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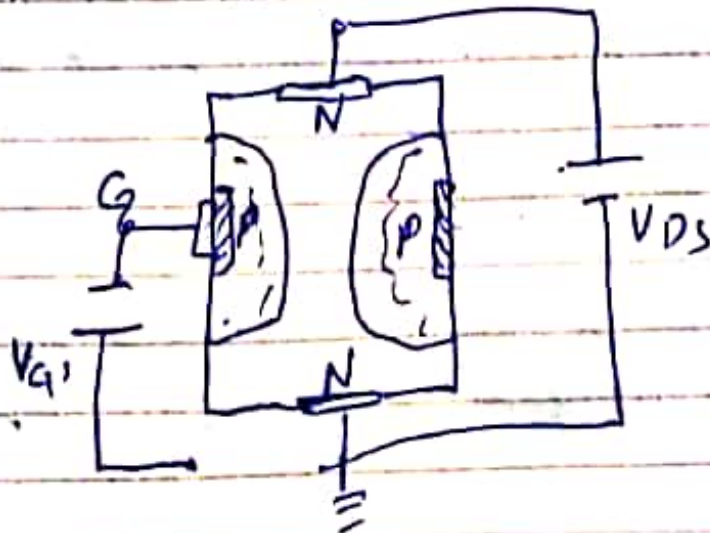
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SUBJECT	C-ARCHITECTURE

Q No 1

(a) Explain how JFET works, including the pinchoff and gate source cutoff voltage?

Ans The working of JFET can be explained as follows:
Case I:-

When a voltage V_{DS} is applied between drain and source terminals and voltage on the gate is zero as shown in the following figure, the two Pn junctions at the sides of the bar establish depletion layers.



(2)

And the cutoff voltage is voltage at which a battery is considered fully discharged, beyond which further discharged could cause harm.

And the the pinchoff voltage is the drain to source voltage after which the drain to source current becomes almost constant and JFET enters into saturation region and is defined only when gate to source voltage is zero.

(Q) Compare the JFET and bipolar junction transistor. Also explain the advantages and disadvantages of each?

Ans The comparison of the JFET and BJT is that the JFET junctions is reverse-biased the Gate current is practically zero.

And the base current of the BJT is always some value greater than zero.

Advantages of JFET:

- (1) The JFET has high input impedance
- (2) JFET are protected to radiation
- (3) The JFET is a low power consumption device.

Disadvantages:

- (1) The main disadvantage of the JFET is relatively low gain bandwidth product

(3)

(2) The performance of JFET go down as frequency increases due to feedback by internal capacitance.

Advantages of BJT:-

- (1) It has a large gain bandwidth.
- (2) It shows better performance at high frequency.
- (3) It has a better voltage gain.

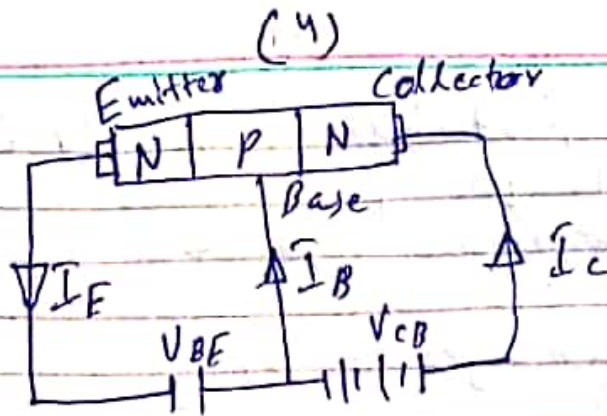
Disadvantages:-

- (1) The BJT is more an effect of radiation.
- (2) It more noise produced.
- (3) It has a low thermal stability.

Q No. 2

(a) Draw an npn transistor showing the n and p region. And then bias the transistor properly and explain how it works?

Ans Bipolar transistor or BJT, comes in two basic forms. An NPN (Negative - positive - Negative) and PNP (Positive - Negative - Positive). The most commonly used transistor is NPN. A Bipolar NPN transistor configuration drawn following configuration.



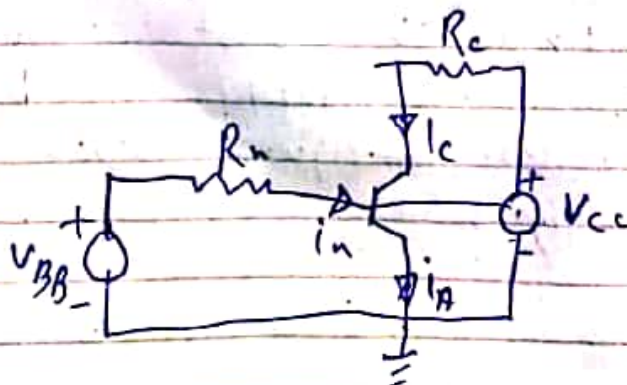
$$I_E = I_B + I_C$$

Working of NPN

The NPN transistor is designed to pass electron from the emitter to the collector (so conventional current flows from collector to emitter). The emitter "emits" electrons into the base, which controls the number of electrons the emitter emits.

