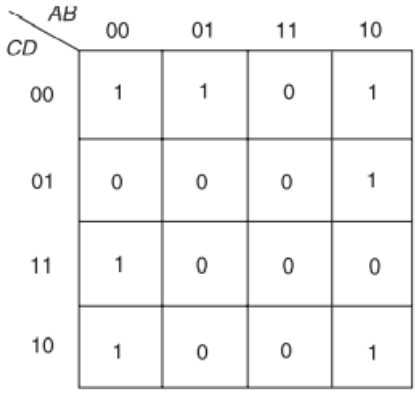
	ITER, SIKSHA 'O' ANUSANDHAN (Deemed to be University)	**Assignment**

Branch	**Computer Science and Engineering**	Programme	**B.Tech**
Course Name	**Digital Logic Design**	Semester	**III**
Course Code	**EET1211**	Academic Year	**2022/Odd**
Assignment-1	**Topic-Number System, Binary Codes and Boolean Algebra**	**GP-1**	

Learning Level (LL)	**L1**: Remembering	**L3:** Applying	**L5**: Evaluating
	L2: Understanding	**L4**: Analysing	**L6**: Creating

Q's	Questions	COs	LL
1	Decimal 43 in hexadecimal and BCD number system is, respectively, (a) B2, 01000011 (b) 2B, 01000011 (c) 2B, 0011 0100 (d) B2, 0100 0100 **Gate[2005]**	**CO1**	**L1**
2	The number of bytes required to represent the decimal number 1856357 in packed BCD (Binary Coded Decimal) form is_____. **[2014]**	**CO1**	**L3**
3	In which base system 24 + 17 = 40 holds good? A. 11 B. 16 C. 4 D. 6	**CO1**	**L3**
4	The code where all successive numbers differ from their preceding number by single bit is A. Binary Code B. Gray Code C. BCD D. Excess – 3	**CO1**	**L1**
5	A function $F(A, B, C)$ defined by three Boolean variables A, B and C when expressed as sum of products is given by $F = \overline{A}\cdot\overline{B}\cdot\overline{C} + \overline{A}\cdot B\cdot\overline{C} + A\cdot\overline{B}\cdot\overline{C}$ Where, $\overline{A}$, $\overline{B}$ and $\overline{C}$ are the complements of the respective variables. The product of sums (POS) form of the function F is. **[2018]** (A) $F = (A+B+C)(A+\overline{B}+C)(\overline{A}+B+C)$ (B) $F = (\overline{A}+\overline{B}+\overline{C})(\overline{A}+B+\overline{C})(A+\overline{B}+\overline{C})$ (C) $F = (A+B+\overline{C})\cdot(A+\overline{B}+\overline{C})\cdot(\overline{A}+B+\overline{C})$ $(\overline{A}+\overline{B}+C)(\overline{A}+\overline{B}+\overline{C})$ (D) $F = (\overline{A}+\overline{B}+C)\cdot(\overline{A}+B+C)\cdot(A+\overline{B}+C)$ $(A+B+\overline{C})(A+B+C)$	**CO2**	**L3**
6	The Boolean expression $F(X, Y, Z) = \overline{X}\overline{Y}\overline{Z} + X\overline{Y}\overline{Z} + X\overline{Y}\overline{Z} + XYZ$ converted into the canonical product of sum (POS) form is **[2015]**	**CO2**	**L3**

	(A) $(X+Y+Z)(X+Y+\overline{Z})(\overline{X}+Y+\overline{Z})$ (B) $(X+\overline{Y}+Z)(\overline{X}+Y+\overline{Z})(\overline{X}+\overline{Y}+Z)(\overline{X}+\overline{Y}+\overline{Z})$ (C) $(X+Y+Z)(\overline{X}+Y+\overline{Z})(X+\overline{Y}+Z)(\overline{X}+\overline{Y}+\overline{Z})$ (D) $(X+\overline{Y}+\overline{Z})(\overline{X}+Y+Z)(\overline{X}+\overline{Y}+Z)(X+Y+Z)$		
7	A function of Boolean variables X, Y and Z is expressed in terms of the min-terms as $F(X, Y, Z) = \Sigma(1, 2, 5, 6, 7)$ Which one of the product of sums given below is equal to the function $F(X, Y, Z)$? **[2015]** (A) $(\overline{X}+\overline{Y}+\overline{Z}).(\overline{X}+Y+Z).(X+\overline{Y}+\overline{Z})$ (B) $(X+Y+Z).(X+\overline{Y}+\overline{Z}).(\overline{X}+Y+Z)$ (C) $(\overline{X}+\overline{Y}+Z)\cdot(\overline{X}+Y+\overline{Z})\cdot(X+\overline{Y}+Z)\cdot(X+Y+\overline{Z})\cdot(X+Y+Z)$ (D) $(X+Y+\overline{Z})\cdot(\overline{X}+Y+Z)\cdot(\overline{X}+Y+\overline{Z})\cdot(\overline{X}+\overline{Y}+Z)\cdot(\overline{X}+\overline{Y}+\overline{Z})$	**CO2**	**L3**
8	The Boolean expression $(X+Y)(X+\overline{Y})+\overline{(\overline{X}\overline{Y})+\overline{X}}$ simplifies to (a) X (b) Y (c) XY (d) $X+Y$ **[2014]**	**CO2**	**L3**
9	For an n-variable Boolean function, the maximum number of prime implicants is (a) $2(n-1)$ (b) $n/2$ (c) 2^n (d) $2^{(n-1)}$ **[2014]**	**CO2**	**L1**
10	In the sum of products function $f(X, Y, Z) = \Sigma(2, 3, 4, 5)$ the prime implicates are (a) $\overline{X}Y$, $X\overline{Y}$ (b) $\overline{X}Y$, $X\overline{Y}\overline{Z}$, $X\overline{Y}Z$ (c) $\overline{X}Y\overline{Z}$, $\overline{X}YZ$, $X\overline{Y}$ (d) $\overline{X}Y\overline{Z}$, $\overline{X}YZ$, $X\overline{Y}\overline{Z}$, $X\overline{Y}Z$ **[2012]**	**CO2**	**L3**
11	The Boolean function $Y = AB + CD$ is to be realized using only 2-input NAND gates. The minimum number of gates required is (a) 2 (b) 3 (c) 4 (d) 5 **[2007]**	**CO2**	**L3**
12	The logical expression $Y = A + \overline{A}B$ is equivalent to (a) $y = AB$ (b) $y = \overline{A}B$ (c) $y = \overline{A} + B$ (d) $y = A + B$ **[1999]**	**CO2**	**L3**

