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EXP – 3: MULTISTAGE BJT

AIM: *To perform transient and AC analysis of a multi stage BJT using LTSpice software*

APPARATURS REQUIRED: *LTSpice software*

THEORY:

A Bipolar Junction Transistor (BJT) is a three-terminal device which consists of two pn-junctions formed by sandwiching either p-type or n-type semiconductor material between a pair of opposite type semiconductors. The primary function of BJT is to increase the strength of a weak signal, i.e., it acts as an amplifier. A BJT can also be used as a solid state switch in electronic circuits.

There are two types of BJTs –

- *NPN Transistor*

  An npn-transistor is composed of two n-type semiconductor materials which are separated by a thin layer of p-type semiconductor. The two terminals viz. Emitter and Collector are taken out from the two n-type semiconductor and the Base terminal is from the p-type semiconductor.

- *PNP Transistor*

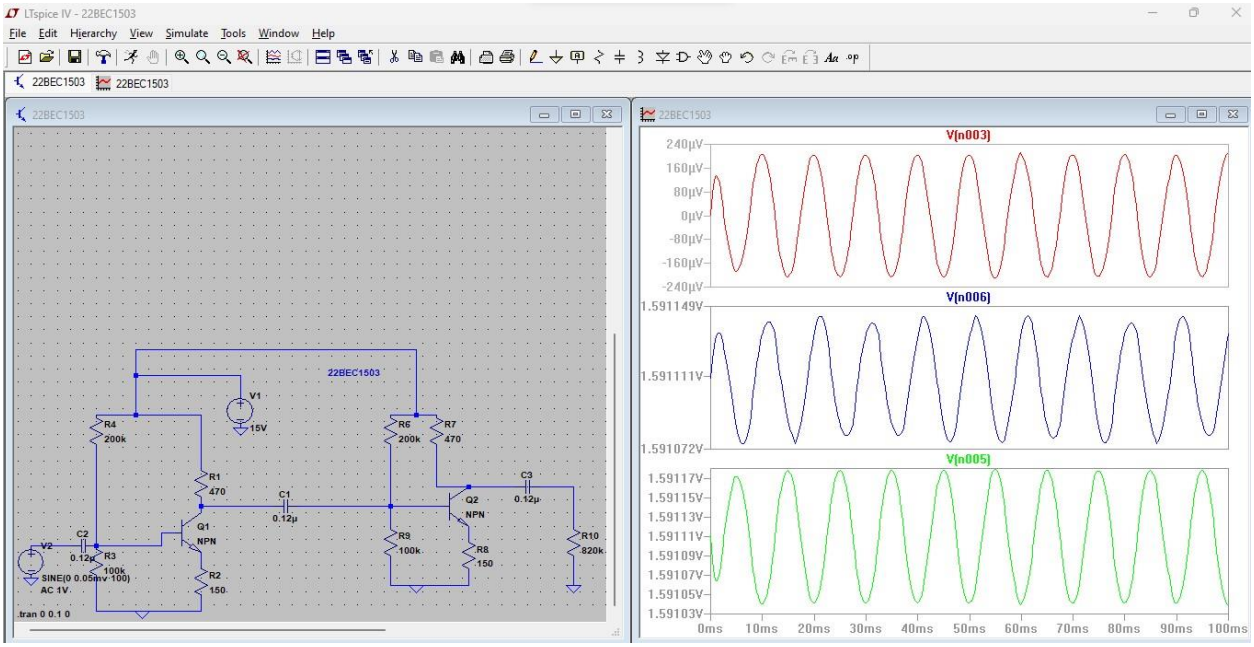
  A pnp-transistor is composed of two p-type semiconductors which are separated by a thin layer of n-type material. The two terminals viz. Emitter and Collector are taken out from the two p-

type semiconductor layers and the Base terminal is from the n-type semiconductor. For the pnp-transistor, the conventional current flows into the emitter as indicated by the inward arrow.

PROCEDURE:

