DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Information Technology **Semester: III**
Subject Name: Switching Theory and Logic Design **Subject Code:** BTITC302
Date:03/12/2018 **Max Marks: 60** **Duration: 3 Hrs.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(COs)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	Convert: i. $(101111.0011111)_2 = (?)_{16}$ ii. $(3B.F)_{16} = (?)_{10}$ iii. $(756.603)_8 = (?)_{16}$ iv. $(10.625)_{10} = (?)_2$ v. $(367.52)_8 = (?)_2$ vi. $(247.6875)_{10} = (\ )_8$	CO1	06
B)	Perform the following subtractions in XS-3 code: (i) 267 – 175 (ii) 57.6 - 27.8	CO1	06
C)	A 12-bit Hamming code word containing 8 bits of data and 4 parity bits is read from memory. What was the original 8-bit data word that was written into memory, if the 12-bit word read out is (a) 010011111000 (b) 011101010010 (c) 010000000101?	CO1	06
Q.2	**Solve Any Two of the following.**		
A)	Using the Quine Mc-Clusky method minimize the following logic function: $F(A,B,C,D) = \sum m\ (0,1,2,3,5,7,8,9,11,14)$	CO1	06
B)	Draw and explain the state diagram, state table for a D flip-flop.	CO2	06
C)	What is logic family? Explain the characteristics of digital ICs.	CO1	06

Q. 3 Solve Any One of the following.

A)	(i) Evaluate the 7-bit composite code word for the data word 0110. (ii) Evaluate the three check bits C1, C2, and C3, assuming no error. (ii) Assume an error in bit D5 during storage into memory. Show how the error in the bit is detected and corrected.	CO1	12
B)	Solve the following expressions with the help of Boolean rules. (a) $X = ABC + \overline{A}B + AB\overline{C}$ (b) $X = \overline{A}B\overline{C} + A\overline{BC} + \overline{ABC}$ (c) $AB + \overline{A}C + BC = AB + \overline{A}C$	CO1	12

Q.4 Solve Any Two of the following.

A)	Design a 4-bit Gray to Binary code converter.	CO2	06
B)	Convert J-K flip flop into T flip flop. Draw truth table and logic symbol of T flip flop.	CO3	06
C)	With the help of appropriate diagrams, briefly explain the operation of Moore and Mealy finite state machines and highlight their differences.	CO2	06

Q. 5 Solve Any One of the following.

A)	Realize the following functions using a PAL with four inputs and 3-wide AND-OR structure. Also write the PAL programming table. $F_1(A,B,C,D) = \sum m\ (6,8,9,12,13,14,15)$ $F_2(A,B,C,D) = \sum m\ (1,4,5,6,7,10,11,12,13)$ $F_3(A,B,C,D) = \sum m\ (4,5,6,7,10,11)$ $F_4(A,B,C,D) = \sum m\ (4,5,6,7,9,10,11,12,13,14,15)$	CO2	12
B)	Implement the following logic functions using an 8 X 1 MUX: i) $F(X,Y,Z) = \sum m\ (0,2,3,5)$ ii) $F(A,B,C,D) = \sum m\ (1,3,4,11,12,13,14,15)$	CO2	12

Q.6 Solve Any Two of the following.

A)	Simplify the following logic functions and realize using NAND/NOR gates i) $F_1(A,B,C,D) = \sum m\ (1,3,5,8,9,11,15) + d(2,13)$ ii) $F_2(A,B,C,D) = \prod M\ (1,2,3,8,9,10,11,14)\ .\ d(7,15)$	CO1	06
B)	What is race around condition? How can it be avoided?	CO3	06
C)	Show how the PLA circuit would be programmed to implement the sum and carry outputs of a full adder.	CO2	06

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