VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
Mid Semester Examinations, Sept - 2024

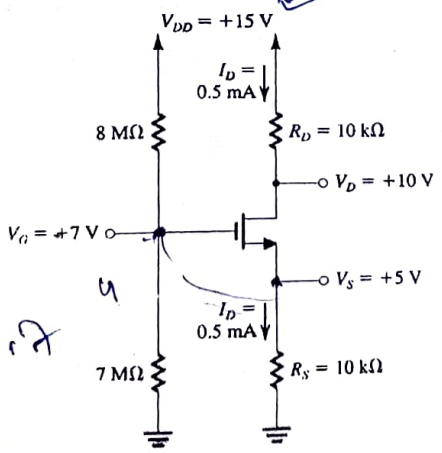
COURSE NAME: B.Tech. SEMESTER: 3rd
BRANCH NAME: EL&TCE (Sec-A and B) SPECIALIZATION:

SUBJECT: ANALOG ELECTRONIC CIRCUITS

FULL MARKS: **30** TIME: **90 Minutes**

Answer **All** Questions.
The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

		Marks	COs
Q1.	Answer all Questions.	[2 × 3]	
a)	Discuss the concept of load line and operating point of a BJT. Which is mostly used biasing circuit? Explain why it is mostly used.		CO1
b)	Draw and briefly explain the biasing of a MOSFET by fixing V_{GS}.		CO2
c)	Draw the frequency response a RC-coupled amplifier circuit and specify the different regions on it. Which components are responsible for low frequency and high frequency responses?		CO3
Q2.		[8]	
a)	Draw and explain the difference between the emitter resistance bias and the emitter bias of a BJT.		CO1
	OR		
b)	Explain the effect of R_S and R_L in small signal analysis of BJT amplifier circuit.		CO1
Q3.		[8]	
a)	Define the model of a semiconductor device. Why a model is used? Draw the re model of a CE configuration and find the parameters, input impedance, output impedance, voltage gain, current gain. For a CB configuration with Ie = 5mA, $\alpha = 0.9$, $R_L = 0.5K$, and an ac signal of 6mV, determine the above-mentioned parameters and draw the re equivalent model for the transistor.		CO1
	OR		
b)	Draw and explain the small signal equivalent model of common source amplifier with a source resistance R_S.		CO2
Q4.		[8]	
a)	It is required to design a voltage divider circuit as shown in the figure given below to established a dc drain current $I_D = 0.5$ mA. The MOSFET is specified to have $V_t = 1$V and k_n (W/L) = 1 mA/V^2. For simplicity, neglect the channel –length modulation effect (i.e., assume $\lambda=0$). Use a power-supply V_{DD}=15V. Calculate the percentage change in the value of I_D obtained when the MOSFET is replaced with another unit having the same k_n (W/L) but $V_t = 1.5$ V.		CO3



OR

b)	Explain the concept of Miller effect capacitance. Find the input and output miller capacitances C_{Mi} and C_{Mo}.	[8]	CO3