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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (R) (FT/WP) Examinations April 2026 (2024 Scheme)

Course Code: PCECT403
Course Name: Linear Integrated Circuits

Max. Marks: 60 Duration: 2 hours 30 minutes

PART A

(Answer all questions. Each question carries 3 marks)

		CO	Marks
1	Define the Common Mode Rejection Ratio (CMRR) of an operational amplifier. An op-amp has a differential -mode gain of 5000 and a common-mode gain of 0.25. Calculate CMRR in dB.	(1)	(3)
2	What are the ideal characteristics of an op-amp?	(1)	(3)
3	Discuss the concept of virtual ground in an inverting amplifier.	(2)	(3)
4	Draw the circuit diagram of a summing amplifier using op-amp and write the output equation.	(2)	(3)
5	List any 3 advantages of active filters over passive filters.	(3)	(3)
6	Draw the circuit diagram of an op-amp monostable multivibrator.	(3)	(3)
7	Define the terms (i) Capture Range and (ii) Lock Range of a Phase Locked Loop (PLL).	(4)	(3)
8	Define settling time and monotonicity of a DAC.	(4)	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

9	a)	With neat diagrams, explain the operation of a dual-input balanced output differential amplifier. Derive the expressions for differential gain (A_d) and input resistance (R_i).	(1)	6

	b)	Define the following (i) Input offset voltage (ii) Input bias current (iii) Slew rate	(1)	3
10	a)	Explain the working of the Widlar current source with a suitable circuit diagram. Derive the expression for the output current.	(1)	5
	b)	Draw the equivalent circuit diagram of a practical op-amp and a description of each parameter.	(1)	4

Module -2

11	a)	Explain the operation of an instrumentation amplifier and derive the output voltage equation.	(2)	5
	b)	Design a non-inverting amplifier for a closed-loop gain of 11.	(2)	4
12	a)	Draw the circuit diagram of a voltage shunt feedback amplifier using an op-amp. Derive the expression for closed-loop gain, input resistance, and output resistance.	(2)	5
	b)	With the help of circuit diagram and waveforms, explain the working of a full-wave precision rectifier.	(2)	4

Module -3

13	a)	Explain the operation of a bandpass and band-reject filter with a suitable circuit diagram and frequency response curves.	(3)	5
	b)	Explain the operation of an RC phase shift oscillator with a neat circuit diagram.	(3)	4
14	a)	Explain the operation of a triangular wave generator with waveforms and derive the expression for frequency.	(3)	5
	b)	Explain the high voltage regulation configuration of IC 723.	(3)	4

Module - 4

15	a)	Explain the monostable operation of a 555 timer.	(4)	5
	b)	Explain the operation of a 3-bit flash ADC with neat circuit diagram.	(4)	4

16	a)	Explain the operation of a 3-bit R-2R ladder DAC with a suitable circuit diagram and derive the output equation.	(4)	5
	b)	Explain the operation of the LM566 VCO with a neat block diagram.	(4)	4

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