U.S.N.										

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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Program: B.E. **Semester: III**

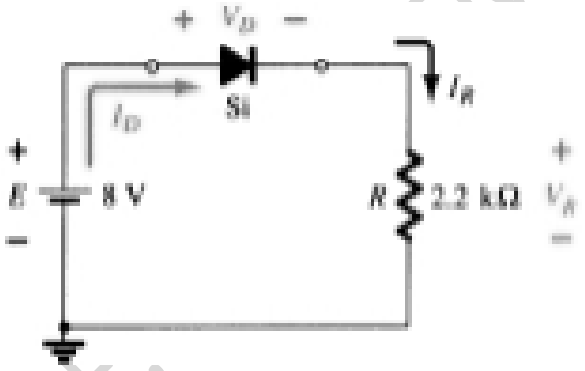
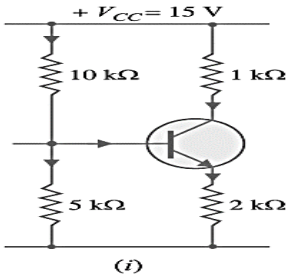
Branch: ES CLUSTER (ECE/TCE/EIE/MD) **Duration: 3 hrs.**

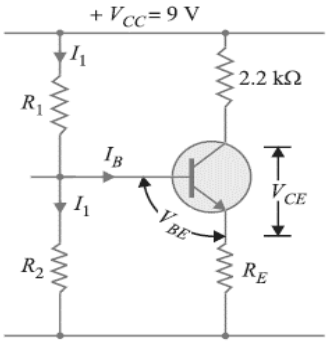
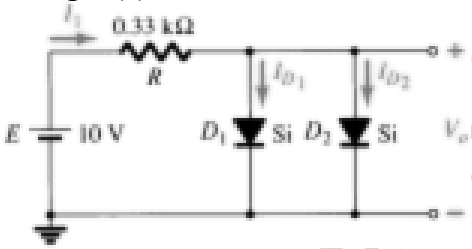
Course Code: 19ES3CCAEC **Max Marks: 100**

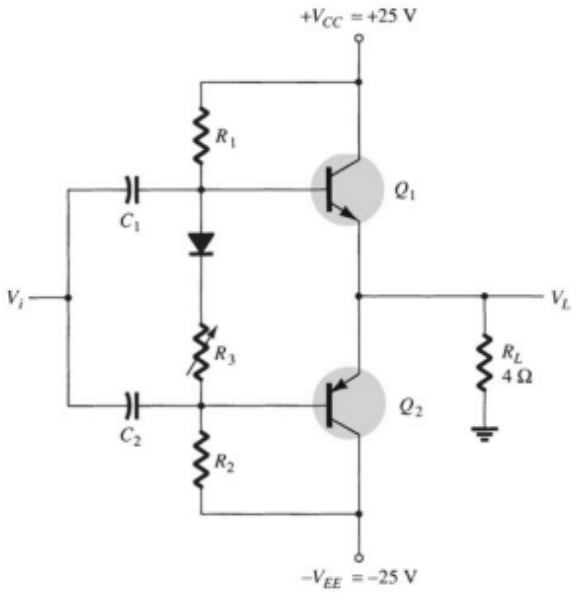
Course: Analog Electronics Circuits

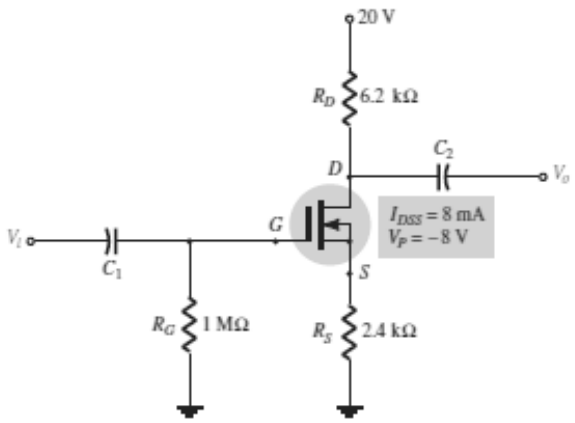
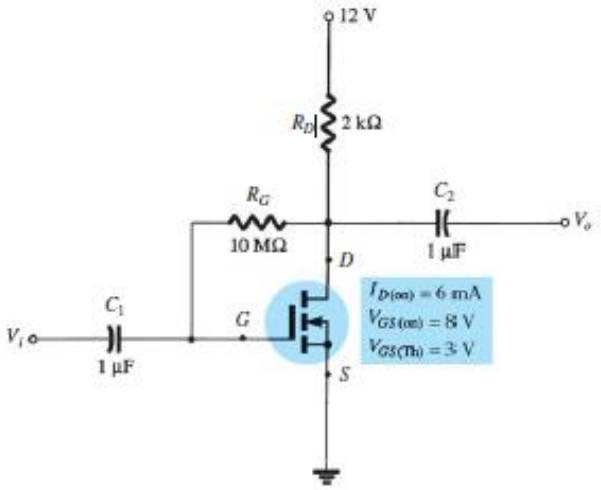
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	For the series diode configuration of Fig.1(a) determine VD, VR, and ID.  Fig.1(a)	*CO1*	*PO1*	**04**
	b)	Fig.1(b) shows the voltage divider bias method. Draw the d.c. load line and determine the operating point. Assume the transistor to be of silicon.  Fig.1(b)	*CO2*	*PO2*	**06**
	c)	Explain the exact and approximate design of voltage divider bias for a transistor.			**10**
		OR			
2	a)	With the circuit write the output for series negative and positive clipper, Biased shunt positive clipper.	*CO2*	*PO2*	**08**

