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ID 14231

SUBJECT ELECTRONIC CIRCUIT DESIGN

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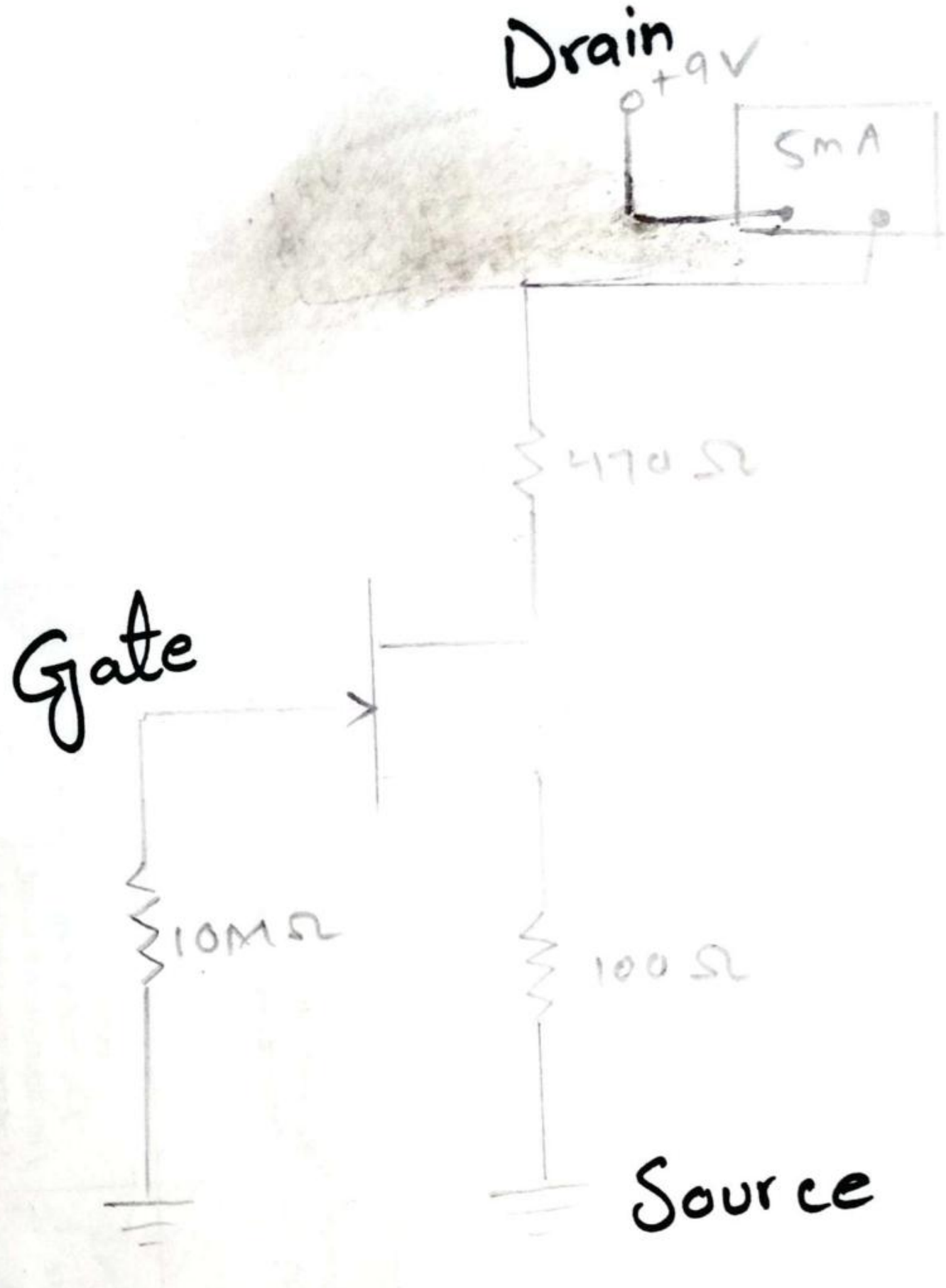
Q1 :-

