Object:
To examine the Common Base (CB) Amplifier characteristic of transistor.

Apparatus:
1. Two DC power supply.
2. Function generator.
3. AVOmeter.
4. Oscilloscope.
5. Transistor, Resistors 1 KΩ and 100 KΩ, Capacitors 1μf.

THEORY
Fig. 1 shows the circuit of a single-stage CB amplifier using NPN transistor.
As seen, input ac signal is injected into the emitter-base circuit and output is taken from the collector-base circuit. The E/B junction is forward-biased by $V_{EE}$ where as C/B junction is reverse-biased by $V_{CC}$. The Q-point or dc working conditions are determined by dc batteries along with resistors $R_E$ and $R_C$. In other words, values of $I_E$, $I_B$ and $V_{CB}$ are decided by $V_{CC}$, $V_{EE}$, $R_E$ and $R_C$. The voltage $V_{CB}$ is given by the equation $V_{CB} = V_{CC} - I_C R_C$.
When no signal is applied to the input circuit, the output just sits at the Q-point so that there is no output signal. Let us now see what happens when we apply an ac signal to the E/B junction via a coupling capacitor $C_1$ (which is assumed to offer no reactance to the signal).

![Circuit Diagram]

**Fig. 1**

Circuit Operation
When positive half-cycle of the signal is applied, then
1. forward bias is decreased because $V_{BE}$ is already negative with respect to the ground.
2. consequently, $I_B$ is decreased.
3. IE and hence IC are decreased (because they are both nearly \( \beta \) times the base current).
4. the drop IC RC is decreased.
5. hence, VCB is increased as seen by the equation given above

Common-base amplifier has
1. very low input resistance (30 – 150 \( \Omega \)).
2. very high output resistance (up to 500 K).
3. a current gain \( \alpha < 1 \).
4. large voltage gain of about 1500.
5. power gain of up to 30 dB.
6. no phase reversal between input and output voltages.

**Procedure:**
1. Connect the circuit as shown in figure (2).
2. Measure Ic and Ie.
3. Draw output waveform on graph paper.

**Discussion:**
1. Determine \( A_i, A_v, \) and \( A_p \).
2. What is the effect of \( R_e \) on amplifier?