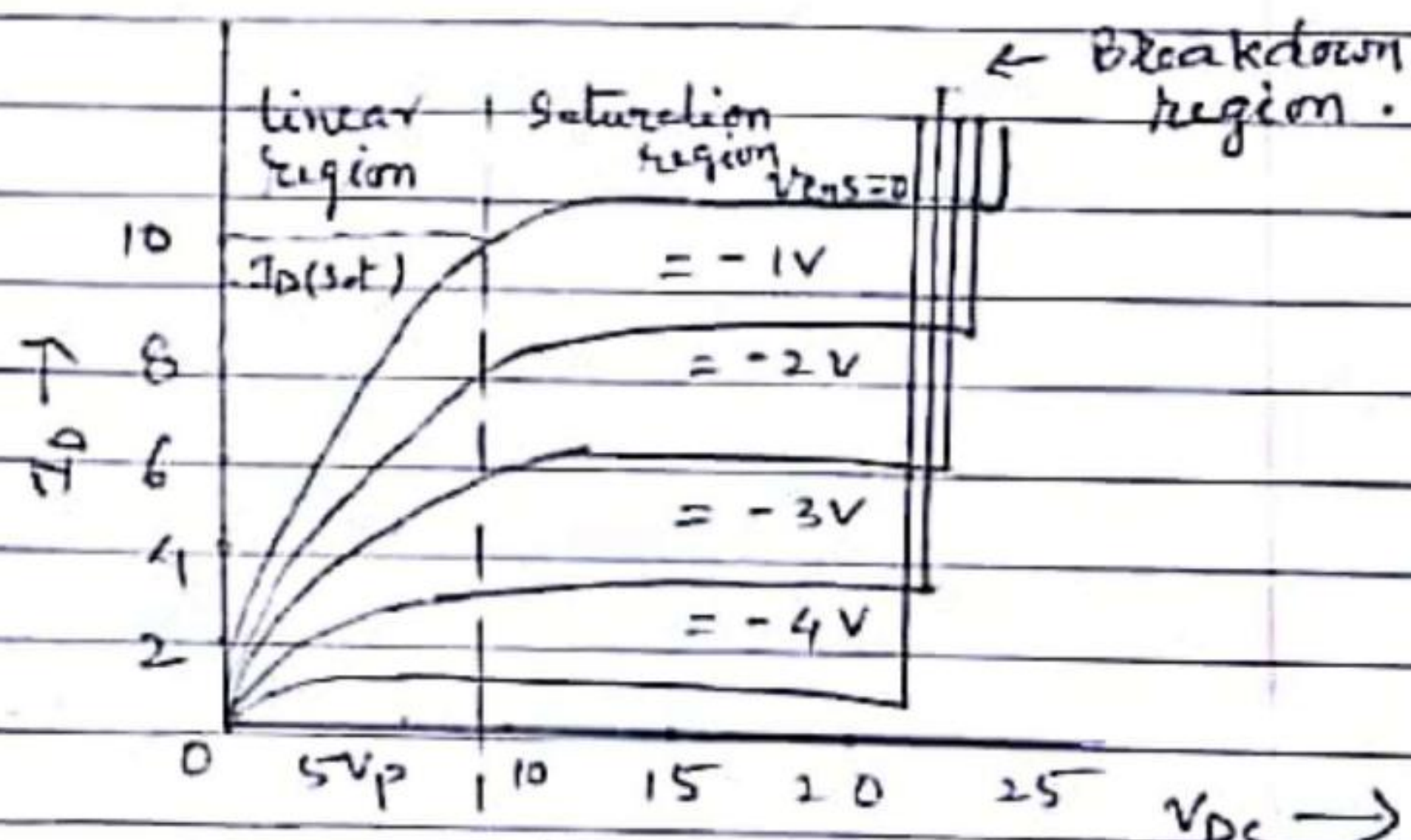


Principle of Operation :- When the junction between the gate & the source is reverse-biased there will be depletion regions on both sides of the channel. The depletion regions contain only immobile charges and no free carriers, therefore the conductivity of these regions will be practically zero. For a fixed drain to source voltage the drain current will be a fn. of the gate to source voltage.

Static characteristic :- (i) The graphical plots of I_D against V_{DS} with V_{GS} as a parameter are termed as static characteristic of the FET.



Linear region, where I_D is const. V_{DS} is small and I_D is proportional to V_{DS} .

(ii) Saturation region, where I_D is const. and is independent of V_{DS} and

(iii) Breakdown region, where I_D rises with a slight increase of the V_{DS} .

To explain these features let us consider $V_{GS} = 0$. When voltage V_{DS} is increased from 0 to a small amount the n-channel bar acts as a simple resistor, hence I_D increases linearly with V_{DS} in this region. With increasing V_{DS} , the characteristic bends, and finally at a value V_p of

the voltage V_{DS} the current I_D saturates at a value $(I_D)_{sat}$.

The channel is now said to be pinched off, and the voltage V_p is called pinched off voltage. Breakdown occurs at a lower value of V_{DS} when the magnitude of the reverse bias voltage V_{GS} is increased.

Transfer characteristic :- It gives the variation of $(I_D)_{sat}$ with V_{GS} .

