Final Exam - (Summer-2020)

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EEE-303
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Answer to the Question no — (1.) (b)

(b) JFET is the unipolar or biopolar transistor; Difference between BJT and JFET is that BJT is a biopolar device while JFET is a unipolar device. because the operation of BJT is dependent on injection and collection of minority change carriers that include both electrons and holes. JFET is majority carrier thus termed as unipolar. that is three terminal unipolar semiconductor divice.

Answer to the question no-(3)(a)

X sectional area in MOSFET: X-sectional area of the channel decreases and hence its resistance ~~inhom~~ increases. This means that conductivity of the channel will decrease

Describe in details are given blew:

The main drawback of JFET is that its gate must be reverse biased for proper operation of the divice i.e. it can only have negative gate operation for n-channel and positive gate operation for p-channel,
thats we can only decrease the width of the channel from its zero bias size.

This type of operation is refeaced to as depletion-mode operation

Therefore, JFET can only be operated in the depletion mode, there is a field effect transistor (FET) That can be operated to enhance or increase the width of the channel it can have enhancement-mode operation. Such a FET is called MOSFET

A field effect transistor (FET) that can be operated in the enhancement-mode is called a MOSFET

Answer to the Question - (3)(b)

Enhancement mode in MOSFET:

MOSFET is ~~no~~ there no conduction of zero voltage, which implies it is closed or "OFF" by default as there is no existing channel. When the gate voltage is increased more than the source voltage, the charge carriers (holes) shifts away leaving behind the electrons and thus a wider channel is established.

The Enhancement MOSFET is classified into Two types.

(i) N-channel Enhancement Type MOSFETS

(ii) P-Type channel " " "

N-channel Enhancement type MOSFETS:

(i) A lightly doped p-type substrate forms the body of the device and the source and drain are heavily doped with n-type impurities.

(ii) N-channel have electrons as majority carriers

(iii) Drain resistance is low compared to p type.

P-channel Enhancement type MOSFETS

(i) A lightly doped N-type substrate from the body of the device and the source and drain are heavily doped with p-type impurities

(ii) p-channel have holes as majority carriers.

(iii) Drain resistance is higher compared to N-type

Answer to the question 1-(a)

there is a role of gate terminal in JFET. thats are describing.

*** Junction Field effect transistor:**

Junction Field effect transistor is a three terminal semiconductor device which current conduction is one of carrier i.e electrons or holes.

*** Gate terminal in JFET:** There are three leads in a JFET viz, source, gate and drain terminals, where JFET is to be connected in a circuit. This difficulty is overcome by making one terminal of the JFET to both the input and output terminals. a JFET can be connected in a circuit in the

Following three way:-

(I) common source connection.
(II) common get "
(III) common drain "

(I) Common source connecton: In et electronics a common-get amplifier is one of ~~ther~~ three basic single field-effect transistor amplife. topologies. it's used as a current buffer or voltage amplefier. In this circuit the source terminal of the transistor service as the input, the drain is the output and the gate is connected to ground, or "common" hence its name

So, that a role of gate terminal involved with JFET

Answer to the question no—(7)(a)

The process of adding controlled, to a semiconductor is known as doping. The amount of impurity or dopant, added to an intrinsic (pure) semiconductor varies. Its ~~doping~~ levels of conductivity in semiconductor production doping is the intentional introduction of impurities into an intrinsic semiconductor for the purpose of modulating properties. The doped material is referred to as an extrinsic semiconductor. A semiconductor doped to such high levels that it acts more like a conductor than a semiconductor is referred to as a degenerate semiconductor

the context of phosphors and semi scintillators, doping is better known as activation. Doping is also used to control the color in some pisment.

