EXPERIMENT NO. 11

Objective: To study the two stage R.C. (Resistance Capacitor) coupled amplifier and

(i) Find its bandwidth.

(ii) Find input & Output impedance.

Apparatus Used:

(i)	CRO	1
(ii)	Funcation Gen 1MHZ	1
(iii)	[redacted]	6
(iv)	Resistance Box	1
(v)	Coaxial Cable	3
(vi)	Connecting Loads	5
(vii)	[redacted]–2 Stage RCAmP	1

Theory:

In most of the applications, the gain of the single transistor amplifier is inadequate. Hence two or more stages are usually cascaded to provide the desired gain. Sometime, cascading is done to achieve the correct input or output impedance for a specified application.

The voltage V_i forms the input voltage to the first stage while V_0 is the output voltage of the second stage. The overall voltage gain = V_0/V_i.

Any desired gain may be obtained by using a suitable number of stages in cascade. Thus it becomes possible to raise a weak signal, a few microvolt to the level of several volts. However, in such cases there is an upper limit on the number of stages which can be cascaded.

The output transistor TR-1 of first stage gets coupled to the input transistor TR-2 of second stage via a coupling capacitor (C) which also serves as a blocking capacitor which prevents the DC component of DC supply from reaching the input at TR-2. Resistor R_C forms the collector circuit resistance. The resistance R_1 & R_2 provide the desired biasing arrangement. Bypass capacitor C_E prevents loss of amplification due to negative feedback. Capacitor C_E is chosen large that it acts as an A.C. short circuit across R_e. For high frequency response of the amplifier one has to consider the junction capacitances, capacitance associated with device socket and the proximity of the components to the chasis and the signal level.

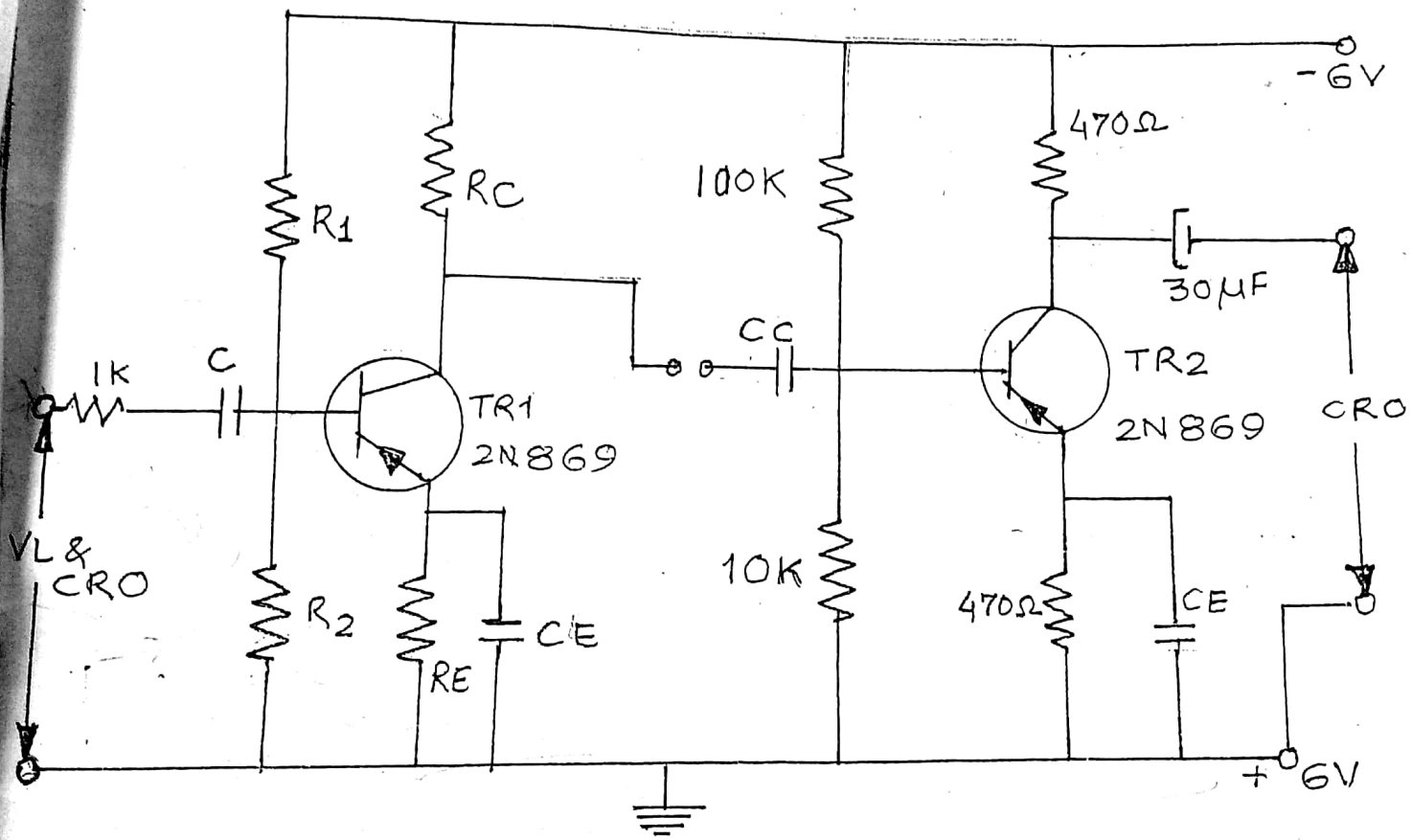

Figure.1.

Procedure:

1. Connect the circuit to the dc supply (Fig. 1)
2. A signed generator is to be connected to the input.
3. A CRO each is to be connected across the input & output.
4. To plot the frequency response curve, keep input signal amplitude V_i fixed vary the frequency of the input signal from 10Hz to 100KHz and note the output signal amplitude.
5. To find input impedance Z_i keep V_i fixed. Place a decade resistance box in series with input. Vary resistance in the box till output becomes $(V_0/2)$. This value of the resistance in the resistance box gives Z_i.
6. To find output impedance Z_0 disconnect the resistance box connected in 5 above and place it across the output. Vary the value of the resistance in the box till the outputs place it across the output. Vary the value of the resistance in the box till the output becomes $(V_0/2)$. This value of the resistance in the resistance box gives Z_0.

Observations:

1. To plot the frequency response curve of the R-C coupled amplifier

Table 1.

V_i = 100m Volts

SI.No.	Frequency (Hz)	Output Voltage (Volts)

2. To find Z_i & Z_0

Impedance (ohms)	Value of resistance to make output ($V_0/2$) (ohms)
Z_i	
Z_0	

Calculations:

1. To find Bandwidth: Locate the frequencies corresponding to the 3dB points and find the difference. This gives the bandwidth.

   BW = HZ

2. Z_i ohms Z_0 = ohms

Result:

Precautions

Report Questions:

1. What conditions have to be satisfied when connecting two amplifiers in cascade?
2. Why is C_z placed to provide an AC short across R_e?
3. How can you estimate the value of C_z for the amplifier?