		b)	In the circuit shown in Fig. 2(b), the operating point is chosen such that I_C = 2mA, V_{CE} = 3V. If R_C = 2.2 kΩ, V_{CC} = 9V and β = 50, determine the values of R_1, R_2 and R_E. Take V_{BE} = 0.3V and I1 = 10IB.  Fig. 2(b)			**08**
		c)	Determine Vo, I1, ID1, and ID2 for the parallel diode configuration of Fig. 2(c).  Fig. 2(c)	*CO2*	*PO2*	**04**
			UNIT - II			
	3	a)	The input power to a device is 10,000 W at a voltage of 1000 V. The output power is 500 W, while the output impedance is 20. i. Find the power gain in decibels. ii. Find the voltage gain in decibels. iii. Explain why parts (i) and (ii) agree or disagree.	*CO3*	*PO3*	**06**
		b)	Discuss the effect of capacitors that determines the low frequency response with relevant circuit and graphs.	*CO3*	*PO3*	**10**
		c)	Determine the voltage gain, input, and output impedance with feedback for voltage-series feedback having A = -100, Ri = 10 k, and Ro = 20 k for feedback of (a) $\beta = -0.1$ and (b) $\beta = -0.5$.	*CO3*	*PO3*	**04**
			OR			
	4	a)	Derive an expression for Millers input and output capacitance.	*CO3*	*PO3*	**10**
		b)	Write the block diagram of the following indicating A, Af and β. i. Voltage series feedback amplifier ii. Voltage shunt feedback amplifier iii. Current series feedback amplifier iv. Current shunt feedback amplifier. Write an Expression for Zi, Zo, Av and Ai for Voltage series feedback amplifier.	*CO3*	*PO3*	**10**

			UNIT - III			
	5	a)	Discuss the working principle of class B power amplifier circuit. Derive an equation for power conversion efficiency.	*CO3*	*PO3*	**10**
		b)	Briefly explain Amplifier Efficiency and DC Bias Operations.	*CO3*	*PO3*	**10**
			OR			
	6	a)	Explain the working principle of a class A transformer coupled power amplifier circuit. Show that maximum power conversion efficiency is 50% for class A power amplifier.	*CO3*	*PO3*	**10**
		b)	For the circuit of Fig.6(b), calculate the input power, output power, and power handled by each output transistor and the circuit efficiency for an input of 12 V rms.  Fig.6(b)	*CO3*	*PO3*	**10**
			UNIT - IV			
	7	a)	With relevant circuit discuss MOSFET as an amplifier and as a switch.	*CO3*	*PO3*	**10**
		b)	Determine the following for the network of the Fig.7(b) given below: i. I_{DQ} and V_{VGSQ}. ii. V_D	*CO3*	*PO3*	**10**

			 Fig.7(b)			
			OR			
	8	a)	Determine I_{DQ} and V_{VDSQ} for the enhancement-type MOSFET of Fig.8(a) given below.  Fig.8(a)	*CO3*	*PO3*	**10**
		b)	Illustrate CMOS Inverter with relevant circuit Diagram.	*CO3*	*PO3*	**10**
			UNIT - V			
	9	a)	With the circuit derive for the voltage gain, input impedance and output impedance for the common source (CS) MOS amplifier with Rs.	*CO3*	*PO3*	**10**
		b)	Derive an expression for trans conductance of MOSFET.	*CO3*	*PO3*	**10**
			OR			
	10	a)	Explain the developmental steps of the T equivalent circuit model with necessary circuit diagram.	*CO3*	*PO3*	**10**
		b)	Explain the working principle of Wilson current and derive an expression for the Wilson current transfer ratio.	*CO3*	*PO3*	**10**

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