Answer to the Question no - (7(b)

The role of logic gates in modern electronics when a transistor is on or 'open' then an electric current can flow through and when its off then no current flows.

when string a bunch of these transistor together then you get whats called a logic gate, in a physical circuit. these logic gate have:

input: All ~~Logic~~ logic gates require same kind of input voltage so that they have numbers to compare.

output: once a logic gate has a chance to process your input, it can then make a decision on whether to open its gate or keep it closed.

Answer to the question no - (2)(b)

Ac equivalet circuit:,

Two steps are applied to the JFET amplifier circuit.

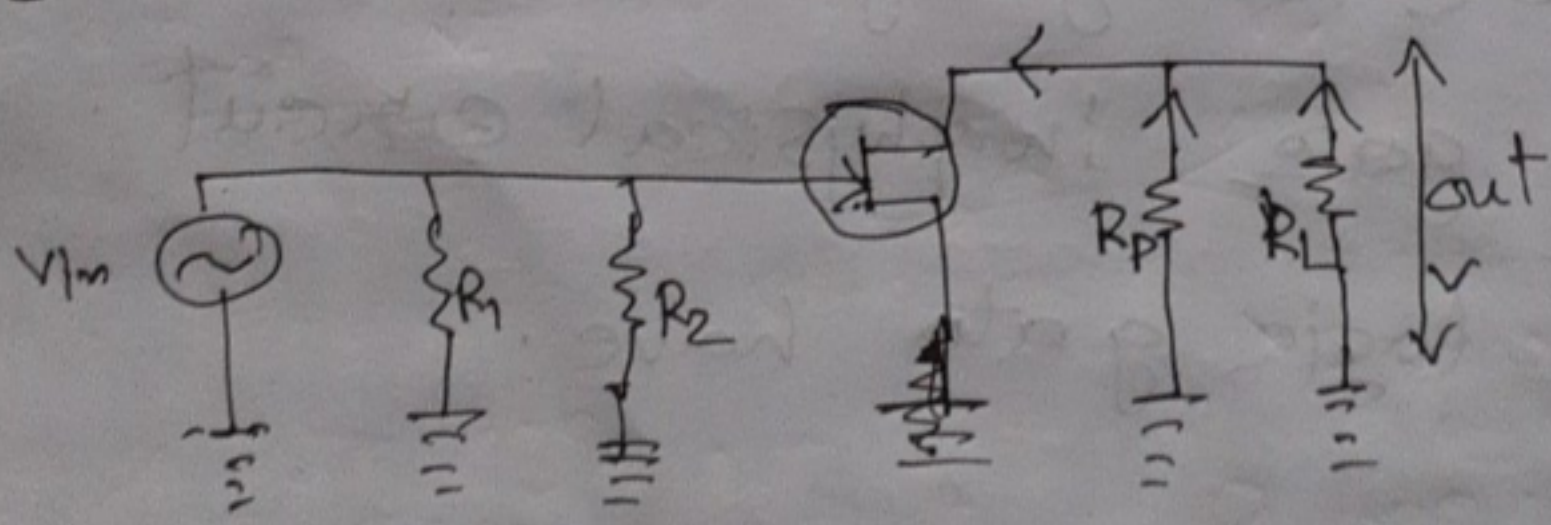


Fig: ac equivalent circuit

(I) Reduce all dc source to zero.
(II) Short all the capacitors.

Dc equivalent amplifier:

two step is ~~ample amp~~ applied,
(I) Reduce all ac sources to zero
(II) open all the capacitors.

