No. of Pages	**1**
No.of Questions	**4**

Department of Computer Science and Engineering
Solution: MIDTERM EXAMINATION Spring 2019
CSE260: Digital Logic Design
Total Marks: 40 **Time Allowed: 1 Hour**

Answer ALL questions (Understanding the question is a part of the exam.)

Question No. 1 10 marks

a) The price of $(2)_3$ pens is $(A)_{16}$ taka. (How many)$_2$ pens can Lina buy with $(23)_{10}$ takas?
If we convert all the numbers into decimal base:
The price of 2 pens is 10 taka. How many pens can Lina buy with 23 takas?

Price of 1 pen= 10/2= 5 takas
So, Lina can buy 23/5 = 4 pens with 23 takas ;[as fractional number of pens is not possible]

So the answer is $(100)_2$

b) How much money has she got left after buying the pens? Use a 6 bit 2s complement system to find that out.

She initially had 23 takas
She used 20 takas to buy 4 pens

So, we have to do 23-20 in 6 bit 2s complement system

23-20
=23+ (2s com of 20)
=010111 + (2s com of 010100)
=010111 + 101100
=1000011

There is an end carry, which we have to ignore

So, the result is = 000011; which equals to 3 takas

Question No. 2 10 marks

F(x,y,z)=x'z+y+x

a) Convert the above boolean equation into POS format.

F(x,y,z)=(x+y+z) = ∏ (0)

b) Draw the equivalent circuit of the given equation using only NAND gates

Question No. 3 10 marks

F(a,b,c,d)=a'bc+ab'c+abc'+abd+abcd+b'cd

Simplify the above equation using K-map and draw the simplified logic circuits using basic gates only.

F(a,b,c,d)=∑(3,6,7,10,11,12,13,15)

Map

	$\overline{C}.\overline{D}$	$\overline{C}.D$	C.D	C.$\overline{D}$
$\overline{A}.\overline{B}$	0	0	1	0
$\overline{A}$.B	0	0	1	1
A.B	1	1	1	0
A.$\overline{B}$	0	0	1	1

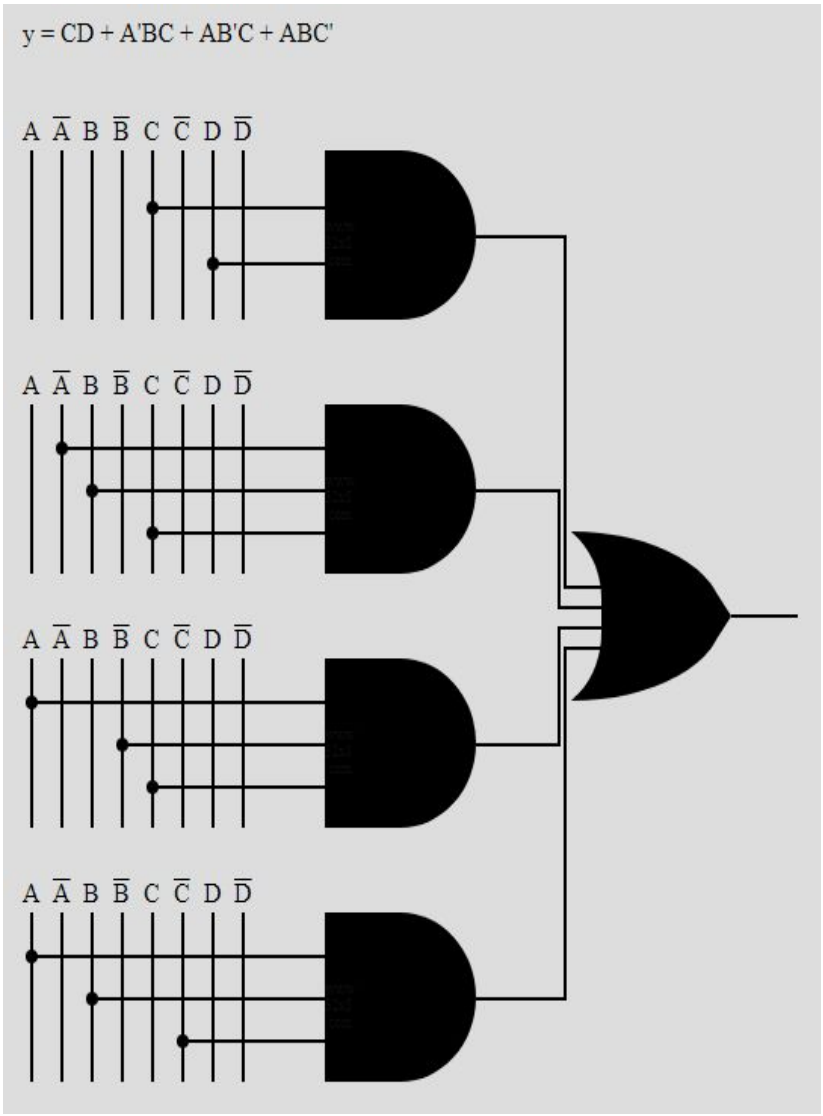
Map Layout

	$\overline{C}.\overline{D}$	$\overline{C}.D$	C.D	C.$\overline{D}$
$\overline{A}.\overline{B}$	0	1	3	2
$\overline{A}$.B	4	5	7	6
A.B	12	13	15	14
A.$\overline{B}$	8	9	11	10

Groups

(3,7,11,15)	C.D
(6,7)	$\overline{A}$.B.C
(10,11)	A.$\overline{B}$.C
(12,13)	A.B.$\overline{C}$

y = CD + A'BC + AB'C + ABC'



Question No. 4 10 marks

F(A,B,C)=∑(1,2,3,7)+d(4,5)

Simplify the above equation using Quine-McCluskey method.

Input

0	
1	m1 001 ☑ m2 010 ☑ d4 100 ☑
2	m3 011 ☑ d5 101 ☑
3	m7 111 ☑

First Comparasion

0	
1	(3, 1) 0-1 ☑ (5, 1) -01 ☑ (3, 2) 01- (5, 4) 10-
2	(7, 3) -11 ☑ (7, 5) 1-1 ☑

Second Comparasion

0	
1	(7, 5, 3, 1) --1

Prime Implicants

(7, 5, 3, 1) --1
(3, 2) 01- (5, 4) 10-

Coverage Table

	--1	01-	10-
1	X		
2		X	
3	X	X	
7	X		

Essential Prime Implicants

$A'B + C$