

COURSE TITLE :- ECD

MODULE :- 4th

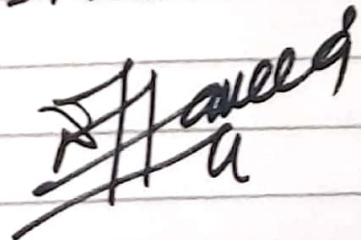
INSTRUCTOR :- ENGR. MUTABA IHSAN

-: STUDENT DETAILS :-

NAME :- NAVEED ALAM

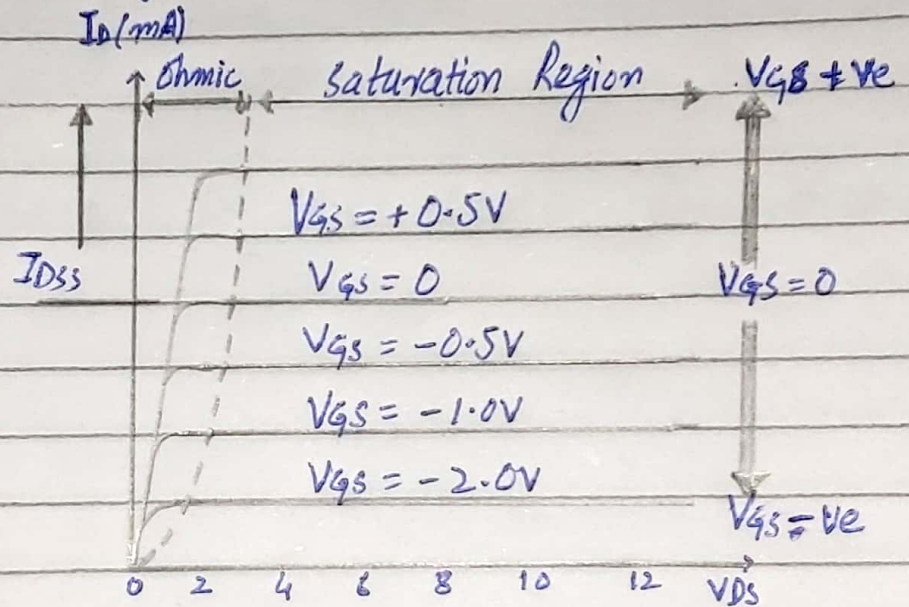
STUDENT ID NO. :- 14965

STUDENT SIGNATURE :-

A handwritten signature in black ink, appearing to read 'Naveed Alam', written over a grid of horizontal and vertical lines.

Q No. 1:- Part (a):-

↳ Explain the drain characteristic curve of D-MOSFET given below:-



Ans:-1:-

Part (a):- Drain characteristic is characteristic between Drain current and voltage V_{DS} for various voltage V_{GS} .

As I_D is the output current and V_{DS} is the output voltage and various voltage is the input voltage.

↳ When V_{DS} is increased I_D (mA) will also increase.

↳ When $V_{GS} = 0V$ the pinch off occurs.

↳ When we increase V_{GS} positive of i.e. 0.5V the gate terminal become +ive the free charge carrier electron in the p-type attracted toward the gate and the channel will have more electron so the current will increase.

So increase in V_{GS} cause I_{DS} increase.

