Department of CSE

B. Tech. Mid Question Bank (R22 Regulation)

Academic Year: 2024-2025 **Semester: III**

Subject Name: Digital Electronics [22EC302ES]

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PART A

QNo	Questions	Marks	BL	CO
1	Convert $(36.52)_8$ to Decimal and Hexadecimal.	2M	L3	CO1
2	Subtract $(745.81)_{10}$- $(436.62)_{10}$ using 10's Complement.	2M	L3	CO1
3	Classify and explain Binary Codes.	2M	L2	CO1
4	State Duality Principle.	2M	L2	CO1
5	Express the Boolean function F = A + B'C as standard sum of minterms.	2M	L2	CO1
6	List out universal gates and why they are called as universal gates.	2M	L1	CO1
7	Map the expression to minterms $f = A'B'C + AB'C + A'BC' + ABC$	2M	L2	CO2
8	Map the expression to maxterms $f = (A+B+C)(A'+B+C')(A'+B'+C')(A+B'+C')(A'+B'+C)$	2M	L2	CO2
9	Reduce the expression $f = \Sigma m(0,2,3,4,5,6)$ using k-map.	2M	L3	CO2
10	Reduce the expression $f = \Pi M(0,1,2,3,4,7)$ using k-map.	2M	L3	CO2
11	Reduce the expression $f = \Sigma m(0,2,3,4)$ using k-map and implement using AOI gates.	2M	L3	CO2
12	Reduce the expression $f = \Sigma m(0,2,3,4,7)$ using k-map and implement using AOI gate.	2M	L3	CO2
13	Define combinational and sequential circuits.	2M	L1	CO3
14	Explain Half adder with truth table.	2M	L2	CO3
15	Draw Full adder using Half Adder.	2M	L2	CO3
16	Describe 1-bit Magnitude Comparator	2M	L2	CO3
17	Brief about Multiplexer and Demultiplexers.	2M	L2	CO3
18	Discuss the 2 to 4 decoder with truth table.	2M	L2	CO3
19	Differentiate Latch and Flip-Flop.	2M	L4	CO4
20	Write excitation table of D and JK flip-flop.	2M	L4	CO4
21	Discuss the different types of shift registers.	2M	L2	CO4
22	List out the applications of Shift Registers.	2M	L1	CO4
23	Write characteristic equations of SR, J-K, D, and T Flip-Flops.	2M	L2	CO4
24	Distinguish between synchronous and asynchronous counters.	2M	L4	CO4
25	List out different types of RAM Memories.	2M	L1	CO5
26	Encode the message bits $(1110)_2$ into 7-bit even parity hamming code.	2M	L5	CO5
27	Discuss the different types of ROM.	2M	L2	CO5
28	Classify the PLDs.	2M	L2	CO5
29	Compare PROM, PLA and PAL.	2M	L1	CO5
30	List out IC classification based on Number of Transistors.	2M	L1	CO5

