U.S.N.										

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

Autonomous Institute Affiliated to VTU

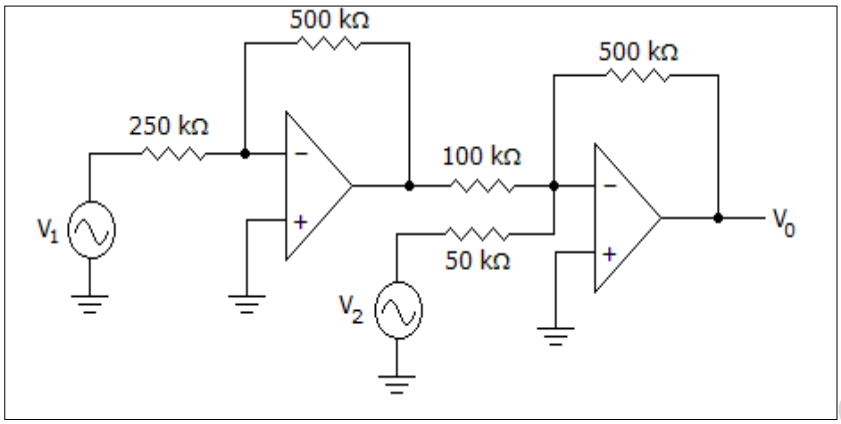
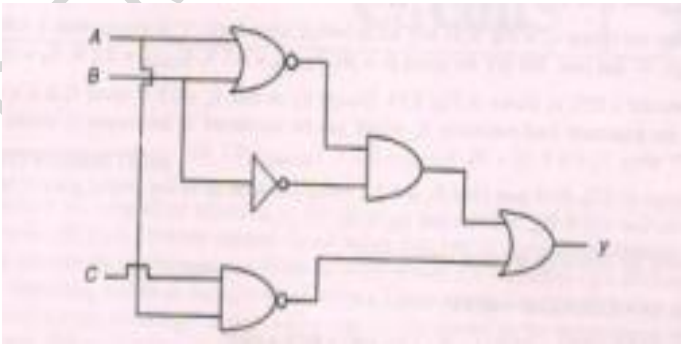
October 2024 Supplementary Examinations

Programme: B.E. **Semester: I / II**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 22EC1ESBEC / 22EC2ESBEC **Max Marks: 100**
Course: Basic Electronics

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)		Explain the forward and reverse biased condition of PN junction Diode.	-	-	**05**
	b)		Derive the expression for Ripple factor and efficiency of Half-wave rectifier.	*CO* 1	*PO1*	**10**
	c)		Design a Zener regulator for following specification: Load current I_L = 20mA.Output voltage V_0 = 5 V, Zener wattage Pz = 500mW Input voltage Vi= 12±2V and I_{Zmin} = 8 mA.	*CO* 3	*PO3*	**05**
			UNIT – II			
2	a)		What is a Regulated power supply? Explain with a block diagram	-	-	**05**
	b)		Derive the expression for Ripple factor and efficiency of Bridge rectifier.	*CO* 1	*PO1*	**10**
	c)		For a Silicon Diode working at a Temperature of 250C, the forward voltage applied across the diode is 0.5V, determine its forward current, if the reverse saturation current is 10nA.	*CO* 1	*PO1*	**05**
			OR			
3	a)		With a neat diagram, explain the input and output characteristics of a transistor in common Base configuration.	-	-	**10**
	b)		Derive the expression for gain of positive and negative feedback systems. An amplifier has mid band gain of 125 and a bandwidth of 250KHz. If 4% negative feedback is introduced, find the new bandwidth and gain. If bandwidth is restricted to 1MHz, find the feedback ratio.	*CO* 1	*PO1*	**10**
			UNIT - III			
4	a)		Explain the block of the operational amplifier with a neat diagram.	-	-	**05**
	b)		The equivalent electrical parameter of a crystal oscillator is L=3H, C=0.05pF, C_P=6pF, and R=1KΩ. Determine the series resonant frequency and the percentage by which the parallel resonant frequency exceeds the series resonance frequency.	*CO* 1	*PO1*	**08**

		c)	Calculate the output voltage of the circuit shown in figure below, if V1 = -300 mV and V2 = 500 mV. Also mention how the op-amp is Configured.  	*CO* 2	*PO2*	**07**
			UNIT – IV			
	5	a)	Implement half adder using basic gates	*CO* 1	*PO1*	**05**
		b)	Perform the following conversion (i) $(45.69)_{10} = (\ )_2 = (\ )_H$ (ii) $(9AEF)_H = (\ )_{10} = (\ )_2 = (\ )_8$	*CO* 1	*PO1*	**10**
		c)	A logic circuit has 3 inputs A, B, C and one output Y. Y=B XOR C when A=0, and Y=C when A=1. Simplify the output expression and realize the same using logic gates.	*CO* 2	*PO2*	**05**
			OR			
	6	a)	Analyze the logic circuit shown in fig. Determine the Boolean function for y and state its truth table  	*CO* 2	*PO2*	**06**
		b)	Design Full Adder circuit using 2 Half adders.	*CO* 3	*PO3*	**08**
		c)	Design a logic circuit using a minimum number of NOR gates to implement the following expression. $F = \bar{A}B + \bar{B}C + BC + A\bar{B}\bar{C}$	*CO* 3	*PO3*	**06**

			UNIT – V			
	7	a)	With a neat block diagram, explain the components of the basic communication System.	-	-	**06**
		b)	Define Signal to Noise Ratio and Noise Factor with relevant equation. At a receiver of a communication system, the signal and noise voltages are given as 3.5mV and 0.75mV respectively. Determine the SNR in dB.	***CO*** 1	***PO1***	**08**
		c)	Discuss different types of computer communication networks based on their size.	-	-	**06**

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