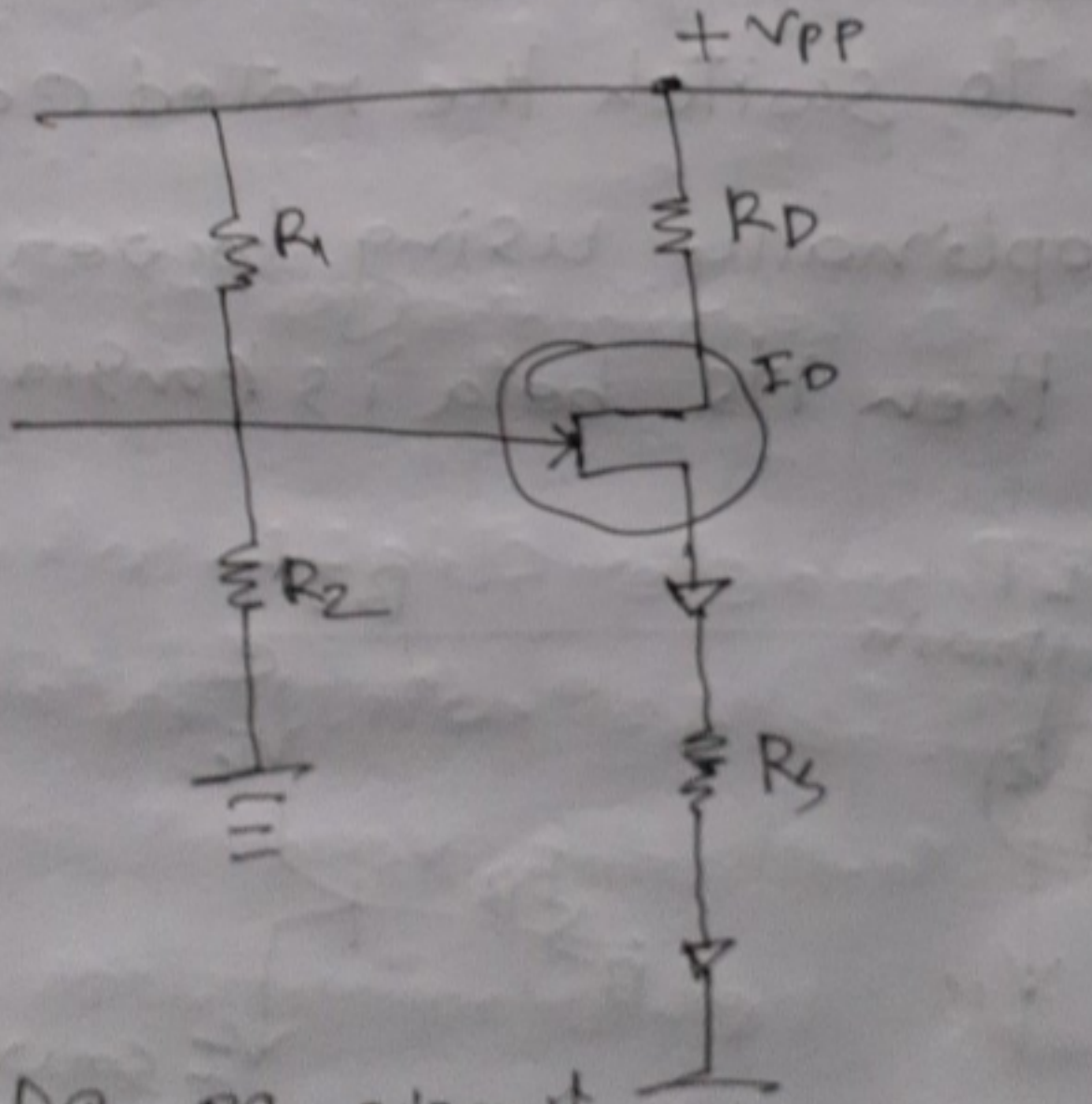
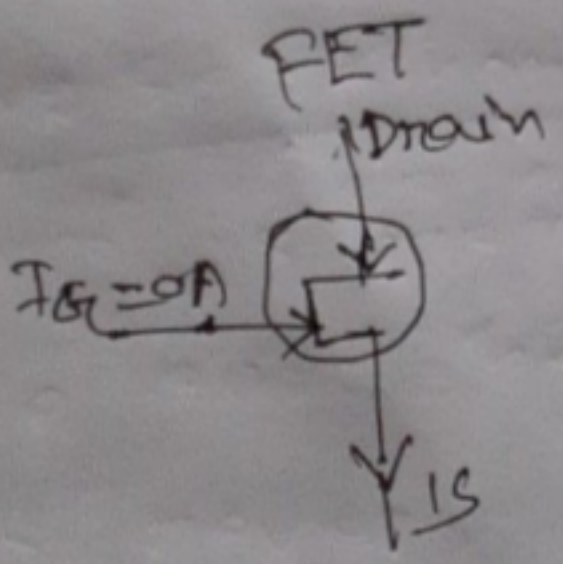