PART- B

QN	Questions	Marks	BL	CO
1	i) Convert the given binary number to equivalent gray code 0011, 0101, 1110, 0010. ii) Write the numbers 9, 6 and 3 in terms of following weighted binary codes a) 4,2,2,1 b) 8,4,2,1	4M	L3	CO1
2	11010-10000 Perform subtraction using 1's and 2's Complement method.	4M	L3	CO1
3	Prove Commutative, Associative and Distributive Laws of Boolean Algebra.	4M	L3	CO1
4	State and Prove DeMorgans Theorm.	4M	L3	CO1
5	Prove that $AB + A'C + BC = AB + A'C$(Consensus Theorem) $AB + A'C = (A + C)(A' + B)$ (Transposition Theorem)	4M	L4	CO1
6	Find the complement and dual of the function and then reduce it to minimum number of literals $f = [(ab)'a][(ab)'b]$	4M	L3	CO1
7	i) Convert $(8E47.AB)_{16}$ to Decimal, Binary and Octal numbers. ii) $(163.875)_{10}$ to Binary, Octal and Hexadecimal	8M	L3	CO1
8	i) Expand the given Boolean expression into maxterms and minterms. a) $A(B' + A)B$ b) $A(A' + B)(A' + B + C')$ ii) Write the Boolean Expression, Truth Table, Logic Symbol of Basic Gates, Universal Gates and Derived Gates	8M	L3	CO1
9	i)State and prove the following Boolean laws: a) Redundant Literal Rule b) Absorption Law ii) Reduce the Boolean expression $f = A[B + C'(AB + AC')']$	8M	L4	CO1
10	Minimize f = $\sum$ m(0,2,3,4,5,6,9,12,14,15) using k map and implement with AOI logic.	4M	L3	CO2
11	Minimize the following expressions using K-map and realize using NAND Gates. F= $\prod$ M (0,1,2,4,5,6,9,11,12,13,14,15)	4M	L3	CO2
12	Reduce the Boolean expression using K-map and implement using NOR gates. F= Σ m (9,10,12)+d(3,5,6,7,11,13,14,15)	4M	L3	CO2
13	Reduce $\prod$ M (1,2,3,5,6,7,8,9,12,13) using K-map and implement using NOR gates.	4M	L3	CO2
14	Minimize the following functions using k map F(A,B,C,D) = $\sum$ m(0,1,2,5,8,15) + d(6,7,10)	4M	L3	CO2
15	Minimize the following functions using k map F(A,B,C,D) = $\prod$ M(0,1,3,56,7,9,10,11,12,13,15)	4M	L3	CO2
16	Reduce the Boolean expression using K-map and implement using both the universal gates. f= Σ m (0,1,3,4,5,6,7,13,15)	8M	L3	CO2
17	i) Convert the Boolean expression $A + \bar{B}\bar{C}$ to minterms and reduce using K-map. ii) Obtain the maxterms for the Boolean expression $A(B \mid \bar{C})$ and minimize using K-map.	8M	L3	CO2

18	Minimize the following expressions using K-map and realize using NAND and NOR Gates. $f = \Sigma m (1, 3, 5, 8, 9, 11, 15) + d (2, 13)$.	8M	L3	CO2
19	Explain Design procedure of combinational circuits.	4M	L2	CO3
20	Design Full Adder and Full Subtractor.	4M	L5	CO3
21	Design BCD Adder.	4M	L5	CO3
22	Design a 2-bit Magnitude Comparator.	4M	L3	CO3
23	Design Octal to Binary Encoder.	4M	L3	CO3
24	Explain i) 4 to 1 MUX. ii)1-to-8 DEMUX.	4M	L3	CO3
25	Discuss the design procedure of Sequential Circuit Design.	4M	L2	CO4
26	Give logic circuit diagram, characteristic equation, truth table and excitation table of the following flip-flops. (i) SR Flip-Flop (ii) D Flip-Flop	4M	L4	CO4
27	Give logic circuit diagram, characteristic equation, truth table and excitation table of the following flip-flops. (i) J-K Flip-Flop (ii) T Flip-Flop	4M	L4	CO4
28	Design Mod-6 asynchronous Counter.	4M	L3	CO4
29	Design Synchronous Mod-10 counter using Flip-flop.	4M	L3	CO4
30	Explain Shift register (SISO, SIPO, PISO, PIPO).	4M	L2	CO4
31	i) Convert JK to T flip-flop ii) Convert SR flip-flop to D flip-flop	8M	L4	CO4
32	Explain Ring and Johnson (Twisted ring) counter.	8M	L3	CO4
33	i) Design 3-bit synchronous DOWN counter ii) Design 3 bit asynchronous UP counter	8M	L3	CO4
34	Explain Memory Decoding	4M	L2	CO5
35	Design a combinational circuit using a ROM. The circuit accepts a three-bit number and outputs a binary number equal to the square of the input number.	4M	L3	CO5
36	Explain Classification of IC.	4M	L2	CO5
37	Give a brief comparison between various logic families	4M	L3	CO5
38	F1 = AB' + AC + A'BC' F2 = (AC + BC)' Implement using PAL	4M	L4	CO5
39	Implement Full adder using PLA	4M	L4	CO5
40	Device a single error correcting code for a 11 bit group 01101110101. Test the following hamming code sequence for a 11 bit message and correct it if necessary 101001011101011	8M	L4	CO5
41	Realize basic logic gates using Diodes and transistors.	8M	L5	CO5
42	The message below coded in the 7-bit Hamming Code is transmitted through a noisy channel. Decode the message assuming that at most a single error occured in each code word. 1001001, 0111001, 1110110, 0011011	8M	L4	CO5