Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

Course: Analog Electronics **Semester: III**
Program: B .Tech Electrical Engg **Time : 03 hrs.**
Course Code: ECEEG 2027 **Max. Marks: 100**

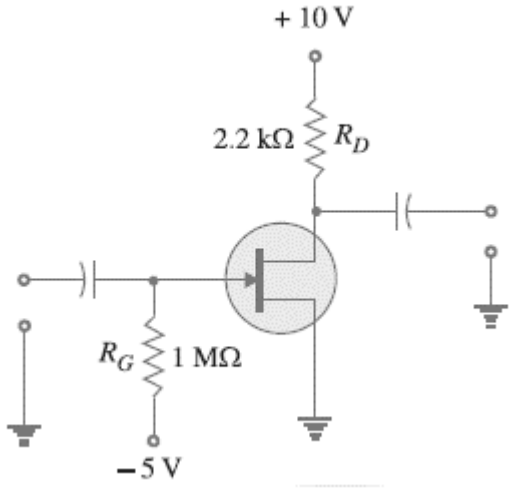
Instructions:

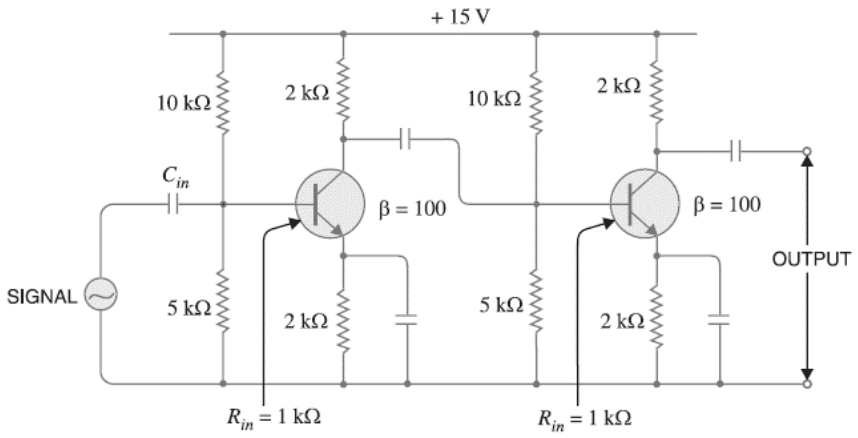
SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q1.	Define the amplification factor of a common base configuration if I_C = 0.88 mA and I_B = 0.02 mA. Find the value of α	**4**	**CO1**
Q2.	Define base width modulation with help of a neat sketch.	**4**	**CO2**
Q3.	Write the Millers theorem and its characteristics with help of a circuit	**4**	**CO2**
Q4.	A JFET has the following parameters I_{DSS} = 30 mA ; V_P(off) = – 8V ; V_{GS} = – 4 V. Find the value of drain current	**4**	**CO3**
Q5.	Write about multistage amplifiers classification and frequency response of an amplifier.	**4**	**CO4**

SECTION B
(4Qx10M= 40 Marks)

Q6.	(a)Draw the Eber's Moll Model for Common Emitter Configuration and current equations in normal mode of operation. (b)In a common base connection, current amplification factor is 0.8. If the emitter current is 1mA, determine the value of base current.	**10**	**CO2**
Q7.	Derive the small signal model of JFET common source amplifier circuit.	**10**	**CO3**
Q8.	A JFET in Fig. has values of $V_P = V_{GS\,(off)}$ = – 8V and I_{DSS} = 16 mA. Determine the values of V_{GS}, I_D and V_{DS} for the circuit. and the operating point	**10**	**CO3**

			
Q9.	(a)A three-stage amplifier has a first stage voltage gain of 100, second stage voltage gain of 200 and third stage voltage gain of 400. Find the total voltage gain in dB (b)Discuss the purpose of biasing and operating point in transistor or JFET. (or) (c) Explain the working of Cascode amplifier and its applications. (d) Write about Darlington Pair and its applications.	**5+5**	**CO4**
	SECTION-C **(2Qx20M=40 Marks)**		
Q10	(a)Derive the mathematical equation for reverse leakage current and show all the current components in common collector configuration. Explain the input output characteristics for the same. (b)Determine the values of Current gain A_I, Ri, Voltage gain Av and Yo for a Common base configuration circuit, if the h-parameters are h_{fb}= -0.98; h_{ob}= 0.49μA/V ; h_{ib}= 21.6 Ω; h_{rb}=2.9x10^{-6};Ri=R_s=1KΩ; R_L=10KΩ. Note: Draw the CB circuit with transistor and its h-parameter equivalent.	**8+12**	**CO3**
Q11	(a) Derive an expression for Step response applicable to any Amplifier. (b)Figure below shows two-stage RC coupled amplifier. If the input resistance Rin of each stage is 1kΩ, Find (i) voltage gain of first stage (ii) voltage gain of second stage (iii) total voltage gain.	**8+12**	**CO4**



(or)

(c)Derive an expression for lower and higher cutoff frequencies in a gain of plot of an Amplifier.

(d)In an n-channel JFET biased by potential divider method, it is desired to set the operating point at I_D = 2.5 mA and V_{DS} = 8V. If V_{DD} = 30 V, R_1 = 1 MΩ and R_2 = 500 kΩ, find the value of RS. The parameters of JFET are I_{DSS} = 10 mA and V_P= V_{GS} (off) = – 5 V.