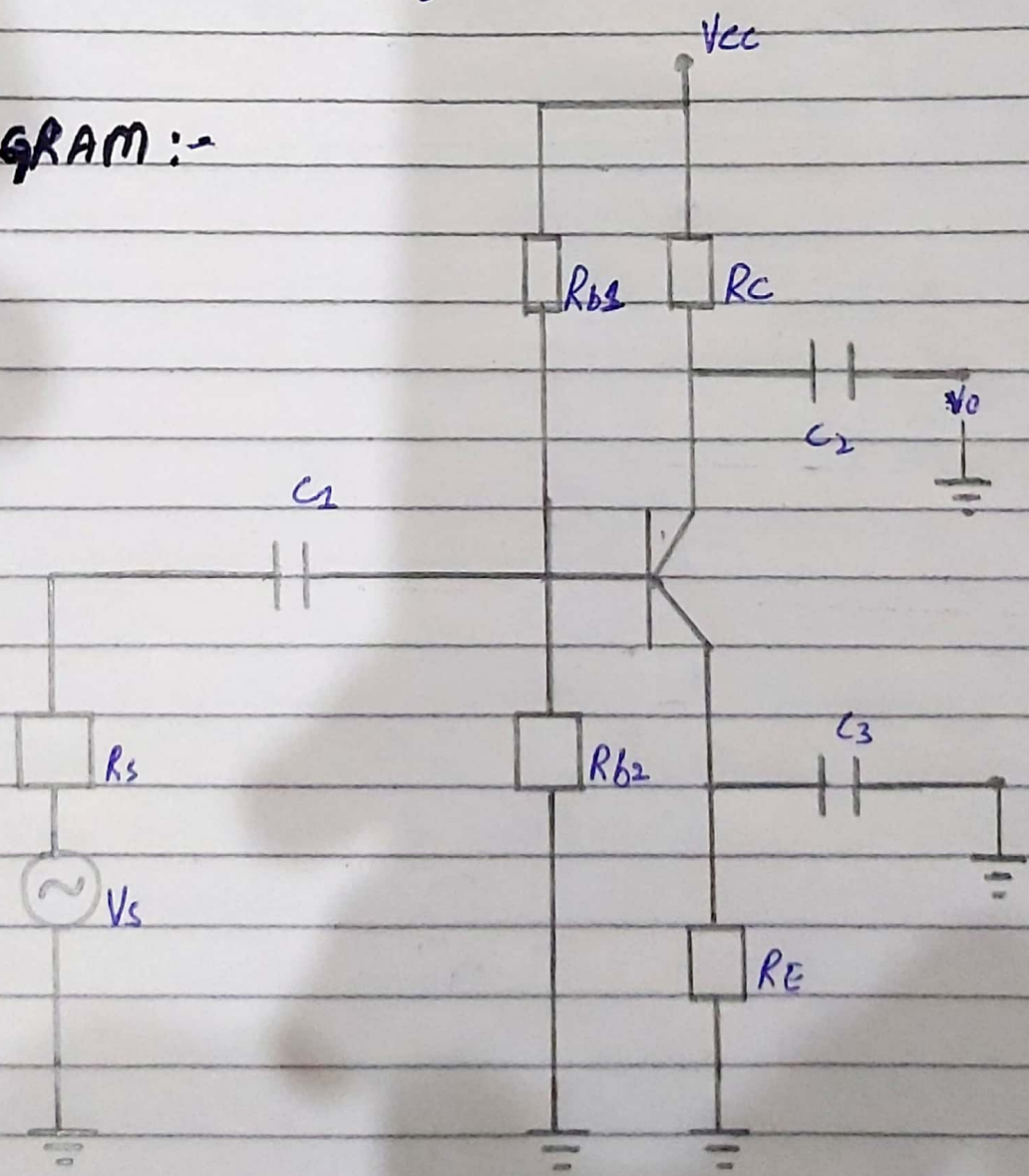
Q No. 1:-

Part B:- Sketch the hybrid model and write equations for the transistor in common emitter configuration.

Part B

Ans 1 (B) Hybrid model of transistor :-

DIAGRAM :-



↳ EQUATION:-

$$h_{ie} = \frac{V_{be}}{I_b} \longrightarrow \text{input impedance.}$$

$$h_{re} = \frac{V_{be}}{V_{ce}} \longrightarrow \text{Reverse voltage ratio.}$$

$$h_{fe} = \frac{I_c}{I_b} \longrightarrow \text{forward current gain.}$$

Q.No. (2)

A certain operational amplifier has a common mode gain of 0.6 and an open loop differential voltage gain of 400,000. Evaluate the CMRR and express it in decibels.

Ans (2)

Given r

↳ Open loop differential voltage gain is 400,000

↳ Common mode gain = 0.6

Required :-

↳ CMRR = ?

Solution:- Formula : $CMRR = A_{od}/A_{cm}$

$$CMRR = \frac{400,000}{0.6} = 666,666.667$$

CMRR is decibels

$$CMRR = 20 \log(A_{od}/A_{cm})$$

$$CMRR = 20 \log(666,666.667)$$

$$CMRR = 116.47 \text{ dB.}$$

Q No. 3 PART (A)

(A) → Explain the concept behind negative feedback in operational amplifiers.

Ans (A) → Negative Feedback:-

"Negative feedback is the process where by a portion of output voltage of an amplifier is returned to the input, with a phase angle that opposes (subtract from) the input signal".

→ Negative Feedback in Operational Amplifier:-

Concept:-

As an amplifier we have with a very large number and the output of the amplifier is extremely high than the input - so we take a connect from the output to the input for stabilization because it has a very high gain & is stable. for stabilization we are use negative feedback in Operational Amplifier.

Q No. 3

Part (B) :- State the following statement as true or false and also give the reason for your answer: "The output of a summing amplifier is positive" -

Ans 3
(B)

"The output of summing amplifier is positive" - This statement is wrong -
Because summing amplifier is an application of inverting operational amplifier configuration which has more than one inputs and its output will be negative -