Date :.....

National Institute of Technology
Surathkal, Karnataka.

Assignment:- 01

Name:- Chikkeri Chinmaya

Roll No:- 211IT017

Branch:- B. Tech Information Technology.

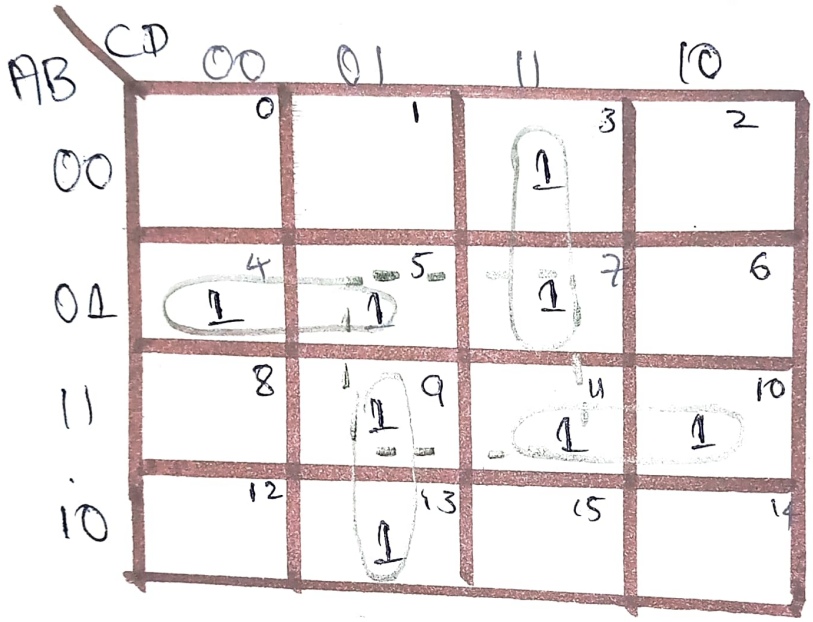
Date :.....

Lecture Assignment - 1

Q7 - K-Map

① Minimize the following Boolean function:- (Mention PI, EPI, RPI And SPI).

① $F(A,B,C,D) = \sum m(3,4,5,7,9,11,13,14,15)$



$F(A,B,C,D) = \bar{A}B\bar{C} + ABC + A\bar{C}D + \bar{A}CD$

Number of Prime Implicants (PI) = 5

Number of Essential Prime Implicants (EPI) :- 4

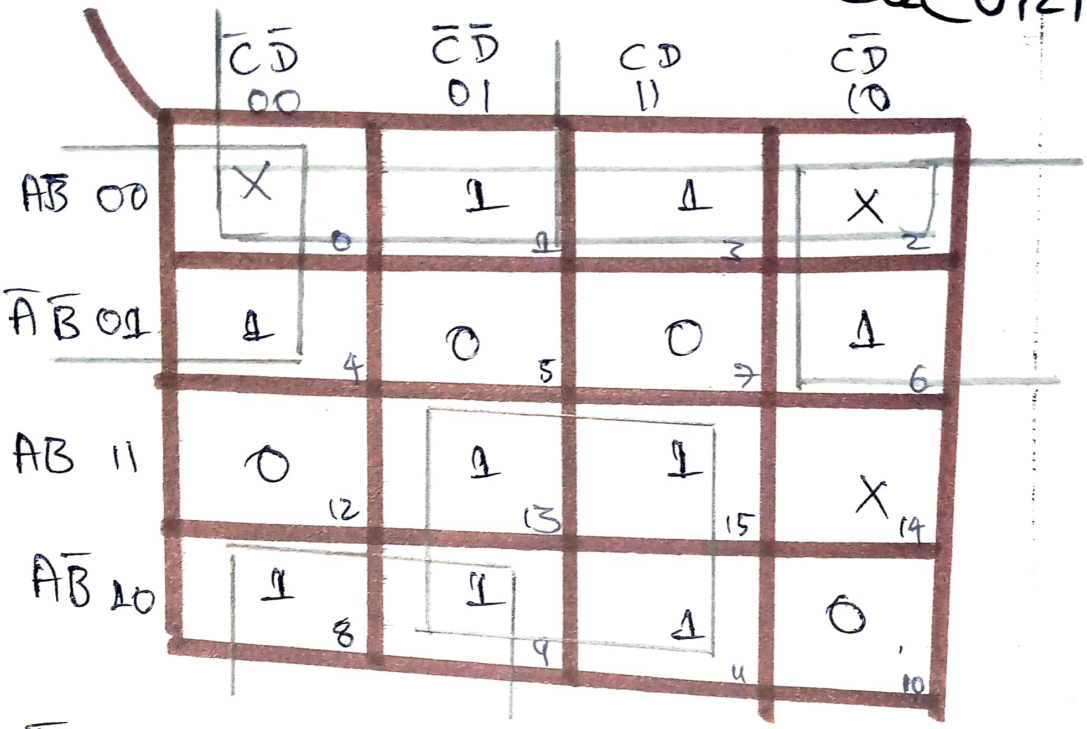
Number of Reduced Prime Implicants (RPI) :- 1

