NARSIMHA REDDY ENGINEERING COLLEGE
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Department of CSE & IT

UNIT WISE QUESTION BANK

S.No		Questions	BT	CO	PO
		UNIT–I			
		BOOLEAN ALGEBRA AND LOGIC GATES			
		Part – A (Short Answer Questions)			
1		Write short notes on binary number systems?	L3	CO1	PO1
2		Discuss 1's and 2's complement methods of subtraction?	L3	CO1	PO1
3		Discuss octal number system?	L3	CO1	PO1
4		Write a short note on five-bit BCD codes?	L3	CO1	PO2
6		Write a short note on error correcting codes?	L3	CO1	PO3
7		State De-Morgan theorem?	L4	CO1	PO1
8		Convert given gray code to binary code (1001001011110010)g	L5	CO1	PO1
9		Convert given binary code to gray code (1001001011110010)b	L5	CO1	PO1
10		Write the steps involved in unsigned binary subtraction using complements with examples?	L3	CO1	PO2
11		Explain the addition of two signed binary number along with examples?	L5	CO1	PO1
12		Differentiate between binary code and BCD code?	L4	CO1	PO2
13		Write the Axiomatic Definitions of Boolean Algebra?	L3	CO1	PO1
		Part – B (Long Answer Questions)			
16	a)	Perform the following conversions:. (a) (3A.2F)16 to binary (b) (573)8 to decimal (c) (11011.011)2 to octal (d) (245)10 to Excess-3 code	L4	CO1	PO2
	b)	State and prove the any four Theorems of Boolean algebra.	L5	CO1	PO1

17		Solve (3250-72532)10 using 10'scomplement?	L5	CO1	PO3
18		Convert 1101101.0111 to octal equivalent and hexadecimal equivalent?.	L5	CO1	PO1
19		Simplify: A'B'C' + A'B'C + A'BC'+AB'C'+ABC' using Boolean Theorems?	L6	CO1	PO5
20	a)	convert the given SOP to Standard SOP form F(A,B,C) = A'C' + A'B' + BC'+AB'C'+ABC'	L5	CO1	PO1
	b)	convert the given POS to Standard POS form F(A,B,C) = (A'+B)(A'+C)			
21		State and prove any 4 Boolean theorems with examples?	L5	CO1	PO1
22	(a)	Perform addition of 01100100+00011001	L6	CO1	PO1
	(b)	Perform the following in 2's complement : (a) 011010 (b) 110010			
23		Explain the truth tables of X-OR, NAND and NOR gates?	L5	CO1	PO5

UNIT–II
GATE –LEVEL MINIMIZATION

S.No	Questions	BT	CO	PO
	Part – A (Short Answer Questions)			
1	What is a Karnaugh Map (K-Map)? How many cells are there in a 4-variable K-map?	L3	CO2	PO2
2	Define min term and max term?	L3	CO2	PO2
3	Convert f(x)=x+y'z in to canonical form?	L5	CO2	PO2
4	What is meant by a don't care condition in K-Map simplification?	L3	CO2	PO2
5	Simplify the Boolean expression using K-Map: F(A,B)=Σ(0,1,2,3).	L6	CO2	PO1
6	Summarize the Boolean function x'yz+x'yz'+xy'z'+xy'z without using K- map?	L6	CO2	PO1
7	Explain the properties of EX-OR gate?	L5	CO2	PO2
8	Draw a 4-variable K-Map and label its cells.	L5	CO2	PO1
9	Sketch the following logic function using k-map and implement it using logic gates? Y(A,B,C,D)=∑m(0,1,2,3,4,7,8,9,10,11,12,14)	L6	CO2	PO1
10	What is a prime implicant?	L3	CO2	PO1

