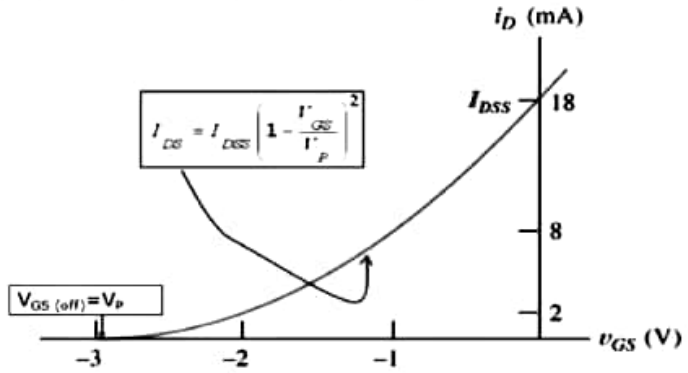
Department of Electrical Engineering
Sessional Assignment
Date: 04/05/2020

Course Details

Course Title: Electronic Circuit Design **Module:** 04
Instructor: Engr. Mujtaba ihsan **Marks:** 20

Student Details

Name: M.yasir shah **Student ID:** 13172

Q1.		**Explain** the trans conductance curve for n-channel JFET given below 	Marks 04 CLO 1
Q2.		**State** the characteristics of a practical operational amplifier.	Marks 04 CLO 1
Q3.		**Calculate** output voltage for summing amplifier if V_1 = 0.2V, V_2 = 0.5V and V_3 = 2V and $R_1=R_2=R_3=R_f$ = 6kΩ	Marks 05 CLO 2
Q4.	(a)	You are working on an audio circuit in the lab. Which class of power amplifier will you not consider for your work? **Justify** your answer with reason.	Marks 04 CLO 2
	(b)	**Outline** the differences between an amplifier and a rectifier.	Marks 03 CLO 2

Name M.Yasir shah

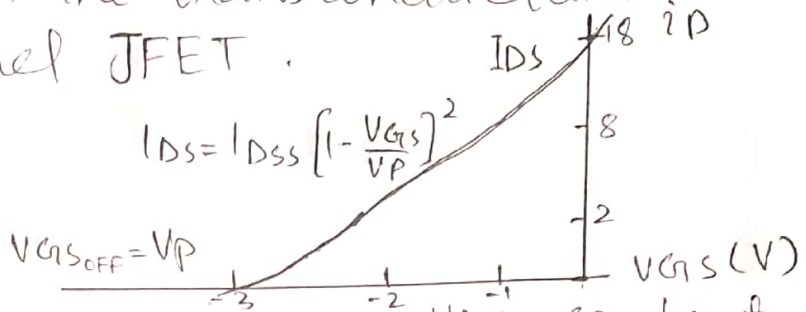
ID 13172

Subject ECD

Assignment # 02 (Sessional)

Submitted to Engr Mujtaba Ihsan

Q#1: Explain the transconductance curve for n-channel JFET.



-> Keeping drain source voltage, VDS constant and determining drain current, ID for various values of gate source voltage VGS.

-> The circuit diagram shows, The curve is plotted between gate-source voltage VGS and drain current, ID.

-> It is observed that

(i) Drain current decreases with the increase in negative gate-source bias.

(ii) Drain current, $I_D = I_{DSS}$ when $V_{GS}=0$.

(iii) Drain current, $I_D = 0$ when $V_{GS} = V_P$.

-> It may be noted that a P-channel JFET operates in the same way and have the similar characteristics as an N-channel JFET except that channel carries are holes instead of electrons and the polarities of VGS and VDS are reversed.

Q#02:

State the characteristics of a practical operational amplifier?

(i) The open loop voltage gain AO is maximum and finite, typical value for the practical op-amplifier is considered to be 200,000.

(ii) The input impedance is maximum and is finite i-e in the order of 100k or more.

(iii) The output impedance is minimum, in the order of 100 or less.

(iv) The CMRR is maximum and finite.

(v) Bandwidth is maximum and finite i-e it can amplify dc to 1 MHz signal.

(vi) A slight drift of characteristics due to the change in temperature, not null.

(vii) Two terminial may be virtually ground, not $v_d = 0$ exactly, for all conditions.

(viii) Maximum slow-rate and has the finite value.

(ix) The output is negligible due to dc-bias when input is zero.

Q#03:

Calculate the output voltage for Summing amplifier.

Given data

$V_1 = 0.2\,V$

$V_2 = 0.5\,V$

$V_3 = 2\,V$

$R_f = R_1 = R_2 = R_3 = 6\,K\Omega$

Solution:

formula $V_{out} = -(R_f/R) * (V_1 + V_2 + V_3)$

$V_{out} = -(6/6) \times (0.2 + 0.5 + 2)$

$V_{out} = -2.7\,V$ Answer.

Q # 04 (a)

→ I will not consider class 'C' of power amplifier for working on an audio circuit in the lab.

→ Because class C amplifiers are never used for audio circuits.

→ They are commonly used in RF circuits.

→ Class C amplifiers operate the output transistor in a state that results in tremendous distortion it would be totally unsuitable for audio circuit.

→ Class C output devices conduct for less than 180 degrees (100 to 150 degrees typicaly for Radio frequencies only, cannot be used for audio.

Q#04 (b)

An Amplifier: An amplifier is an electronic device that can increase the power of a signal (a time varying voltage or current). It is a two port electronic circuit that uses electric power from a power supply to increase the amplitude of a signal applied to its input terminals.

A Rectifier: A rectifier is an electrical device that converts alternating current (AC) to direct current (DC). which flow in one direction.

This process is known as rectification.