Course Code: **24BC1T01**

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

I-BCA I-Semester Regular/Supplementary Examinations (BR24), Feb - 2026

DIGITAL LOGIC DESIGN (BCA)

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)	Find 2's complement of 1011011	(2M)	CO1	BL2
b)	State Demorgon's laws	(2M)	CO1	BL2
c)	State Ex-OR and Ex-Nor logic gates.	(2M)	CO2	BL3
d)	Distinguish between canonical and standard forms by giving an example.	(2M)	CO2	BL3
e)	What is a multiplexer? What is the function of a multiplexer's select input.	(2M)	CO3	BL5
f)	Write the truth table of half adder.	(2M)	CO3	BL5
g)	Differentiate between a latch and a flip flop.	(2M)	CO4	BL3
h)	List out Applications of Flip-Flops	(2M)	CO4	BL3
i)	What are the applications of shift registers?	(2M)	CO5	BL6
j)	What are the advantages and disadvantages of ripple counters?	(2M)	CO5	BL6

PART–B (5X10 = 50M)

2a.	i) Convert $(657)_8$ into decimal. ii) Convert $(2348)_{10}$ into hexa decimal.	(5M)	CO1	BL2
2b.	Subtract $(111001)_2$ from $(101011)_2$ using 1's and 2's complement?	(5M)	CO1	BL2
	(OR)			
3a.	Solve the Boolean expressions using Boolean algebra, Show: AB'C+B+BD'+ABD'+A'C=B+C	(5M)	CO1	BL2
3b.	What are the various logic gates, give the representation along with the truth table.	(5M)	CO1	BL2
4a.	Obtain the simplified expression in POS (product of sums) of F(w, x, y, z)=π (1,2,4,7,12,14,15) using K-maps.	(5M)	CO2	BL3
4b.	Implement the function f(a,b,c)=Σ(1,3,4,6) using NOR-NOR two level gate structure.	(5M)	CO2	BL3
	(OR)			
5a.	Explain the working and functions of decoders and encoders. Construct 2/4 line decoder with logic gates with enable input.	(5M)	CO2	BL3
5b.	Define a multiplexer? Draw a 2:1 multiplexer for the function f(x,y,z)=Σ(0,2,3,5,7)	(5M)	CO2	BL3
6a.	Briefly explain about flipflops with edge triggering timing diagram.	(5M)	CO3	BL5
6b.	With logic diagram and truth table explain the working JK Flip-flop.	(5M)	CO3	BL5

(OR)

7a.	Explain about clocked RS flip flop using NAND gates	(5M)	CO3	BL5
7b.	Explain briefly about T flipflop.	(5M)	CO3	BL5
8a.	Design a 4 bit synchronous counter with D flip - flops and explain its working.	(5M)	CO4	BL3
8b.	What is a register? Discuss the applications of shift registers?	(5M)	CO4	BL3
	(OR)			
9a.	Explain the operation of 4-bit ring counter with circuit diagram, state transition diagram and state table.	(5M)	CO4	BL3
9b.	List the applications of shift registers.	(5M)	CO4	BL3
10	Explain the working of 4-bit asynchronous counter.	(10M)	CO5	BL6
	(OR)			
11a.	Write the steps for the design of asynchronous sequential circuit	(5M)	CO5	BL6
11b.	Explain about a NOR Latch in detail, with a neat diagram.	(5M)	CO5	BL6

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