U.S.N.										

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

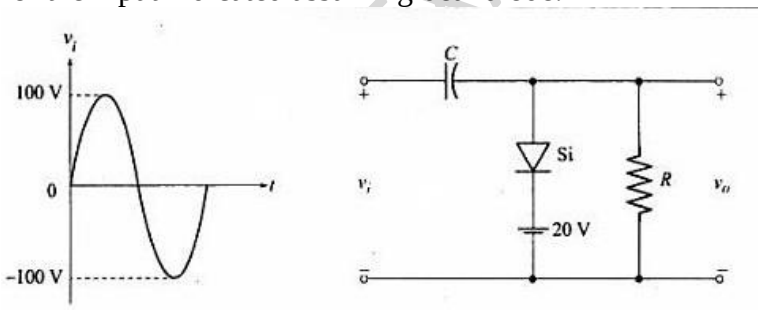
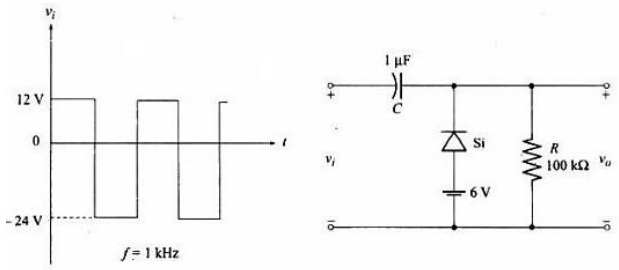
Autonomous Institute Affiliated to VTU

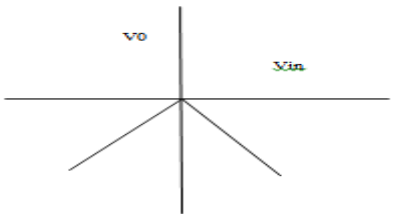
June 2025 Semester End Main Examinations

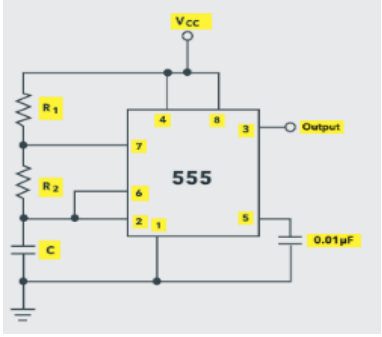
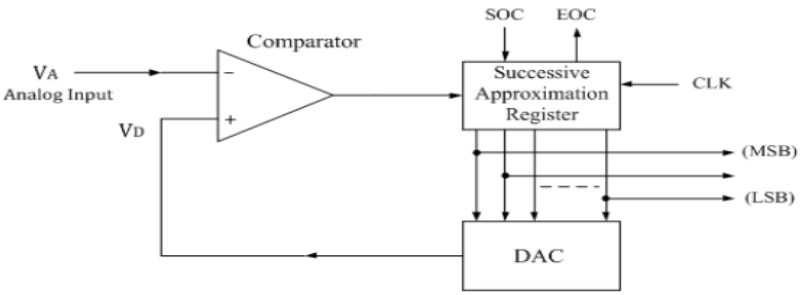
Programme: B.E. **Semester: III**
Branch: Electronics and Telecommunication Engineering **Duration: 3 hrs.**
Course Code: 22ET3PCALC **Max Marks: 100**
Course: Analog and Linear circuits

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)	Draw the r_e model for a voltage divider bias configuration and derive expressions for input impedance, output impedance and voltage gain.		*CO2*	*PO1*	**10**
	b)	What is an operating point? With a neat circuit diagram and relevant expressions, explain collector to base feedback resistor biasing of BJT.		*CO1*	-	**10**
		OR				
2	a	For the circuit shown below, find and plot the waveform of vo for the input indicated assumingideal diode. 		*CO2*	*PO1*	**10**
	b	For the circuit shown below, find and plot the waveform of vo for the input indicated. 		*CO3*	*PO2*	**10**
			UNIT - II			
3	a)	Explain the working of class B complementary symmetry push pull amplifier. Also derive an expression for maximum conversion efficiency.		*CO1* *CO2*	- *PO1*	**10**

		b)	It is required to design a class B output stage to deliver an average power of 20 Watt to an 8Ω load. The power supply is to be selected such that Vcc is about 5V greater than peak output voltage. Determine the supply voltage required, the peak current drawn from each supply, the total supply power and power conversion efficiency.	*CO2*	*PO1*	**10**
			OR			
	4	a)	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 and (iv) Current shunt feedback amplifier.	*CO1*	-	**10**
		b)	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.	*CO1* *CO2*	- *PO1*	**10**
			UNIT - III			
	5	a)	Derive an expression for i) input impedance ii) output impedance iii) voltage gain and overall gain for a common source amplifier with source resistance.	*CO2*	*PO1*	**10**
		b)	Explain the effects of biasing by fixing V_{GS} in a MOSFET with i_D-V_{GS} characteristics.	*CO1*	-	**10**
			OR			
	6	a	What is biasing? What are the types of biasing in MOSFET amplifiers? Explain each with circuit diagram	*CO1*		**10**
		b	Consider a common source amplifier circuit with resistor R_s and current source biasing where g_m=0.5mA/V,V_{DD}=15V,V_{ss}= -15V,R_G=5MΩ,R_D=10KΩ,R_L=12KΩ,R_S=2KΩ and R_{sig}=100Ω.Find R_{in},R_{out},A_v,A_{v0} and G_v. Write its circuit diagram.	*CO2*	*PO1*	**10**
			UNIT - IV			
	7	a)	Design a suitable op-amp circuit to get the transfer characteristics given below. Explain its working. Draw the necessary waveforms. 	*CO4*	*PO3*	**10**
		b)	Sketch and Explain the circuit of (i) voltage to current converter with grounded and floating load (ii) current to voltage converter with relevant mathematical equations and mention its applications.	*CO1*	-	**10**
			OR			
	8	a	Explain with relevant circuit diagrams and equations how the total output offset voltage of an op-amp due to non-ideal DC characteristics is assessed	*CO1*		**10**
		b	With a neat circuit diagram, explain the working of instrumentation amplifier by deriving an expression for its output. What are the characteristics of instrumentation amplifiers?	*CO2*	*PO1*	**10**

			UNIT - V			
	9	a)	Draw and explain the functional block diagram of 555 timer and hence, For the circuit given below, If R_1=6.8KΩ,R_2=3.3KΩ and C=0.1μF,calculate t_{HIGH}, t_{LOW}, Frequency and duty cycle.  	*CO1* *CO2*	- *PO1*	**10**
		b)	Identify the circuit given and hence analyze the circuit operation for the digital representation 11010100.  	*CO3*	*PO2*	**10**
			OR			
	10	a)	Explain, with the help of a neat circuit diagram and truth table, the operation of the parallel comparator A/D converter.	*CO1*	-	**10**
		b)	With the help of a block diagram of the PLL, explain its basic principles. Define capture range, lock range, and pull-in-time.	*CO1*	-	**10**

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