U.S.N.										

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

Autonomous Institute Affiliated to VTU

September 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.

			CO	PO	Marks
		UNIT – I			
1	a)	Explain the V-I characteristics of PN junction diode with Shockley's equation.	-	-	**6**
	b)	Derive the expression for Ripple factor and efficiency of Half-wave rectifier.	***CO1***	***PO1***	**8**
	c)	The diode current is 0.6mA when the applied voltage is 500mV.Determine the η, assume V_T=25mV.	***CO1***	***PO1***	**6**
		OR			
2	a)	Explain the forward and reverse biased condition of PN junction Diode.	-	-	**4**
	b)	Arrive at the expression for Ripple factor and efficiency of Bridge rectifier.	***CO1***	***PO1***	**10**
	c)	For a Zener regulator R=2.2K Ω, R_L=1K Ω, calculate the range of input voltage for which output will remain constant. V_Z=6.1V, $I_Z$min=2.5mA, $I_Z$max=25mA, Rz=0 Ω. 6 Marks	***CO1***	***PO1***	**6**
		UNIT – II			
3	a)	Deduce the relationship between various Transistor current and also α and β of a transistor.In a common emitter transistor circuit, if β = 100 and I_B = 50μA, compute the values of α, I_E and I_C.	***CO 1***	***PO1***	**10**
	b)	With a neat diagram, explain the input and output characteristics of a transistor in common emitter configuration.	-	-	**10**
		UNIT - III			
4	a)	Derive the expression of the output of an Op-Amp Integrator with a neat circuit diagram.	***CO 1***	***PO1***	**5**
	b)	Draw the output waveform of an Op-Amp i. If square wave is given at the differentiator input. ii. If triangular wave is given at the differentiator input	***CO 1***	***PO1***	**5**

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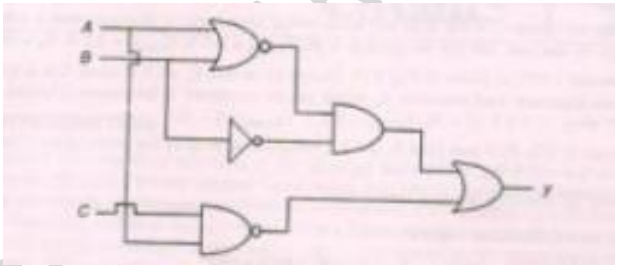
		c)	i .The transistor RC phase shift oscillator has three RC sections with C = 0.01μF and R = 6.3 KΩ. If R_L = 4.7kΩ. Determine the frequency of oscillation. ii. What is the frequency of Hartley oscillator if the total inductance of L_1 and L_2 is 50mH and the capacitance of the resonant circuit is 200pF?	***CO 1***	***PO1***	**5 +5**
			UNIT - IV			
	5	a)	With the state table, explain the working of SR Flip-flop realized using NAND gates.	-	-	**5**
		b)	Perform the following conversion (i) $(25.6)_{10}$ = ( )$_2$ = ( )$_H$ (ii) $(7BEF)_H$ = ( )$_{10}$ = ( )$_2$ = ( )$_8$ (iii) $(57279)_{10}$ = ( )$_{16}$	***CO 1***	***PO1***	**10**
		c)	Design Full Adder circuit using 2 Half adders.	***CO 3***	***PO3***	**5**
			OR			
	6	a)	With the state table, explain the working of JK Flip-flop realized using NAND gates.	-	-	**5**
		b)	Perform the following i. $(532.65)_{10}$ = ( )$_{16}$ ii. $(250.67)_{16}$ = ( )$_2$ = ( )$_{10}$ iii. $(952.01)_{10}$ = ( )$_{16}$ = ( )$_8$	***CO1***	***PO1***	**10**
		c)	Analyze the logic circuit shown in figure below. Determine the Boolean function for y and state its truth table. 	***CO2***	***PO2***	**5**
			UNIT – V			
	7	a)	Explain the different types of modulation techniques with relevant Waveforms. Mention the modulation index of AM and FM wave.	-	-	**4**
		b)	A 100MHz carrier wave is frequency modulated by a 10KHz sinusoidal modulating signal. If the maximum frequency deviation is 50KHz, Compute the modulation index and also find Carrier Swing.	***CO1***	***PO1***	**4**
		c)	Write a short note on (i) Cellular communication system (ii) computer communication network. (iii) Compare 1G, 2G, 3G and 4G technologies of cellular communication.	-	-	**12**

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