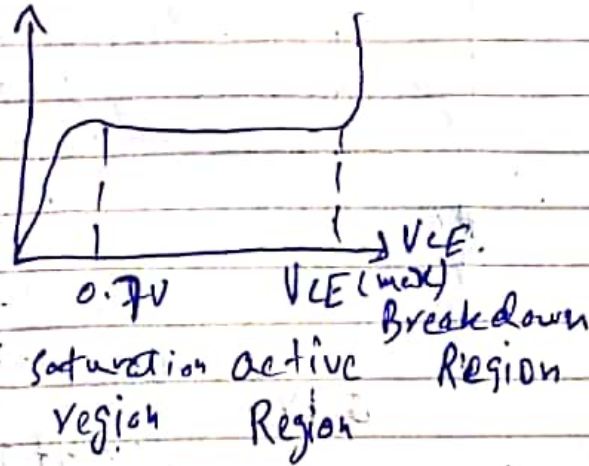
(b) Draw a set of collector curves. Then, using these curves show how the four operating regions of a transistor?

Consider the circuit of the following fig which we will use to learn about the operation of the transistor in a circuit by adjusting the voltage sources V_{BB} and V_{CC} .



(5)

A graph of the collector characteristic i_c versus V_{CE} is shown in following fig.



Suppose V_{BE} and V_{CE} are produce a current $i_B > 0$ and $V_{CE} = 0V$, Then Both BE and BC junction are forward biased. The saturation region corresponds to the case where both junction are forward biased.

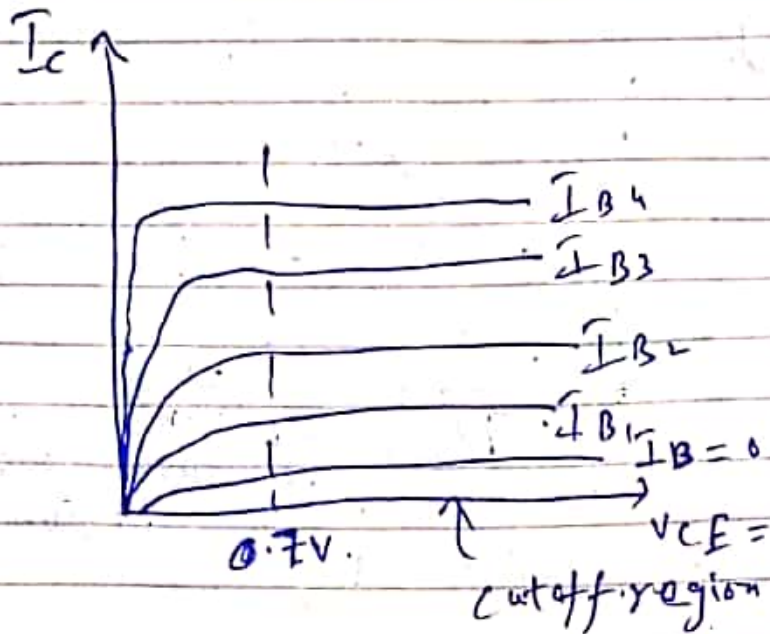
Active region or linear region corresponding to the BE junction forward biased and BC reverse biased.

If V_{CE} increases too much, the transistor goes into the breakdown region. This should be avoided.

The following fig shows collector curves for different four values of base current. When $i_B = 0$ A, the transistor is in its cutoff region, and only a small leakage

(8)

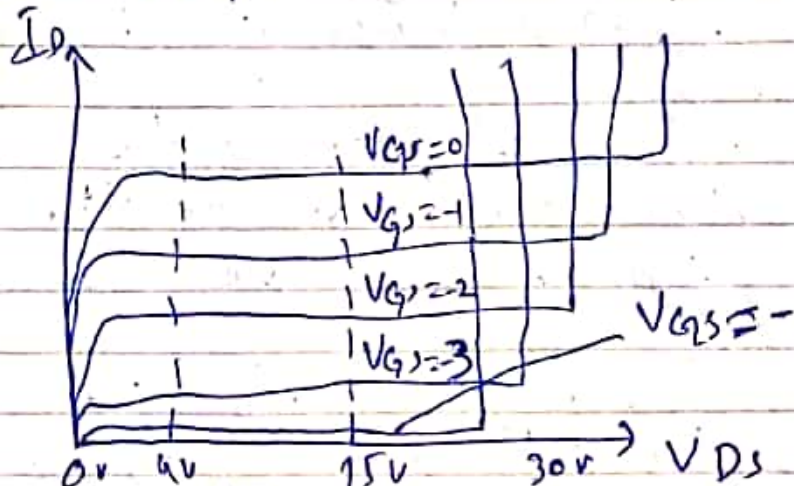
Current flows as I_c



Q No 1

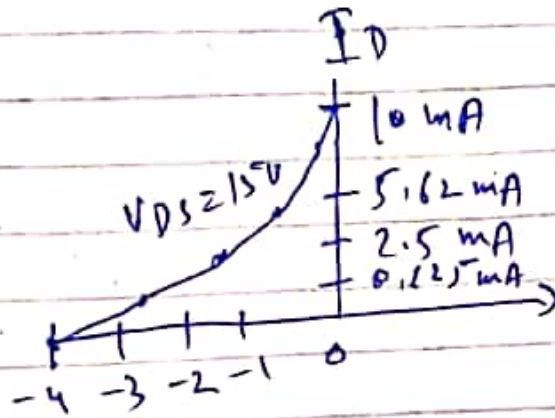
(b) Draw the drain curves and the transconductance curve for a JFET?

Ans The following are the drain curves and the transconductance curve of a JFET.



(a) (Drain Curves)

(7)



(b) Transconductance curve