Number of Selective Prime Implicants (SPI) :- 0

Date :

② $F(A,B,C,D) = \sum m(1,3,4,6,8,9,11,13,15) + \sum d(0,2,14)$

Step ① :- 4 variables



From the K-Map. for $Q_1 = ① = \bar{A}\bar{B}$

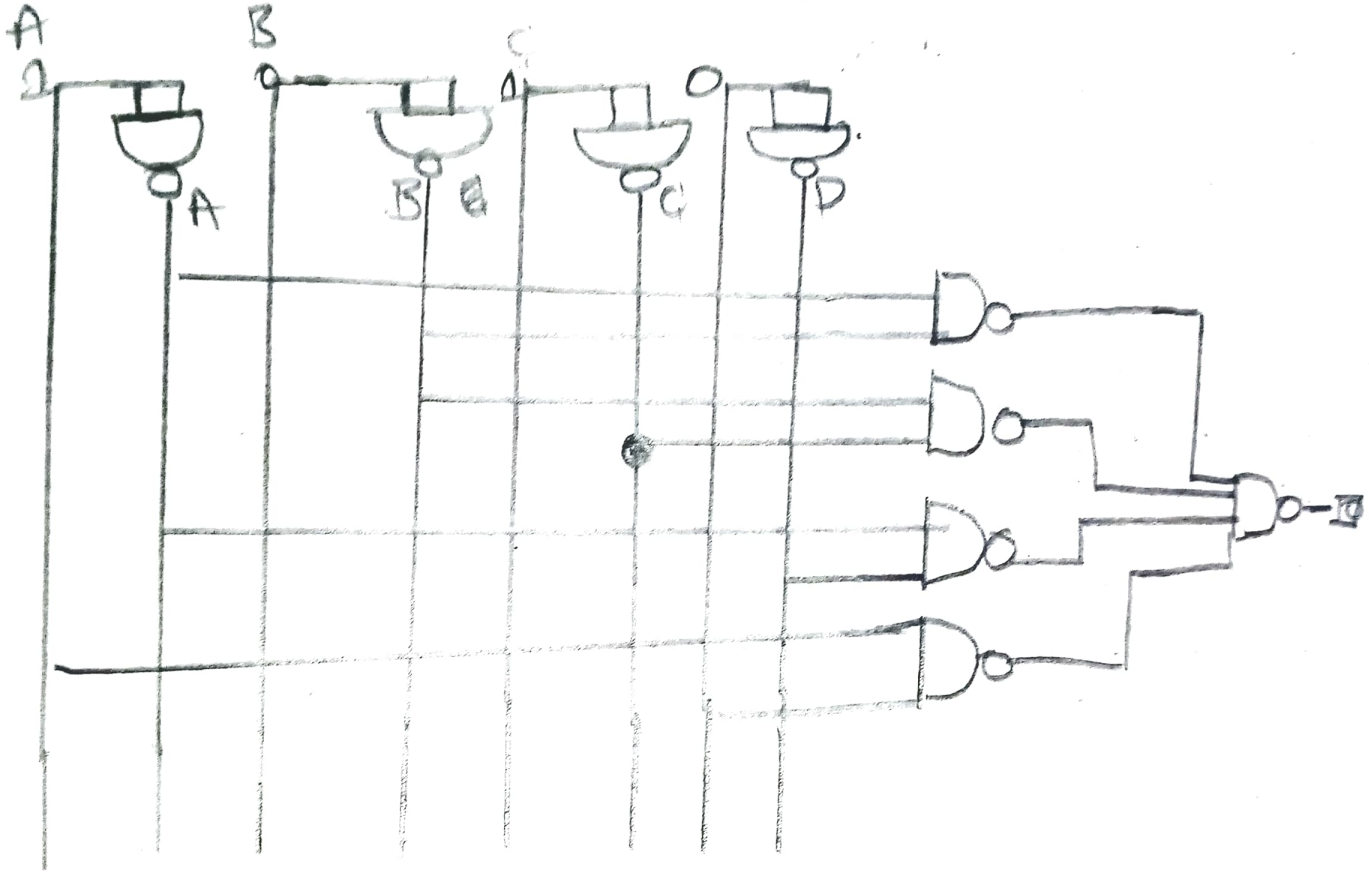
for $\bar{B} = ②$, for $Q_3 = ③ = \bar{A}D$