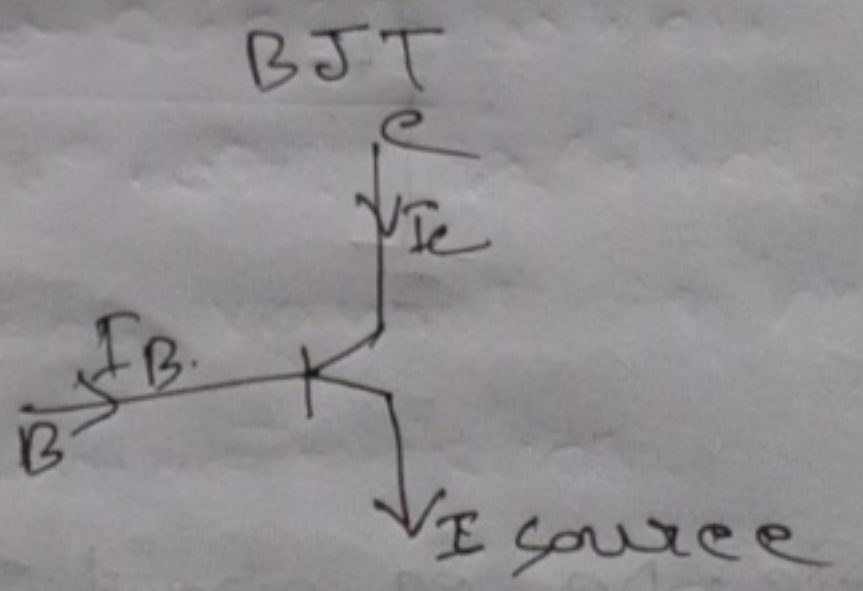
Fig: Dc eq circuit.

Answer to the question no -(2)(a)

yes B factor is very important in JFET

B Factor in JFET:- Beta is in BJT. determines the gain of device. If BJT uses relatively higher current to switch its collector load optionally when it has low B. conversely of it is able to switch the rated collector current optionally using lower base current. then its beta is considered high





So we can say that, if B factor is invalid in JFET its not work and its very important of JFET.

Answer to the Question no-6

The Source between anod-cathod current voltage (V) and anode current (I) of an SCR at constante gate.

V-I characteristics of a SCR.

forward characteristics. when anod is positive wrt cathod, the curve between v and I is called the forward characteristics. in fig ABC is the forward ~~bias~~ characteristics of SCR at I_G-0-If the supply voltage is increased from zero, a point is reached when the SCR starts conducting under the condition, the voltage across SCR suddenly drops as shown by curve AB and most of

Supply voltage appears across the load resistance, R_L.