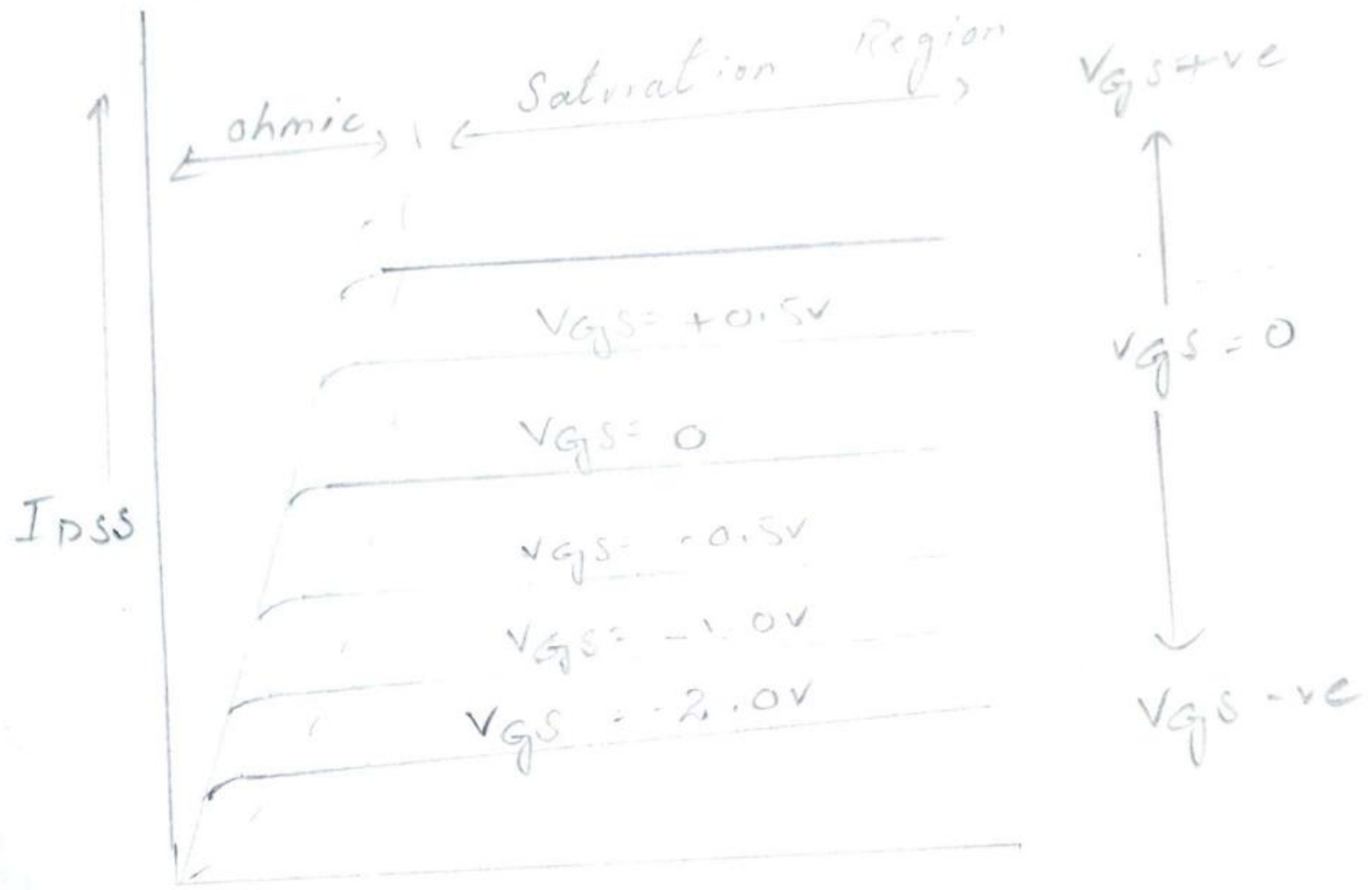


ANS:- (a) N channel JEFT

(c) $V_{DS} = V_D - V_S$

$V_{GS} = V_g = (V_{in} \; R_1/R_2)\,(R_g + R_1//R_2$

Q20. Explain the drain characteristic curve of D-MOSFET given below



Ans:- Drain characteristic of D-MOSFET:-

* The upper curves are for positive V_{GS} and the lower curves are for negative V_{GS}.

* The bottom drain curve is for $V_{GS} = V_{GS(OFF)}$.

* For a specified drain-source voltage at which drain current reduces to a certain specified negligibly small value.

