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

Course Title: Electronic Circuit Design **Module:** 04 **Instructor:** Sir Mujtaba Ihsan
Total Marks: 20

Student Details

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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 not consider for your work? **Justify** your answer with reason.

Marks 05

CLO 2

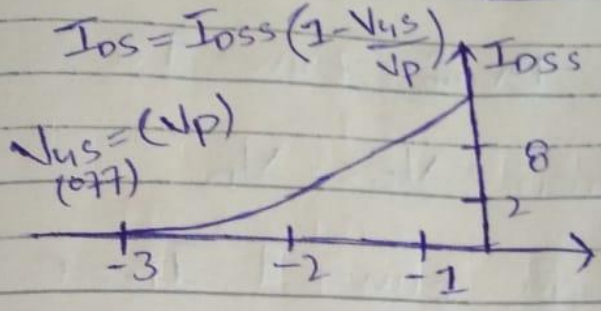
Marks 04

CLO 2

Q4. (a) You are working on an audio circuit in the lab. Which class of power amplifier will

(b) **Outline** the differences between an amplifier and a rectifier. Marks 03 CLO 2

Q1: Ans:



Given graph give us the transfer characteristics of N-channel JFET.

In the graph drain current (I_D) and voltage source to gate (V_{GS}) is shown. and curve is between voltage gate and source (V_{GS}) to drain current (I_D). and also drain to source current decrease with increase in negative gate source bias.

when $V_{GS} = 0$.

$$I_{DS} = I_{DSS}\left(1 - \frac{0}{V_P}\right).$$

$I_D = I_{DSS}$

that is Drain current.

And when $V_{GS} = V_D$

Then Drain current $I_D = 0$

" — " — " — " — "

Q2 Ans:

Practical Op-Amp

characteristics:

1) It is voltage gain of the op-amp when no feedback is practically it is several thousands.

2) It is finite and typically greater then 1 MΩ. But using FETs for the input stage it can be increased upto several hundred MΩ.

3) The bandwidth of is

open loop configuration is very small by application of negative feedback.

4) It is typically few hundred ohm with the help of negative feedback. it can be reduced to very small value like 1 to 2 ohm.

" — " — " — "

Q3 Ans:

Given:

$V_1 = 0.2V$

$V_2 = 0.5V$

$V_3 = 2V$

$R_1 = R_2 = R_3 = R_7 = 6K\Omega$

As:

$$V_{out} = \left(\frac{R_7}{R_1} V_1 + \frac{R_7}{R_2} V_2 + \frac{R_7}{R_3} V_3\right)$$

Using eqn (i).

(4)

As:

$A_1 = \frac{R_7}{R_1} \Rightarrow \frac{6k\Omega}{6k\Omega} \Rightarrow 1$

$A_2 = R_7 /\!/ R_2 \Rightarrow \frac{6k\Omega}{6k\Omega} \Rightarrow 1$

$A_3 = R_7 /\!/ R_3 = \frac{6k\Omega}{6k\Omega} \Rightarrow 1$

And also equ (i) written as:

$V_{out} = (A_1 \times V_1) + (A_2 \times V_2) + (A_3 \times V_3)$

$V_{out} = (1 \times 0.2) + (1 \times 0.5) + (1 \times 2)$

$V_{out} = (0.2) + (0.5) + 2$

$\boxed{V_{out} = 2.7V}$

Q4 (a) Ans:

In lab class 'C' amplifier are not used because:

i) class 'C' amplifier have lowest linearity.

ii) class 'C' amplifier are not suitable in audio applications.

iii) For these amplifiers it is difficult to obtain ideal inductors and coupling transforms.

iv) These amplifier reduce dynamic range.

(b)

Q 4 (b) Ans

Difference between rectifier and amplifier:

Amplifier	Rectifier
is used to increase the strength of electric signal	Allow current to pass in only one direction.
It convert Ac signal to Dc	convert Ac voltage of 100V or greater to Dc voltage.
Amplifier also increase the power of weak signal	By using single diode convert Ac signal to Dc.