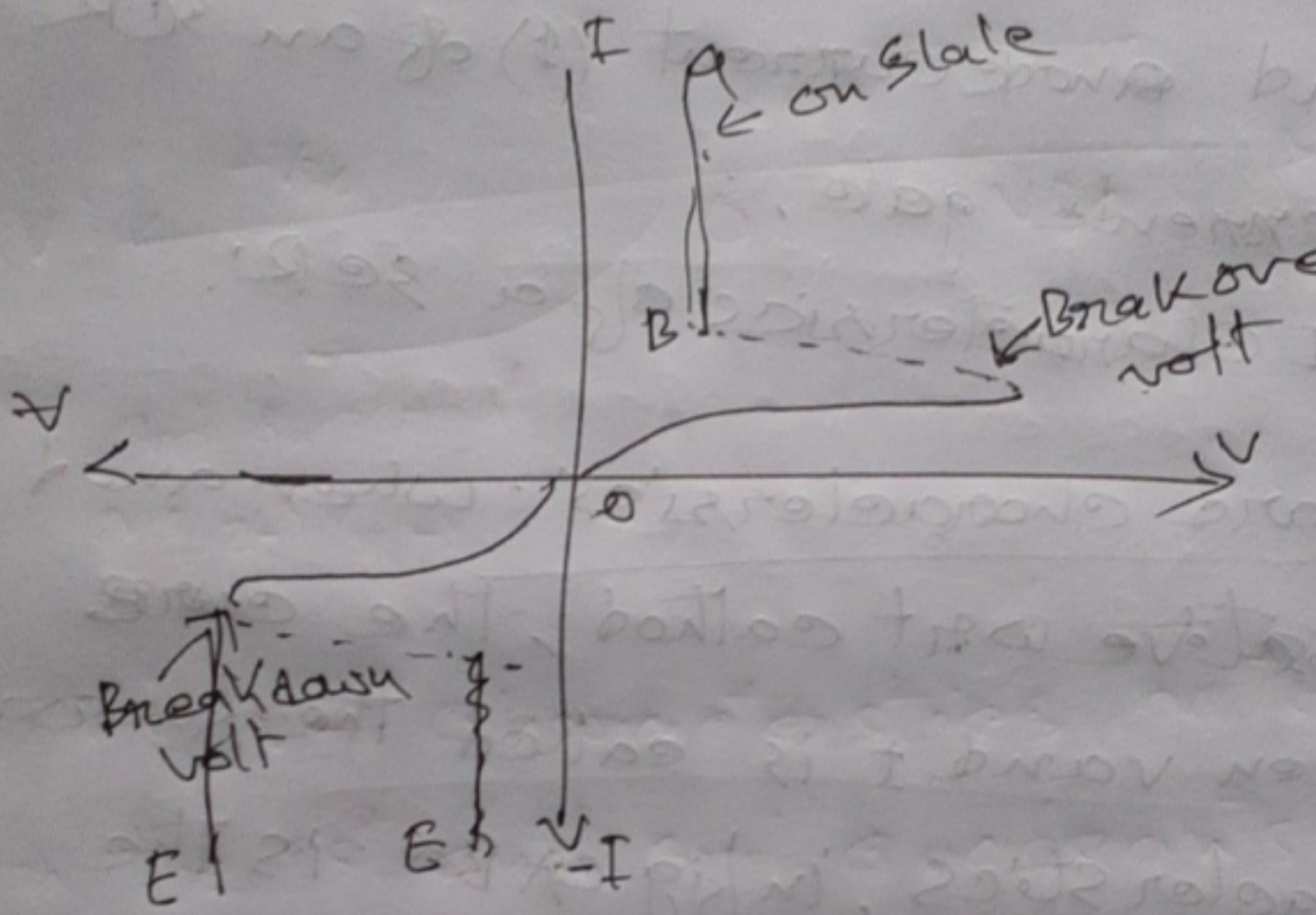


Fig: SCR characteristics

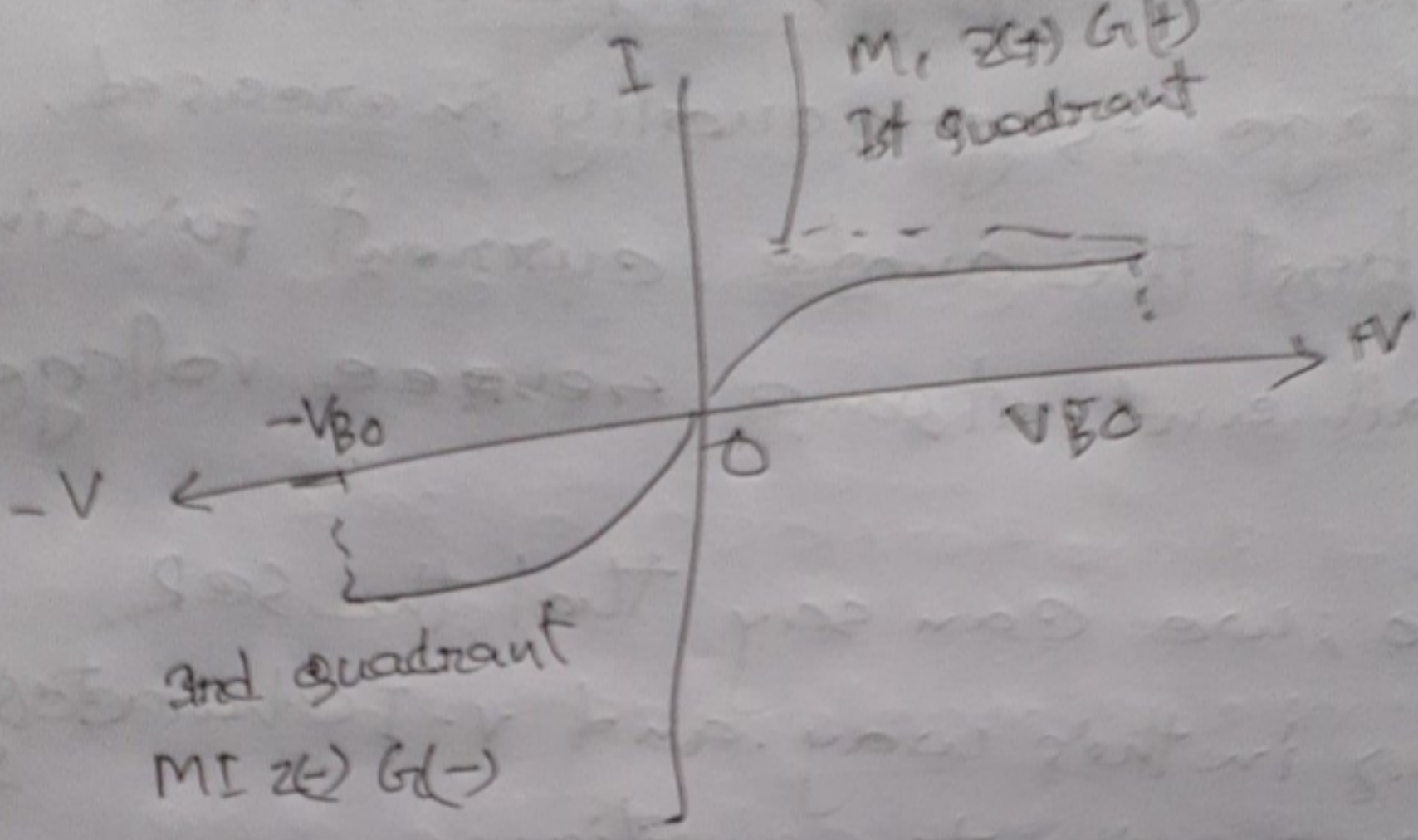
Reverse characteristics: when anod is negative with cathod the curve between V and I is known as reverse characteristics. the reverse voltage does come across DCR when it is operated

with ac supply. if the reverse voltage is gradually increased, at first the anode current remains small and at some reverse voltage

so ; we can say that the SCR work in this way. and V-I characteristics of SCR with its operation.

Answer to the question no - (5)

A triac is a three-terminal semiconductor Switching device which can control alternating current flow a load Triac characteristic.



