GLOBAL ACADEMY OF TECHNOLOGY

(Autonomous Institution, Affiliated to VTU)

SEE MODEL QUESTION PAPER-2

UG

First Semester B.E. Degree Examination, April - 2021

Elements of Electronics Engineering

Time: 3 hrs. **Course Code: 20ELN16** **Max. Marks: 100**

***Note: answer any Five full questions, choosing ONE full question from each module*.**

		MODULE - 1	Marks
1	a.	Discuss the working of Full wave Bridge rectifier with circuit diagram and waveforms. Show that efficiency 81.2 %.	8
	b.	A full wave rectifier has a load of 1kΩ. The ac voltage applied to the diode is 200V−0V−200V. If diode resistance is neglected, calculate (i) average dc current and (ii) average dc voltage.	8
	c.	Design a Zener voltage regulator to meet the following specifications: Output voltage = 5 V load current = 10 mA Zener wattage = 100 mW input voltage = 10 V ±2V	4
		OR	
2	a.	Discuss how Zener diode can be used for voltage regulation.	6
	b.	A full wave bridge rectifier with an input of 100 V (rms) feeds a load of 1 kΩ. V_T = 0.7 V If the diodes employed are of silicon, what is the dc voltage across the load and determine the PIV rating of each diode.	7
	c.	Discuss the different types of Diode approximations.	7
		MODULE - 2	
3	a.	Explain how transistor can be used as a Switch.	7
	b.	A voltage divider bias circuit has V_{CC} = 15V, R_c = 2.7kΩ, R_E = 2.2kΩ, R_1 = 22kΩ, R_2 = 12kΩ and h_{fe} = 50. Calculate V_E, V_c, I_c and V_{CE}, draw the DC load line, and mark the Q-point assume V_{BE} = 0.7V.	6
	c	Discuss working principles of Crystal Oscillator using BJT.	7
		OR	
4	a.	Explain the operation of Hartlet oscillator with circuit diagram and write the expression for the frequency of oscillation.	7
	b	Design voltage divider bias circuit to have V_{CE} = V_E = 6V and I_c = 1.5mA supply voltage is 24V and transistor h_{fe} = 80.	6
	c	Determine the operating point of a Base bias Circuit using Silicon transistor with β = 100, R_B = 500kΩ, R_c= 2.5kΩ and V_{cc} = 20V. Show the load line and Q- point.	7
		MODULE - 3	
5	a.	Obtain an expression for the output voltage of an Subtractor using Op-amp	7
	b.	The input to the basic differentiator circuit is a sinusoidal voltage of peak value of 10	6

		mV and frequency 1.5 kHz. Find the output if R_f = 100 kΩ and C_1 = 1μF.	7
	c.	Obtain an expression for the output voltage of an Inverting Summer using Op-amp	
		OR	
6	a.	Design an Inverting Schmitt Trigger using Op-Amp with UTP = +4V, LTP =-4V and Vcc=18V	7
	b.	Explain zero crossing detector using Op-Amp and also Sketch the input and output waveforms.	7
	c.	Design an adder circuit usingop-amp to obtain an output expression of $V_o = -[0.1V_1 + 0.5V_2 + 20V_3]$, where V_1, V_2 and V_3 are inputs. Select R_f = 150 kΩ.	6
MODULE - 4			
7	a.	Reduce the Boolean Expression and Implement using Universal gates Y=∑(1,2,4,7).	6
	b.	Deduce a Full Subtractorr using Logic gates and write the truth table and logical expressions.	7
	c	Explain the working of a JK flip-flop with logic diagram and truth table.	7
		OR	
8	a	Perform 1's and 2's Complement Subtraction for $(32)_{10} - (46)_{10}$	6
	b	Implement Half adder using NAND gates.	7
	c.	Explain the working of an SR- latch using NOR gates.	7
MODULE - 5			
9	a.	Explain the various technology generations used in Wireless Communication System.	7
	b.	What is modulation and explain the need for modulation.	6
	c.	A modulating signal 10 sin (2π x 103t) is used to modulate a carrier signal 20sin(2πx104t). Find the modulation index, percentage of modulation and bandwidth of the modulated signal.	7
		OR	
10	a.	Explain the basic principle of cellular communication.	7
	b.	Discuss different types of Electronic Communication.	7
	c.	A 500 Watts, 1MHz carrier is amplitude modulated with a sinusoidal signal of 1kHz. The depth of modulation is 60%. Calculate the band width, power in the side bands and the total power transmitted.	6