		Part – B (Long Answer Questions)			
10		Using Karnaugh map. Solve F(A,B,C,D)=Σ(0,1,2,5,6,7,8,9,10,13,14,15).	L5	CO2	PO2
11		Reduce using mapping the expression f=ΠM(2,8,9,10,11,12,14) and implement the real minimal expression in universal logic	L4	CO2	PO1
12	 (a) (b)	Summarize the following Boolean expressions using K-map and implement them using NOR gates: F(A,B,C,D)=AB'C'+AC+A'CD' F(W, X,Y,Z)=W'X'Y'Z'+WXY'Z'+W'X'YZ+WXYZ.	L6	CO2	PO1
13		Realize the AND, OR, NOT, EX-OR gates by using universal gates?	L3	C02	PO2
14		Reduce the following expressions using K-Map. (a) (A+B)(A+B'+C)(A+C') (b) A(B+C')(A+B')(B+C+D')	L4	C02	PO1
15		Convert the following to minterms: (b) A+B'C' (b) A'+B+CA (c) ABC+AB+DC+D' (d) ABCDE+ABE'+ACD	L5	C02	PO1
16		Simplify the following function f(w,x,y,z)=Σ(1,2,3,5,9,12,14,15)+d(4,8,11)	L6	C02	PO3
17		Implement the function F with the following four two-level forms: (c) NAND-AND (b) AND-NOR (c) OR-AND (d) NOR-OR	L4	C02	PO3
		UNIT–III			
		COMBINATIONAL LOGIC			
S.No		Questions	BT	CO	PO
		Part – A (Short Answer Questions)			
1		What is a combinational circuit?	L3	C03	
2		Explain the design procedure for combinational circuits?	L5	CO3	PO4
3		Design a combinational logic circuit with 3 input variables that will produce logic 1 output when more than one input variables are logic1?	L5	CO3	PO5
4		What is a half adder? Write its Boolean expression?	L3	CO3	PO4

S.No	Questions	BT	CO	PO
5	Define magnitude comparator?	L3	CO3	PO4
6	Write the Boolean expressions for the sum and carry outputs of a full adder.	L3	CO3	PO4
7	How many select lines are required for an 8-to-1 multiplexer?	L3	CO3	PO4
8	Define magnitude comparator?	L3	CO3	PO5
9	How many output lines does a 3-to-8 decoder have?	L3	CO3	PO3
10	Design a 4-bitpriority encoder?	L5	CO3	PO4
11	Differentiate multiplexer and demultiplexer?	L4	CO3	PO3
12	Explain the working of 8:1multiplexer?	L5	CO3	PO2
Part – B (Long Answer Questions)				
13	Design full adder with two half adders and OR gate?	L5	C03	PO3
14	Design a 4-bit adder-subtractor circuit and explain the operation in detail?	L5	C03	PO3
15	Explain the functionality of a 3 to 8 line decoder with a neat diagram?	L5	C03	PO1
16	With the help of a block diagram explain the working of a serial adder?	L5	C03	PO1
17	With the help of a logic diagram explain a parallel adder/subtractor using 2's complement system?	L5	C03	PO1
18	Explain the functionality of a 8*1multiplexer with neat diagram?	L5	C03	PO1
19	Design 1-bit comparator using logic gates?	L5	CO3	PO4
20	With the help of a logic diagram and truth table explain (a) a 1-line to 4-line demultiplexer and (b) a 1-line to 8-line demultiplexer.	L5	CO3	PO3
21	Construct 16:1 multiplexer using 8:1 and 2:1multiplexer?	L3	CO3	PO3
UNIT–IV SEQUENTIAL LOGIC				
S.No	Questions	BT	CO	PO
Part – A (Short Answer Questions)				
1	Differentiate combinational and sequential logic circuits?	L4	CO4	PO3
2	Explain basic difference between a shift register and	L5	CO4	PO3

