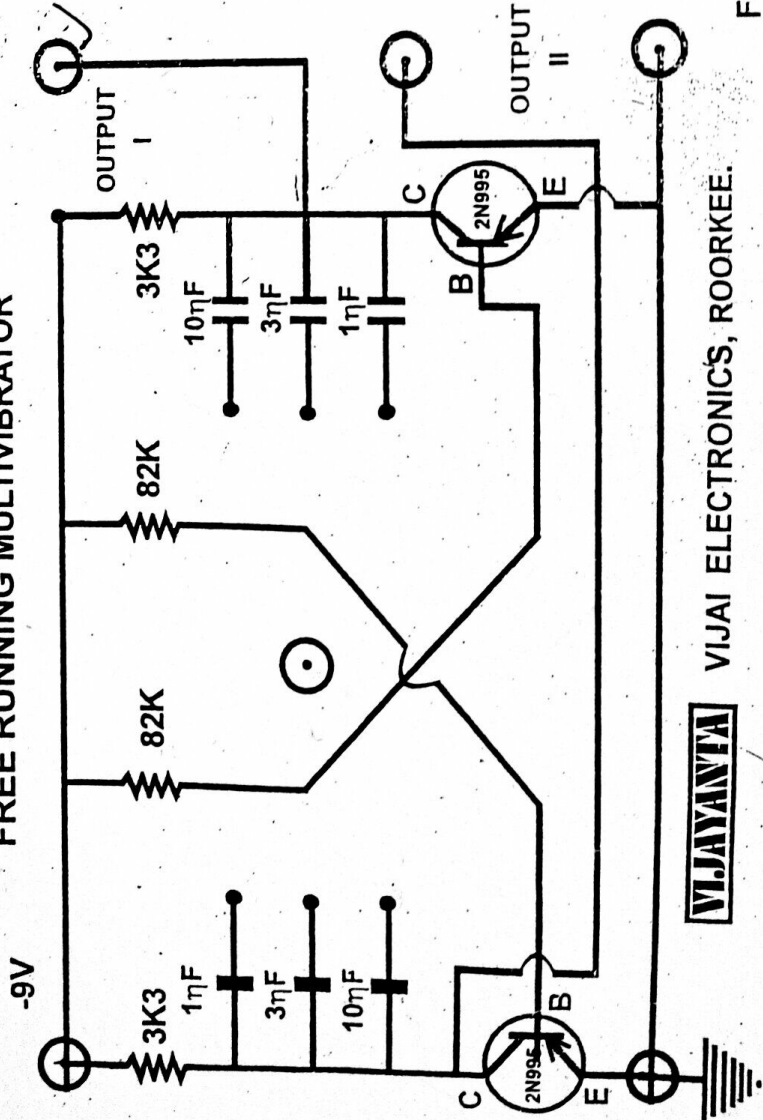
MODEL - MV - 12

POWER SUPPLY

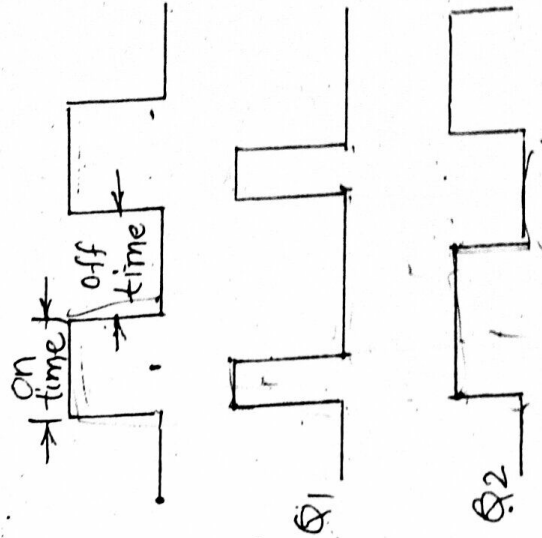
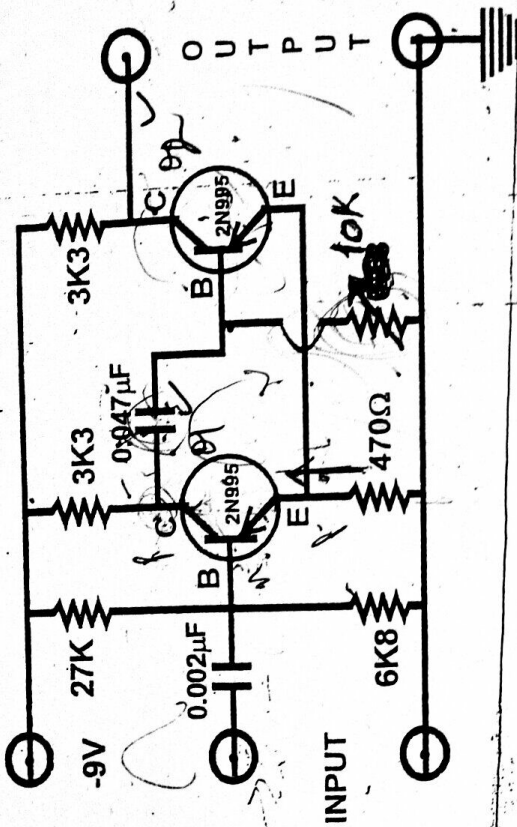


ON

FREE RUNNING MULTIVIBRATOR



UNIVIBRATORS



VIJAYANTA VIJAI ELECTRONICS, ROORKEE.

Fig. 4