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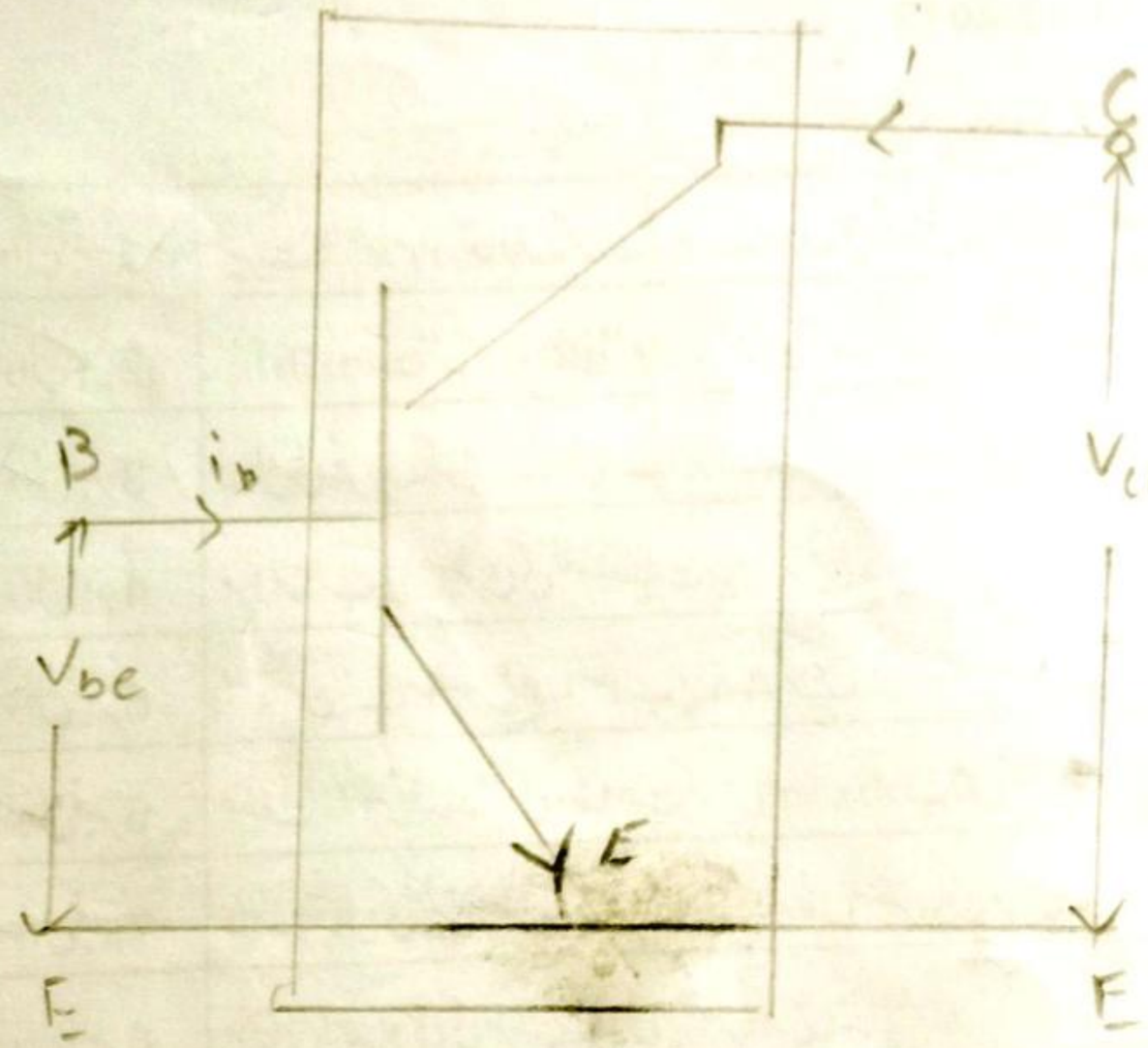
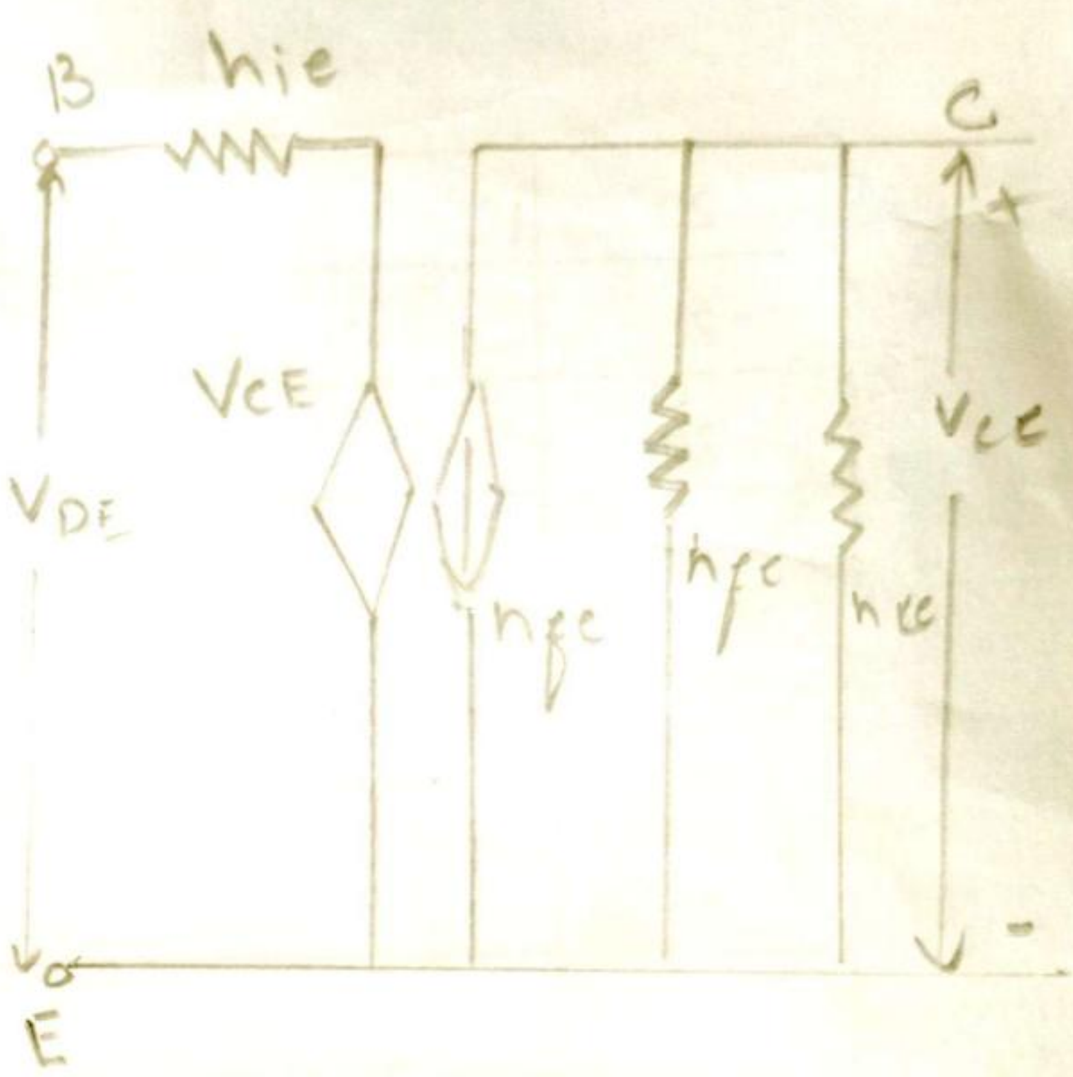
* For V_{GS} between $V_{GS(OFF)}$ and zero the device operates in depletion-mode while for V_{GS} exceeding zero the device operates in enhancement mode.

