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Name:

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S,FE) (FT/WP), (S3 PT) Examination May 2025 (2019 Scheme

Course Code: ECT 301

Course Name: LINEAR INTEGRATED CIRCUITS

Max. Marks: 100 Duration		: 3 Hours	
	PART A		
	(Answer all questions; each question carries 3 marks)	Marks	
1	What are the ideal characteristics of an op-amp.?	3	
2	Define Slew rate? Explain its significance.	3	
3	Discuss the concept of virtual ground.	3	
4	State how practical integrator is different from simple integrator circuit, with	3	
	relevant sketches.		
5	Draw the circuit of an op-amp monostable multivibrator and write down the	3	
	expression of time period.		
6	What are the advantages of active filters over passive filters?	3	
7	Design a free-running multivibrator using 555 for a frequency of 1 KHz and a	3	
	duty cycle of 60%. Choose $C=0.1\mu F$.		
8	Mention three applications of PLL.	3	
9	Explain the features and functional block diagram of IC 723.	3	
10	List out DAC specifications.	3	

PART B

(Answer one full question from each module, each question carries 14 marks) Module -1

11	a)	Derive CMRR, input resistance and output resistance of a dual input balanced	7
		output differential amplifier configuration.	
	b)	How a constant current bias circuit can be used to improve the CMRR of a	7
		differential amplifier?	
12	a)	Draw the block diagram of an op-amp and explain the functions of each block.	7
	b)	Draw the equivalent circuit of an op-amp and explain the voltage transfer	7
		characteristics of an op-amp.	

Module -2

13	a)	Design the circuits to obtain the following output, V_0 . (i) $V_0 = (5V_1)$	8
		(ii) $V_0 = V_1 + 2V_2$ (iii) $V_o = -(\frac{V_1 + V_2 + V_3}{3})$ (iv) $V_0 = -2V_1 - 5V_2$	
	b)	Derive the following characteristics of voltage shunt amplifier: (i) Closed loop	6
		voltage gain (ii)Input resistance (iii) Output resistance (iv)Bandwidth	
14	a)	What is a logarithmic amplifier? Draw the circuit and derive the transfer	7
		function of a logarithmic amplifier.	
	b)	Draw and explain the circuit of a voltage to current converter with grounded	7
		load and derive its transfer function.	
		Module -3	
15	a)	With the help of circuit diagram explain the operation of RC phase shift	10
		oscillator using op-amp. Derive the expression for frequency of oscillation and	
		the minimum gain requirement for sustained oscillation.	
	b)	Design a first order low pass filter with the following specifications	4
		(i)-3dB frequency 1 KH _z , (ii) DC gain 20dB. Choose C= 0.01μ F.	
16	a)	Design a circuit to generate a triangular waveform of $7V_{P-P}$ at 1 KH _z using an	7
		op-amp having saturation voltage of ± 14 V and draw the waveforms also.	
	b)	Derive the equation for the frequency of oscillation of an opamp astable	7
		multivibrator with the help of circuit diagram and waveforms.	
		Module -4	
17	a)	Draw the functional block diagram of 566 VCO and explain its operation.	7
	b)	Explain the operation of PLL. What is its lock range and capture range.	7
18	a)	List the features of Timer IC 555	4
	b)	Draw the internal diagram of a 555 timer and explain its working as a	10
		monostable multivibrator and derive the expression for its pulse-width.	
		Module -5	
19	a)	Discuss how the IC 723 can be used as high voltage regulator with current limit	7
		and with current fold back.	
	b)	Draw and explain the working of successive approximation type ADC.	7
20	a)	With neat circuit diagram explain the working of a 3-bit flash ADC.	7
	b)	Explain the circuit of a 4-bit R-2R ladder DAC.	7