**Theory**

An amplifier is a circuit which magnify (amplify) the input signal.

When ac source is coupled to the base. This produces fluctuations in the base current and hence in the collector current of the same shape and frequency. During positive half cycle, base current increase, causing the collector current to increase. This produces a large voltage drop across the collector resistor; therefore, the voltage output decreases and negative half cycle of output voltage is obtained. Common emitter BJT Amplifier 4 Conversely, on the negative half cycle of input voltage less collector current flows and the voltage drop across the collector resistor decreases, and hence collector voltage increases we get the positive half cycle of output voltage.

The most common circuit configuration for an NPN transistor is that of the Common Emitter Amplifier and that a family

of curves known commonly as the Output Characteristics Curves, relates the Collector current (IC), to the output or Collector

voltage (VCE), for different values of Base current (IB). All types of transistor amplifiers operate using AC signal inputs

which alternate between a positive value and a negative value. Presetting the amplifier circuit to operate between these two

maximum or peak values is achieved using a process known as Biasing. Biasing is very important in amplifier design as it

establishes the correct operating point of the transistor amplifier ready to receive signals, thereby reducing any distortion to

the output signal.

The single stage common emitter amplifier circuit shown below uses what is commonly called "Voltage Divider Biasing".

The Base voltage (VB) can be easily calculated using the simple voltage divider formula below:

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Thus, the base voltage is fixed by biasing and independent of base current provided the current in the divider circuit is large compared to the base current. Thus assuming IB ≈0, one can do the approximate analysis of the voltage divider network without using the transistor gain, β, in the calculation. Note that the approximate approach can be applied with a high degree of accuracy when the following condition is satisfied: βRE ≥ 10R2.