13	The K-map for a Boolean function is shown in the figure. The number of essential prime implicants for this function is  (a) 4 (b) 5 (c) 6 (d) 8 **[1998]**	**CO2**	**L3**
14	Which one of the following gives the simplified sum of products expression for the Boolean function $F = m_0 + m_2 + m_3 + m_4$, where m_0, m_2, m_3 and m_5 are minterms corresponding to the inputs A, B and C with A as the MSB and C as the LSB ? **[2017]** (A) $\overline{A}\,B + \overline{A}\,\overline{B}\,\overline{C} + A\,\overline{B}\,C$ (B) $\overline{A}\,\overline{C} + \overline{A}\,B + A\,\overline{B}\,C$ (C) $\overline{A}\,\overline{C} + A\,\overline{B} + A\,\overline{B}\,C$ (D) $\overline{A}\,BC + \overline{A}\,\overline{C} + A\,\overline{B}\,C$	**CO2**	**L3**
15	If $X = 1$ in the logic equation $[X + Z\{\overline{Y} + (\overline{Z} + X\overline{Y})\}]\{\overline{X} + \overline{Z}(X + Y)\} = 1$, Then (a) $Y = Z$ (b) $Y = \overline{Z}$ (c) $Z = 1$ (d) $Z = 0$ **[2009]**	**CO2**	**L2**
16	The boolean function A + BC is a reduced form of _____. A. AB + BC B. (A + B)(A + C) C. A'B + AB'C D. (A + C)B	**CO2**	**L3**
17	The complement of the Boolean Function F=x' y z' + x 'y' z gives us: A. X y' z + x y z' B. (x' + y + z')(x' + y' + z) C. (x + y' + z)(x + y + z') D. x' y z' + x' y' z	**CO2**	**L2**
18	Expressing the Boolean function F = A + B' C as a sum of minterms we get: A. $\sum(1, 4, 5, 6, 7)$ B. $\sum(0, 2, 3, 5, 6)$ C. $\prod(0, 2, 3, 5, 6)$ D. $\prod(1, 4, 5, 6, 7)$	**CO2**	**L3**

19	Write the Boolean equation for this truth table? **Inputs** **Outputs** X Y Z 0 0 0 0 1 1 1 0 1 1 1 0 A. Z = X Y' + X' Y + X Y B. Z = A B' + A' B C. Z = (X Y')(X' Y) D. Z = X Y' + X' Y	**CO2**	**L3**
20	How many two-input AND and OR gates are required to realize Y=CD+EF+G A. 2, 3 B. 3, 3 C. 2, 2 D. 5, 1	**CO2**	**L4**

Assignment 1	**Topic: Number Systems, Binary Codes and Boolean Algebra**	**Date of Assignment1: 1.11.2022**	**Date of Submission: 12.11.2022**

Note:

1. assignment carries weightage of **20 marks out of 100**
2. Course outcome CO1 to CO2 was covered.

Course Outcomes	CO1	Able to State and explain different number systems, binary codes
	CO2	Able to apply the principles of Boolean algebra and Karnaugh map to simplify logic expressions and implement it using gates
	CO3	Able to Analyse and design various combinational circuits
	CO4	Able to Analyse and design different synchronous and asynchronous sequential circuits
	CO5	Able to Analyse and design various Memory, Programmable Logic circuits and register transfer level
	CO6	Able to implement various digital circuits using HDL and Standard ICs.