for $Q_4 = ④ = AD$

So Hence the Minimized Boolean Expression of given Expression is

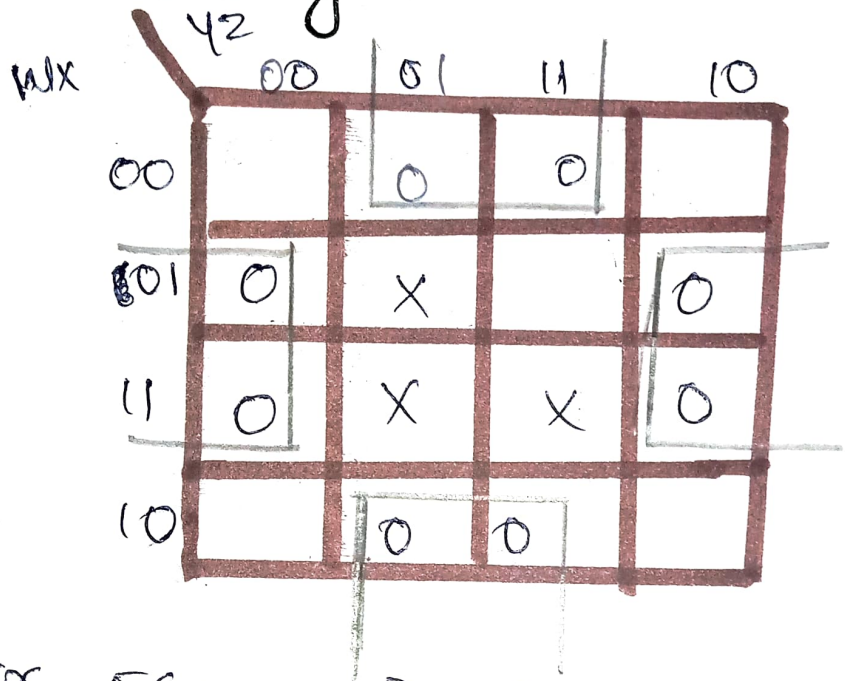
$F = Q_1 + Q_2 + Q_3 + Q_4$

$F = \bar{A}\bar{B} + \bar{B}\bar{C} + \bar{A}\bar{D} + AD$


A
B
C
D
A
B
C
D

③ $F(w,x,y,z) = \pi M(1,3,4,6,9,11,12,14) + \Sigma d(5,13,15)$

-Minimized Expression should be Expressed in NOR gate.



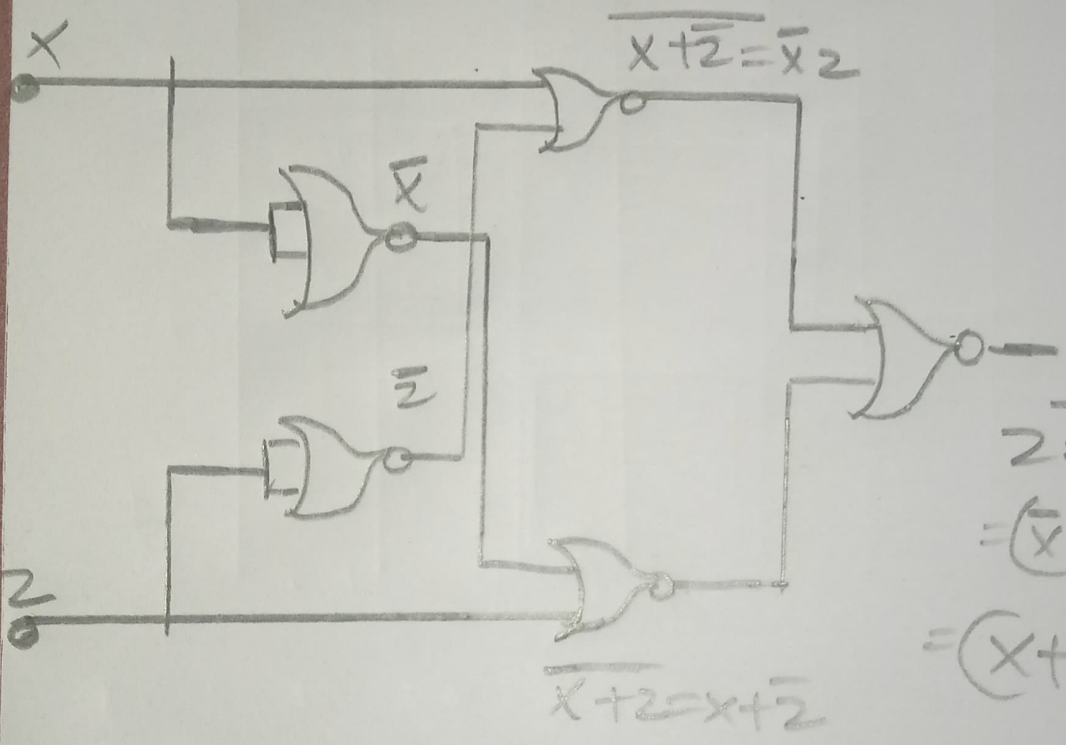
for $F(w,x,y,z) = (x+z) + (\bar{x}+z)$

Where Number of prime Implicant (PI) = 4

Number of Essential prime implicant (EPI) = 4

Number of Reductant prime implicant (RPI) = 2

Number of Selective prime implicant (SPI) = None.



$$Z = \bar{X}Z + \bar{Z}$$

$$= (\bar{X}+Z)(\bar{X}\bar{Z})$$

$$= (X+\bar{Z})(\bar{X}+\bar{Z})$$