(1) The v-I characteristics for triac in the 1st and 3rd quadrants are essentially identical to those of an scr in the 1st quadrant

(2) The triac can be operated with positive or negative gate control voltage but normal operation usually the gate voltag is positive in

quadarnt I and negative in quadant (III)

(3) Supply voltage at which the triac is trund on depend upon the gate current.

Triac :-

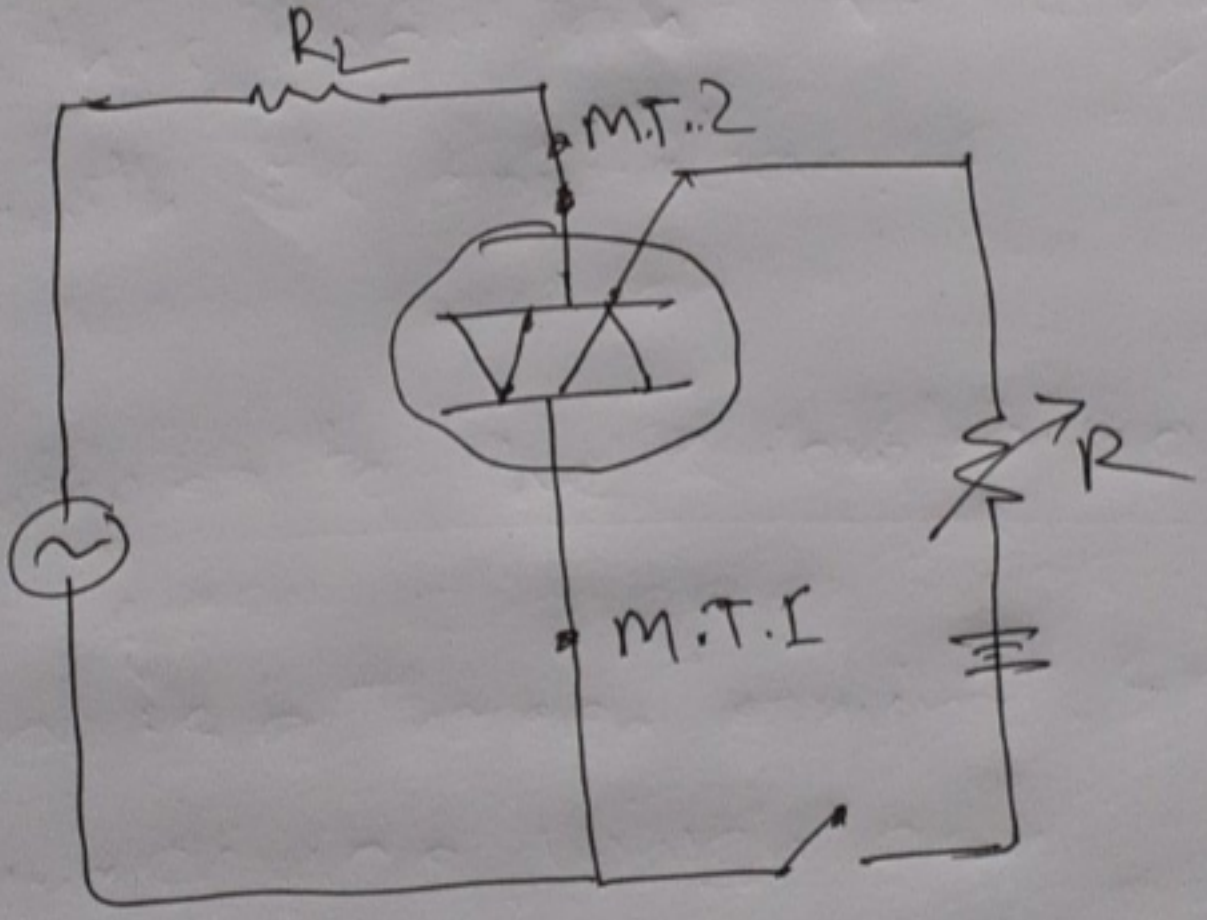


Fig :- Triac