	counter?			
3	Illustrate applications of shift registers?	L4	CO4	PO3
4	What is a flip flop?	L3	CO4	PO3
5	Classify the basic types of counters?	L3	CO4	PO3
6	What are the two types of flip-flops?	L3	CO4	PO3
7	Explain the operation of a JK flip-flop?	L5	CO4	PO1
8	Distinguish between synchronous and asynchronous latches?	L4	CO4	PO2
9	Explain the operation of a SR flip-flop?	L5	CO4	PO1
10	What is meant by race around condition in flip-flop?	L3	CO4	PO3
11	Explain what do you mean a stable state?	L5	CO4	PO1
12	What is a register?	L3	CO4	PO3
	Part – B (Long Answer Questions)			
13	Differentiate combinational and sequential logic circuits?	L4	CO4	PO3
14	Explain about design procedure of sequential circuit?	L5	CO4	PO3
15	Explain the working of the following: (a) J-K Flip-flop (b) SR Flip-flop (c) D Flip-flop	L5	CO4	PO3
16	What are the different types of shift registers? Explain any one type of shift register?	L3	CO4	PO3
17	Explain about parallel in serial out shift register with neat diagram?	L5	CO4	PO3
18	Design a 3-bit synchronous counter using JK Flip-flop?	L5	CO4	PO3
19	Draw the circuit diagram of a 3-bit ripple counter using JK flip-flops and explain its operation?	L3	CO4	PO1
20	(a) What is state assignment? Explain with a suitable example? (b) Explain the working of the following: (a) D Flip-flop (b) T Flip-flop	L3	CO4	PO1
21	Design a 4-bit Ring counter?	L5	CO4	PO4
22	Design and draw the 3 bit up-down Asynchronous counter?	L5	CO4	PO4
23	Explain the state reduction and state assignment in designing sequential circuit. Consider one example in the above process?	L5	CO4	PO3
	UNIT–V **MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC**			

S.No	Questions	BT	CO	PO
	Part – A (Short Answer Questions)			
1	Explain the block diagram of memory unit?	L5	CO5	PO3
2	Explain in detail about RAM and types of RAM?	L5	CO5	PO3
3	Illustrate the features of a ROM cell?	L3	CO5	PO3
4	Explain in detail about ROM and types of ROM?	L5	CO5	PO3
5	Differentiate static and dynamic RAM?	L4	CO5	PO3
6	Explain what is the use of cache memory?	L5	CO5	PO3
7	Explain PLA with the help of block diagram?	L5	CO5	PO3
8	Explain the advantage of PLA over ROMs?	L5	CO5	PO3
	Part – B (Long Answer Questions)			
9	Sketch the PLA program table for the four Boolean functions .Minimize the number of product terms? $A(x,y,z)=\Sigma(0,1,3,5)$ $B(x,y,z)=\Sigma(2,6)$ $C(x,y,z)=\Sigma(1,2,3,5,7)$ $D(x,y,z)=\Sigma(0,1,6)$	L5	CO5	PO3
10	Discuss about Programmable Array Logic(PAL)?	L3	CO5	PO3
11	Explain the logic implementation of a 32X4 bit ROM using decoder of a suitable size?	L5	CO5	PO1
12	List the PLA programming table for the BCD to Excess -3 converter?	L3	CO5	PO3
13	Solve the following two Boolean functions using a PLA having 3-inputs,4 product terms and 2 outputs? $F1(A,B,C)=\Sigma(0,1,2,4)$ $F2(A,B,C)=\Sigma(0,5,6,7)$	L5	CO5	PO3
13	Draw the logic diagram of Programmable Logic Array with 3 inputs, 4 product terms and 2 outputs?	L3	CO5	PO1
14	What are different types of ROMs and compare them?	L3	CO5	PO1
15	Differentiate the PROM, PLA and PLD? Implement the following two Boolean functions with a PLA. $F1(A,B,C) =\Sigma m(0,1,2,4)$ $F2(A,B,C)=\Sigma m(0,5,6,7)$	L4	CO5	PO3

* Blooms Taxonomy Level (BT) (L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analyzing; L5 – Evaluating; L6 – Creating)