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

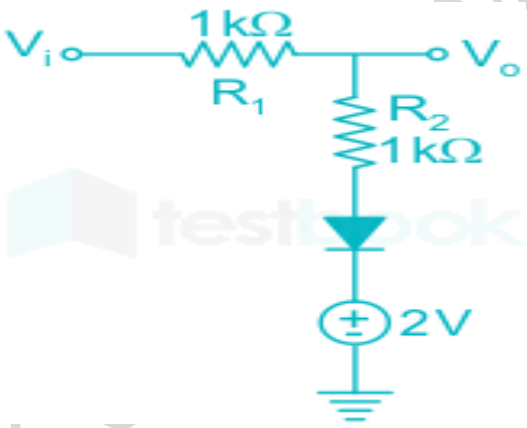
Autonomous Institute Affiliated to VTU

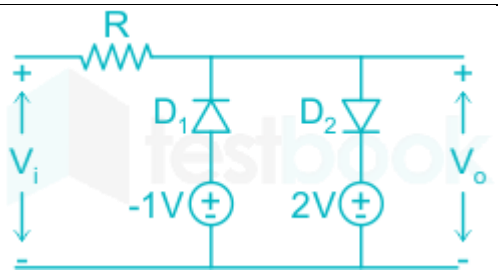
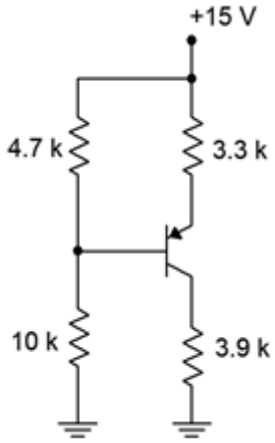
September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: III**
Branch: ES Cluster (EEE/ ECE) **Duration: 3 hrs.**
Course Code: 19ES3CCAEC **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.

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

		UNIT - I	CO	PO	Marks
1	a)	Explain the need for Clamping circuits and draw the circuit diagram of positive peak clamper circuit and explain its operation.	CO1	PO1	**08**
	b)	The diode in the circuit shown in figure 1 has Von = 0.7 Volts but is ideal otherwise. If Vi = 5 sin (ωt) Volts, the minimum and maximum values of V_0 (in Volts) are, respectively,  **Figure 1**	CO1	PO1	**06**
	c)	Derive the equations for current gain, voltage gain, input and output impedance for a Voltage divider configuration using r_e model.	CO1	PO2	**06**
		OR			
2	a)	Explain the operation of a negative clipper with neat sketches	CO1	PO1	**05**
	b)	Two silicon diodes, with a forward voltage drop of 0.7 V, are used in the circuit shown in the figure 2. The range of input voltage Vi for which the output voltage $Vo = Vi$ and Determine the transfer characteristics.	CO1	PO1	**07**

			 **Figure 2**			
	c)	Assuming β=200, determine the Q point (I_C and V_{CE}) for the circuit of Figure 3.Also determine the values of V_C and V_B.  **Figure 3**	*CO1*	*PO2*	**08**
		UNIT - II			
3	a)	Explain the low frequency response of BJT amplifier and derive the expression for Ri, Vi, Ro, F_{LS}, F_{LE},Re and Av.	*CO2*	*PO1*	**08**
	b)	Prove that Miller effect Capacitance, $C_{miller}=(1-A_v)C_{f.}$	*CO2*	*PO1*	**07**
	c)	Name any two topologies of the feedback amplifiers and draw any one block diagram schematic among topologies.	*CO2*	*PO1*	**05**
		UNIT - III			
4	a)	For a class B amplifier using a supply of VCC = 12V and driving a load of 8Ω, determine (i) maximum load power (ii) d.c. input power (iii) collector efficiency.	*CO3*	*PO1*	**07**
	b)	Explain the working of transformer coupled Class A power amplifier with a neat circuit diagram, waveforms and necessary equations.	*CO3*	*PO2*	**08**
	c)	Define Power Amplifier. Explain the Classification of power amplifiers based on class of operation.	*CO3*	*PO1*	**05**
		UNIT - IV			
5	a)	Define Biasing. Explain the different types of biasing MOSFET amplifiers	*CO3*	*PO1*	**08**
	b)	Draw Vi versus Vo characteristics of n-channel MOSFET.	*CO3*	*PO1*	**04**

		c)	Consider a process technology for which for which Lmin = 0.4μm, tox = 8nm,μ_n = 450cm^2 /V.s and Vt =0.7V (i) Find Cox and k'_n (ii) For a MOSFET with W/L = 8μm/0.8μm, calculate the values of V_{GS} and V_{DSmin} needed to operate the transistor in the saturation region with a dc current I_D = 100μA. (iii) For the device in (ii) find the valued of V_{GS} required to cause the device to operate as a 1000Ω resistor for a very small V_{DS}.	*CO3*	*PO2*	**08**
			UNIT - V			
	6	a)	Explain the working principle of Wilson current mirror and derive an expression for Wilson current transfer ratio.	*CO3*	*PO1*	**10**
		b)	Derive an expression for input resistance, output resistance, voltage gain and overall voltage gain of a common source MOSFET amplifier.	*CO3*	*PO1*	**10**
			OR			
	7	a)	Explain the working of current steering circuit using MOSFET with neat Circuit Diagram.	*CO4*	*PO1*	**10**
		b)	Develop a T-equivalent circuit model from its small signal model for an n-channel enhancement MOSFET	*CO4*	*PO1*	**10**

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