Object:
To examine the Common collector (CC) 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 and 2 show the circuit of a single-stage CC amplifier using an NPN transistor. The input signal is injected into the base-collector circuit and output signal is taken out from the emitter-collector circuit. The E/B junction is forward-biased by $V_{EE}$ and C/B junction is reverse-biased by $V_{CC}$. The quiescent values of $I_B$ and $I_E$ are set by $V_{CC}$ and $V_{EE}$ together with $R_B$ and $R_E$. As seen from Fig. 2.

$$I_E = \frac{V_{EE} - V_{BE}}{R_E + R_B / \beta}$$
**Circuit Operation**

When positive half-cycle of the signal is applied, then
1. forward bias is *increased* since $V_{BE}$ is positive w.r.t. collector i.e. ground,
2. base current is *increased*,
3. emitter current is *increased*,
4. drop across $R_E$ is *increased*,
5. hence, output voltage (i.e. drop across $R_E$ is *increased*).

Consequently, we get positive half-cycle of the output. It means that a *positive-going* input signal results in a *positive going* output signal and, consequently, the input and output signals are in phase with each other as shown in Fig. 2.

**Characteristics of a CC Amplifier**

A CC amplifier has the following characteristics :
1. high input impedance (20-500 K),
2. low output impedance (50-1000 Ω),
3. high current gain of $(1 + \beta)$ i.e. 50 – 500,
4. voltage gain of less than 1,
5. power gain of 10 to 20 dB,
6. no phase reversal of the input signal.

**Procedure:**

Consider the circuit shown in Fig. (3), it is a single stage amplifier
1- Connect the circuit.
2- Give an input to the amplifier so that the output is 4Vpp at 1 kHz Measure the input voltage (f=1 kHz).
3- Give an input of 0.5V p-p to the amplifier.

**Discussion:**

1. Determine $A_i$, $A_v$, and $A_p$. 
2. What is the effect of $R_b$ on amplifier?

![Fig. 3](image-url)