[/11

0904E106

Candidate's Seat No : _____

B.Sc. Sem.-6 Examination

CC-307

Electronics

April-2025

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions: (1) Symbols used here have their usual meanings.
(2) Figures to the right indicate marks.

Q-1	(i)	Write a short-note on Zero Crossing Detector using Op-Amp.	(7)
	(ii)	For the log amplifier using op-amp, prove that the output voltage is proportional to the logarithm of the input voltage.	(7)
		OR	
Q-1	(i)	Explain working of anti-log amplifier using Op-Amp.	(7)
	(ii)	Explain Schmitt Trigger circuit using Op-Amp.	(7)
Q-2	(i)	Draw the schematic block diagram of the PLL. Explain function of each block in detail.	(7)
	(ii)	Explain Lock-in range, Capture range and Pull-in time of the PLL.	(7)
		OR	
Q-2	(i)	What is the difference between active and passive low pass filter? What is the importance of low pass filter in PLL?	(7)
	(ii)	Explain the application of PLL as frequency multiplication.	(7)
Q-3	(i)	Draw the V-I characteristics of an SCR. Explain forward and reverse characteristics in detail.	(7)
	(ii)	Explain the terms: Break-over voltage, Holding current, PRV and Forward Current Rating used in SCR analysis.	(7)
		OR	
Q-3	(i)	Discuss the application of an SCR as an over-light detector.	(7)
	(ii)	What is Crowbar circuit? Explain the application of an SCR in the Crowbar circuit.	(7)
Q-4	(i)	Draw the schematic of two SCR equivalent circuit TRIAC. Briefly explain working of this circuit.	(7)
	(ii)	Discuss the construction of TRIAC in detail.	(7)
		OR	
Q-4	(i)	Write a short note on UJT relaxation oscillator.	(7)
	(ii)	Draw the V-I characteristics of DIAC. Explain the operation of DIAC using these characteristics.	(7)
Q-5		Attempt any SEVEN out of twelve.	(14)
	(1)	Draw the sine wave as an input and its integrated output waveform for Op-Amp integrator circuit.	
	(2)	What is the limitation of log amplifier using single Op-Amp?	
	(3)	Draw the schematic symbol of a multiplier using Op-Amp.	
	(4)	Write the full form of PLL.	
	(5)	What is capture range in PLL?	
	(6)	The free running frequency of a PLL is 300 kHz and the bandwidth of low pass filter is 10 kHz. Will the PLL acquire lock for an input signal of 320 kHz?	
	(7)	An SCR has a circuit fusing rating of $50A^2s$. The device is being used in a circuit where it could be subjected to a 100A surge. Determine the maximum allowable duration of such a surge.	
	(8)	Why SCR is called "Thyristor"?	
	(9)	An SCR in a circuit is subjected to a 50 Amp surge that lasts for 12 ms. Determine whether or not this surge will destroy the device. Given that circuit fusing rating is $90A^2s$.	
	(10)	Draw the symbol of DIAC.	
	(11)	Differentiate between DIAC and Transistor?	
	(12)	Draw the symbol of UJT.	