



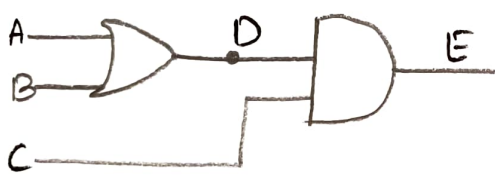
K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCES
SESSION: 2023-2024 (ODD SEMESTER)

FIRST ASSIGNMENT

Degree : B.E
 Branch : AI&DS
 Course Title : Digital design and Computer Organization
 Date : 28/12/2023

Semester : III
 Course Code : BCS302
 Max Marks : 10
 Last Date for : /12/2023
 submission

| Q No. | Question | Marks | K-Level | CO mapping |
|-------|--|-------|----------------|------------|
| 1 | <p>Identify all the prime implicants and essential prime implicants for the following Boolean function and obtain minimum sum of product using K-map</p> <p>i) $F(a,b,c,d)=\sum m(1,2,3,5,6,7,11,12,13,14,15)$ ii) $F(w,x,y,z)=\sum m(0,2,4,5,6,7,8,10,12,13,14,15)$ iii) $F(w,x,y,z)=\sum m(0,2,4,5,6,7,8,10,13,15)$</p> | 1 | Applying K3 | CO1 |
| 2 | <p>Simplify the following Boolean function by using K map</p> <p>i) $F(a,b,c,d)=\sum m(0,1,2,4,5,6,8,9,12,13,14)$ ii) $F(w,x,y,z)=\sum m(0,1,3,8,9,10,11,12,13,14,15)$ iii) $F(w,x,y,z)=\sum m(4,5,6,7,12)$ with don't-care function $d(w,x,y,z)=\sum m(0,8,13)$ iv) $F=\bar{A}\bar{B}\bar{C}+\bar{B}\bar{C}\bar{D}+\bar{A}BC\bar{D}+A\bar{B}\bar{C}$</p> | 1 | Applying K3 | CO1 |
| 3 | <p>Simplify the following Boolean function by using K map</p> <p>i) $F(a,b,c,d)=\pi M(0,2,3,8,9,12,13,15)$ ii) $F(a,b,c,d)=\pi M(0,3,4,7,8,10,12,14)$ with don't-care function $d=(2,6)$</p> | 1 | Applying K3 | CO1 |
| 4 | <p>Simplify the following Boolean function into (a) sum of product form (b) product of sum form</p> <p>i. $F(w,x,y,z)=\sum m(0,2,8,10,12,13,14)$ ii. $F(A,B,C,D)=\sum m(0,2,8,10,12,13,14)$</p> | 1 | Applying K3 | CO1 |

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|----|---|---|----------------|-----|
| 5 | <p>Implement the following boolean functions with NAND gates</p> <p>i. $F(A,B,C,D)=A(CD+B)+BC\bar{C}$</p> <p>ii. $F(A,B,C,D)=(A\bar{B}+\bar{A}B)(C+\bar{D})$</p> | 1 | Applying K3 | CO1 |
| 6 | <p>Implement the following boolean functions with NOR gates</p> <p>i. $F(w,x,y,z)=(y+\bar{z})(w\bar{x}+\bar{w}x)$</p> <p>ii. $F=(A\bar{B}+\bar{A}B)(C+\bar{D})$</p> | 1 | Applying K3 | CO1 |
| 7 | <p>i) Explain the duality principle with an example.</p> <p>ii) Find the complement of the following functions</p> <p>1. $\bar{x}y\bar{z}+\bar{x}\bar{y}z$</p> <p>2. $\bar{A}B\bar{C}+\bar{A}\bar{B}C$</p> | 1 | Applying K3 | CO1 |
| 8 | <p>Write a verilog code for the circuit below</p>  | 1 | Applying K3 | CO2 |
| 9 | <p>Design a BCD to excess code converter with a neat diagram.</p> | 1 | Applying K3 | CO2 |
| 10 | <p>i) Design a combination circuit with three input and output. The output is 1 when the binary value of the input is less than or equal to 2. The output is zero otherwise.</p> <p>ii) Design a combinational circuit that gives output as 1 if the input variable has more 1's than 0's. The output is 0 otherwise.</p> | 1 | Applying K3 | CO2 |

Paulant
Course Incharge

[Signature]
HOD