

**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)**

III - B.Tech II-Semester Regular Examinations (BR23), MAY - 2026

LINEAR AND DIGITAL IC APPLICATIONS (EEE)

Time: 3 hours

Max. Marks: 70

Question Paper consists of Part-A and Part-B

*Answer ALL the question in **Part-A and Part-B***

PART-A (10X2 = 20M)

	Marks	CO	BL
1. a) What is the slew rate of an Op-Amp?	(2M)	CO1	BL2
b) Define a differentiator and mention one application.	(2M)	CO1	BL1
c) What is the purpose of using Op-Amp in active filters?	(2M)	CO2	BL2
d) Write two applications of a square-wave generator	(2M)	CO2	BL1
e) What is a Parallel (Flash) type ADC?	(2M)	CO3	BL2
f) What is a weighted resistor DAC?	(2M)	CO3	BL1
g) What are combinational logic circuits?	(2M)	CO4	BL1
h) Define a priority encoder?	(2M)	CO4	BL1
i) Differentiate between a Latch and a Flip-Flop with a neat logic diagram.	(2M)	CO5	BL2
j) Compare ROM and RAM.	(2M)	CO5	BL2

PART-B (5X10 = 50M)

2a. Explain in detail the AC characteristics of an ideal op-amp with relevant expressions	7(M)	CO1	BL3
b. Derive the expression for voltage gain of an inverting amplifier.	3(M)		BL4
(OR)			
3a. What is an instrumentation amplifier? Explain the working of instrumentation amplifiers with a neat circuit diagram.	7(M)	CO1	BL2
b. Explain the operation of a Schmitt trigger circuit using IC 741.	3(M)		BL3
4a. Design a second order Butterworth LPF having upper cut-off frequency of 1 kHz.	5(M)	CO2	BL4
b. Draw the circuit diagram of All pass filters and derive its transfer function	5(M)		BL3
(OR)			
5a. What is 555 timer? Explain the working of 555 timer as Monostable Multivibrator	7(M)	CO2	BL3
b. Draw the circuit of a PLL AM detector and explain its operation	3(M)		BL3
6a. Draw the circuit diagram of 5-bit inverted R-2R ladder DAC. How many levels are possible in this DAC? What is its resolution if the output range is 0 to 10 V.	3(M)	CO3	BL4
b. Explain the operation of parallel comparator type ADC	7(M)		BL4
(OR)			
7a. Draw the circuit of a Weighted Resistor DAC and obtain expression for n-bits	7(M)	CO3	BL4
b. Write the specifications of DAC and ADC.	3(M)		BL1

8a.	Discuss the specifications of TTL 74XX and CMOS 40XX series ICs and their applications	3(M)	CO4	BL2
b.	Implement the 32 input to 5 output priority encoder using four 74LS148 & gates (OR)	7(M)		BL4
9a.	Design a 16x1 multiplexer using 74LS151 IC's.	5(M)	CO4	BL4
b.	Explain magnitude comparators	5(M)		BL2
10a	Describe the operation of a Master-Slave JK Flip-Flop with a neat diagram and truth table.	5(M)	CO5	BL3
b.	Explain the operation of a 4-bit synchronous binary counter using flip-flops (OR)	5(M)		BL3
11a	Draw and explain 4-bit universal shift register.	3(M)	CO5	BL3
b.	Discuss in detail ROM Architecture.	7(M)		BL2