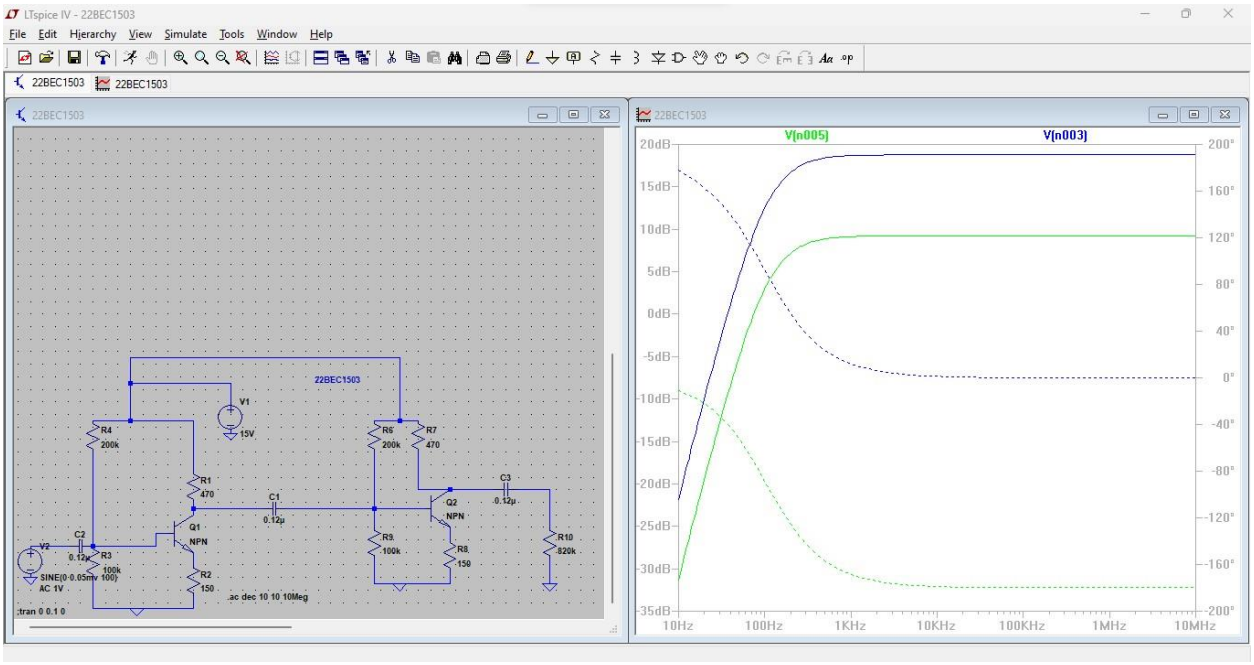
1. *Build the circuit diagram of a double stage BJT in LTSpice.*
2. *Do transient analysis by setting stop time as 0.1 and time to start saving data as 0. Analyse the graph between input and output.*
3. *Do AC analysis by setting type of sweep as 'Decade', no. of points in decade as 10, start frequency as 10 and stop frequency as 10Meg. Observe the output graph.*

TRANSIENT ANALYSIS:

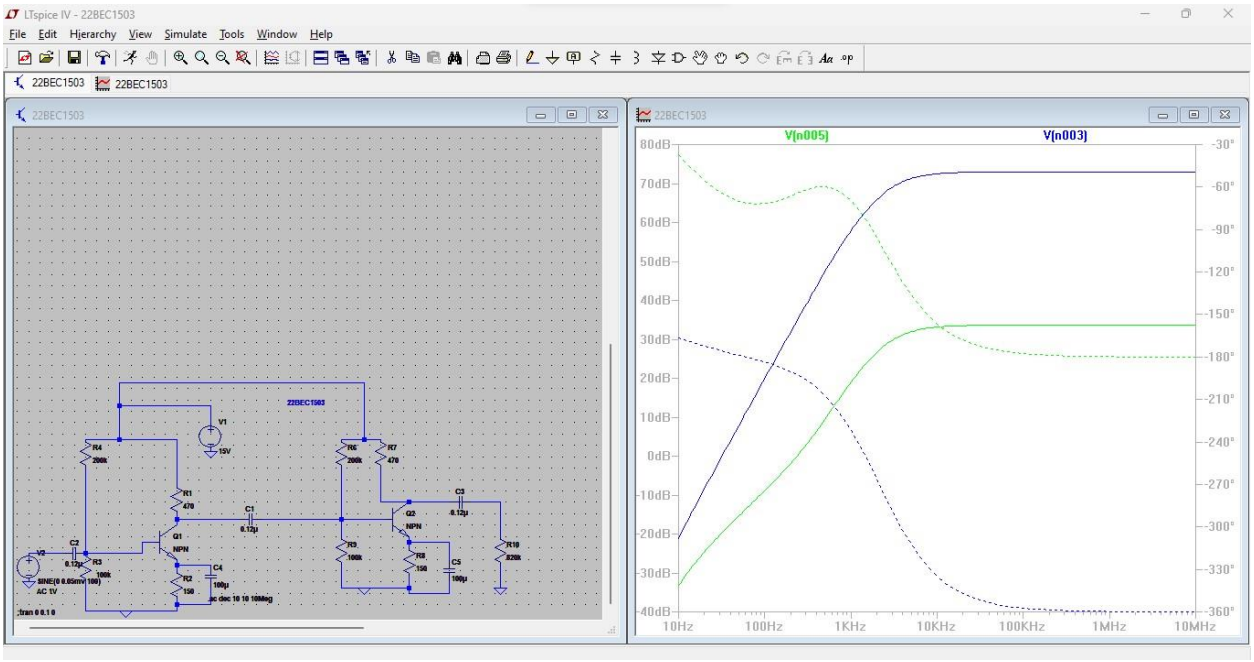


AC ANALYSIS:

WITHOUT BYPASS CAPACITOR :



WITH BYPASS CAPACITOR:



RESULT: *Hence the transient and AC characteristics of a multi stage BJT are analyzed.*