SUMIT KUMAR YADAV **AVIJIT MANDAL**

18CS30042 **18CS30010**

PART : 1

(Characteristics of NMOS and PMOS transistors)

AIM:

To do the following using appropriate MOS IC chips do the following for

1. high resistive load (5MΩ)
2. additionally, a light capacitive load at the output (10nF)

1. Obtain the transfer characteristics of NMOS transister and determine the threshold voltage
2. Obtain the transfer characteristics of PMOS transister and determine the threshold voltage
3. Connect the PMOS and NMOS transistors to form an inverter and obtain the transfer characteristics of PMOS transister and check the effect of the NMOS and PMOS threshold voltages on the characteristics

MATERIALS REQUIRED:

1.Bread board

2.Connecting wires

3.IC 4007 (*1)

THEORY:

In general, any MOSFET is seen to exhibit 3 operating regions:

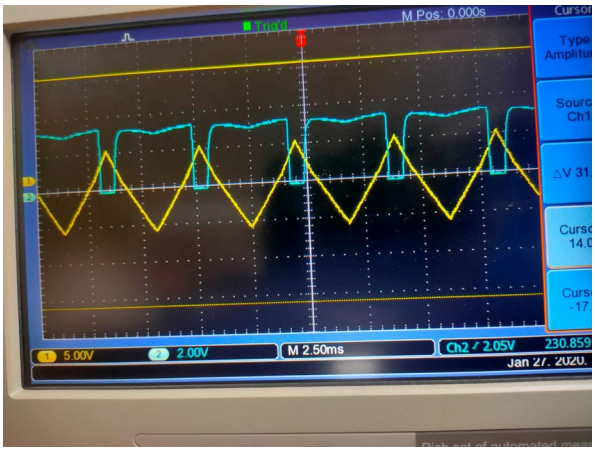
1.CUT-OFF REGION: In this region the MOSFET is OFF as there is no current flowing through it .It behaves like an open switch in this region.

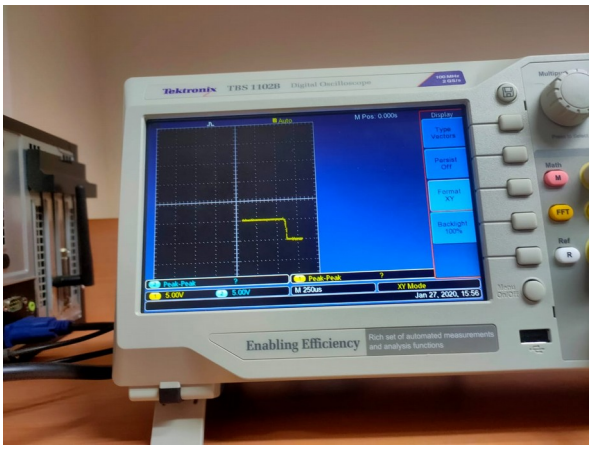
2.OHMIC OR LINEAR REGION: In this region the current Ids increases with an increase in the value of Vds. When MOSFET are made to operate in this region,they can act as amplifier.

3.SATURATION REGION: In this region the MOSFET have their Ids constant inspite of increase in Vds, once Vds exceeds the value of pinch-off voltage Vp.

OBSERVATION:

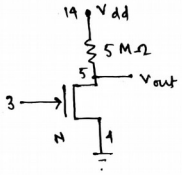
1.Obtain the transfer characteristics of NMOS transister and determine the threshold voltage



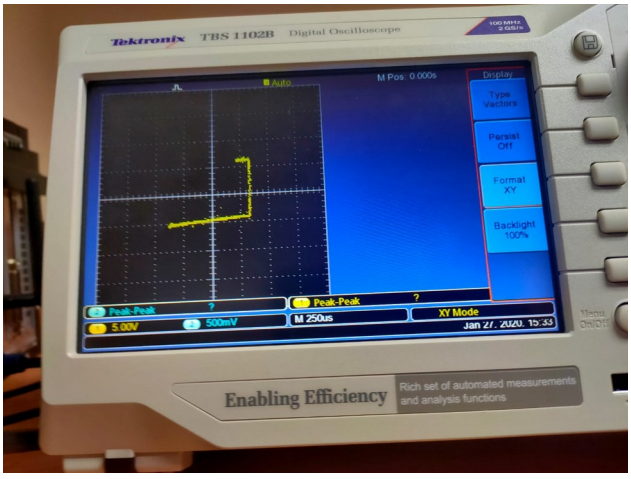


Threshold voltage : 1.40 V

NMOS CIRCUIT DIAGRAM ->

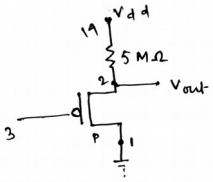


2.Obtain the transfer characteristics of PMOS transister and determine the threshold voltage

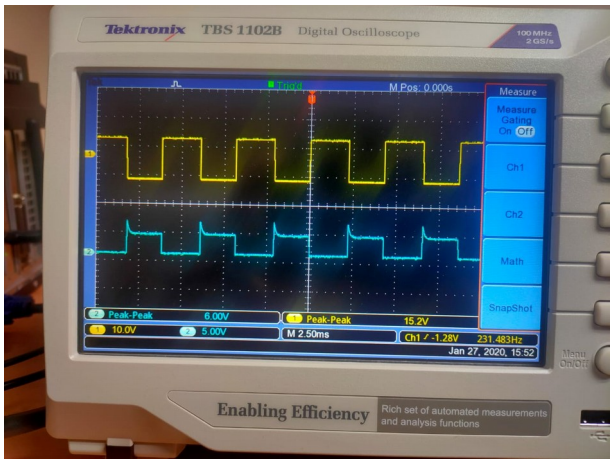


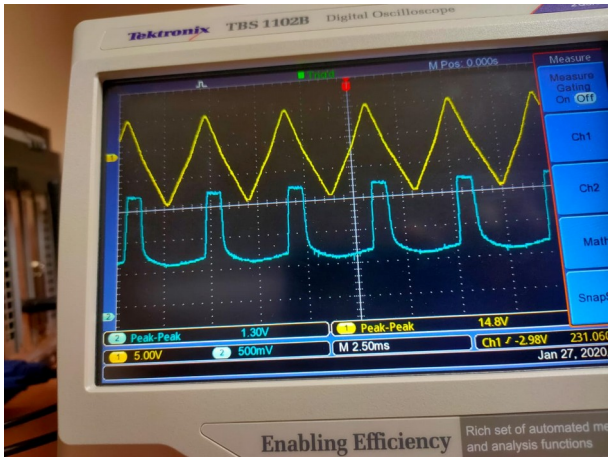
Threshold voltage : 0.80 V

PMOS CIRCUIT DIAGRAM ->



3.Connect the PMOS and NMOS transistors to form an inverter and obtain the transfer characteristics of PMOS transister and check the effect of the NMOS and PMOS threshold voltages on the characteristics





<u>Threshold voltage : 0.70 V</u>

<u>INVERTER CIRCUIT DIAGRAM</u> :->