U.S.N.										

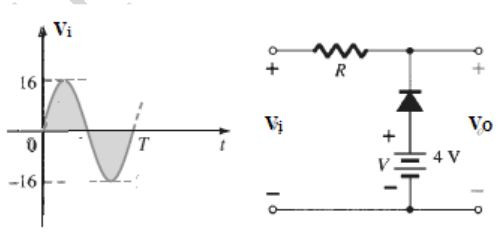
B.M.S. College of Engineering, Bengaluru-560019

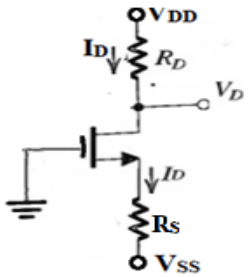
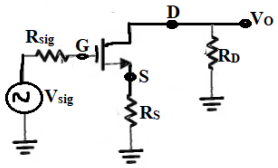
Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E. **Semester: III**
Branch: Electronics and Communication Engineering **Duration: 3 hrs.**
Course Code: 23EC3PCAEC **Max Marks: 100**
Course: Analog Electronic Circuits

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	CO	PO	Marks
1	a)	Analyse voltage divider circuit using exact method.	CO 3	PO2	5
	b)	What is clamper? Explain the operation of positive clamper with equations and draw the input output waveforms.	CO 1	-	6
	c)	Determine the dc bias voltage V_{CE} and the current I_C for the voltage divider configuration given R_1 =39 kΩ, R_2 =3.9 kΩ, R_C =10 kΩ, R_E = 1.5 kΩ, V_{CC} = 22V and β = 100. Draw the DC loadline.	CO 2	PO 1	9
		OR			
2	a)	Derive the expression for Zi, Zo, A_v, using r_e model in a common Emitter voltage divider bias configuration.	CO 2	PO 1	9
	b)	Analyse the working of the clipping circuit shown. Draw the output waveform and transfer characteristics. Assume the diode as ideal. 	CO 3	PO 2	6
	c)	Explain the significance of coupling and the bypass capacitors in a CE amplifier.	CO 1	-	5
		UNIT - II			
3	a)	Explain the different types of feedback used in amplifiers.	CO 1	-	8
	b)	For an amplifier, the midband gain is 100 and lower cut-off frequency is 1kHz. Calculate the gain of the amplifier at frequency of 20 Hz.	CO 2	PO 1	4
	c)	Obtain the expression for gain, input resistance and output resistance for a voltage series feedback amplifier.	CO 2	PO 1	8

			UNIT - III			
	4	a)	Explain the classification of power amplifiers	***CO 1***	-	**8**
		b)	With a neat circuit diagram, explain the operation of complementary symmetry Class B push-pull amplifier and show that its maximum conversion efficiency is 78.5%.	***CO 2***	***PO1***	**8**
		c)	What is distortion in power amplifiers? Define harmonic distortion.	***CO 1***	-	**4**
			UNIT - IV			
	5	a)	State the disadvantage of fixed V_{GS} biasing technique and explain how stability of operating point is achieved in drain to gate feedback resistor biasing technique in a MOSFET amplifier.	***CO 1***		**8**
		b)	Determine the values of R_S and R_D for the circuit shown so that the transistor operates at $V_{DD} = -V_{SS} = 2.5V$, $I_D = 0.3$ mA and $V_D = +0.4$ V. The NMOS transistor has $V_t = 1$ V, $\mu_n C_{ox} = 60$ $\mu A/V^2$ and W/L = 40. Neglect the channel-length modulation effect (i.e., assume that $\lambda = 0$). 	***CO 2***	***PO 1***	**6**
		c)	Compare the n-channel and p-channel enhancement type MOSFET characteristics	***CO 2***	***PO 1***	**6**
			UNIT - V			
	6	a)	Draw the conceptual MOSFET amplifier circuit and derive the expression for drain current i_D	***CO 2***	***PO 1***	**8**
		b)	Explain the basic MOSFET amplifier configurations.	***CO 1***	-	**6**
		c)	A MOSFET is to operate at I_D= 0.1mA and is to have g_m=1mA/V. If k_n' =50mA/V^2. Find the required (W/L) ratio and the overdrive voltage.	***CO 2***	***PO 1***	**6**
			OR			
	7	a)	Analyze the circuit of common drain amplifier and derive the expressions for no-load voltage gain, overall voltage gain, input resistance and output resistance.	***CO 3***	***PO 2***	**8**
		b)	For the circuit shown in figure, derive the expression for R_{in}, Ro, A_V and A_{VO} using T- Model 	***CO 2***	***PO 1***	**6**
		c)	Explain the operation of Wilson MOS Mirror	***CO 2***	-	**6**

******