* I_{DSS} is the drain current extends to the right of the origin, I_{DSS} is no longer the maximum possible drain current.

* Ohmic Region the transistor is in its constant resistance region

* Saturation Region. In this region the gate voltage is much greater than threshold voltage.





Transistor Bias voltage

$$V_B = \frac{V_{cc} R_2}{R_1 + R_2}$$

Beta Value

$$\beta = \frac{\Delta I_c}{\Delta I_c}$$

$$\text{Voltage Gain} = \frac{V_{out}}{V_{in}} = \frac{\Delta V_L}{\Delta V_B} = -\frac{R_L}{R_E}$$

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Q4:-

Ans:- (1) Gate rests on a thin oxide layer over the source-drain channel. The oxide layer, effectively a dielectric act as a capacitor and isolates gate and rest of the substrate body, source, drain and channel.

(2) The enhancement mode an N-channel D-MOSFET with a positive V_{GS} is opening.

(3) JFET Channel pinched off the result is that the FET act more like a voltage controlled resistor which has zero resistance when $V_{GS}=0$ and maximum 'ON' resistance when the Gate voltage

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is very negative. Under normal operating conditions. the JFET gate is always negatively biased relative to the source.

(4) The BJT. is a one type of transistor that uses both majority and minority charge carrier The main function of this transistor is to amplify current

The FET is one type of transistor where the o/p current is controlled by electric fields. FET consist of three terminals namely source, drain and gate terminals

(5) An oxide layer is deposited on the substrate to which the gate terminal is connected. This oxide layer acts as an insulator and hence the MOSFET has another name as IGFET.

(6) JFET is called square law device because A drain current varies as square of drain voltage for a fixed gate-source voltage

(7) In the common base amplifier configuration the input current exceeds all other currents in the circuit including the output current the current gain of this amplifier is actually less than 1.

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