Logic Design - Fall 2022-2023 – Homework 3

Instructions:

1- This document has 2 pages, please download then open it.
2- Please submit before deadline of 27-Dec-2022
3- Answer the questions in details with standard procedures as per examples in lecture notes
4- Solve assigned questions only as per below table (You need answer Questions for Lecture 3)
5- Answer the questions as handwritten on white A4 paper, then scan and include all scanned images in a single word or pdf document (you can use Mobile Camera and App like CamScanner)
6- Submit the answer by email with name HW_3 to: alaa.ghazi@tiu.edu.iq

	Questions	1	2	3	4
#	Student Name				
1	Abdulrahman Hassan Zakarya	b	d	c	a
2	Aesan Azad Mikhael	a	c	c	b
3	Ahmed Salah Ismail	c	a	b	b
4	Ahmed Sarhang Mohammed	c	d	b	b
5	Anas Bilal Ali	c	c	a	a
6	Blind Salim Faqi	c	b	b	a
7	Chener Farhad Othman	a	d	d	b
8	Eman Dlshad Khidir	c	d	c	b
9	Ghazaly Faris Yousif	b	a	c	d
10	Kamaran Bakhtyar Abdulqader	d	d	d	d
11	Khalid Amir Maml	c	d	b	d
12	Lava Ahmed Mohammed	d	d	d	a
13	Matin Guli	b	c	a	a
14	Meer Hoger Shakir	b	a	a	c
15	Milad Mazin Khdir	b	d	b	a
16	Mohammad Karkhi Mohammad	c	c	a	a
17	Nihad Naji Bag	c	c	d	a
18	Raman Hamadameen Omer	d	c	c	a
19	Rashwan Abdulrahman Abduljabar	b	a	a	c
20	Rastgo Farman Izaddin	c	a	b	a
21	Rebar Shamal Mamand	c	d	a	d
22	Saywan Nuri Rashed Ali	d	b	d	d
23	Shad Mohammed Taha Hussin	b	c	b	a
24	Solav Rebwar Hamo	b	b	d	d
25	Yousif Emyan Aziz	b	c	d	a
26	Zagros Ramzi Aziz	a	b	c	c
27	Zainab Musher Saeed	d	a	c	d

Lecture 3

Q1\ Convert the following expressions to Standard sum-of-product (SOP) forms, and then from Standard SOP find out Truth Table.

(a)	$Y = BCD + D\,(B\overline{C} + B)$
(b)	$Y = B(\overline{C}\,\overline{D} + CD)$
(c)	$Y = B + CBD + C\overline{D}$
(d)	$Y = B(\overline{C}D + CD + \overline{D})$

Q2\ Develop a truth table for each of the following standard SOP expressions, then evaluate standard POS for each.

(a)	$Y = A\overline{B}C + AB\overline{C} + \overline{A}\,\overline{B}C + ABC$
(b)	$F = XYZ + X\overline{Y}Z + \overline{X}Y\overline{Z} + \overline{X}YZ + X\overline{Y}\,\overline{Z}$
(c)	$Y = \overline{A}\,\overline{B}C + AB\overline{C} + \overline{A}\,\overline{B}C + A\overline{B}C$
(d)	$F = W\overline{X}\,\overline{Y} + \overline{W}X\overline{Y} + W\overline{X}Y + \overline{W}\,\overline{X}Y + \overline{W}X\overline{Y}$

Q3\ From truth tables below, evaluate standard SOP and standard POS and from Karnaugh map then find minimum SOP and minimum POS.

a)

A	B	C	X
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

b)

A	B	C	X
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

c)

A	B	C	X
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

d)

A	B	C	X
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

Q4\ For each of the following SOP expressions find minimum **POS** expressions using Karnaugh map: (Hint: Convert to standard SOP first then Truth Table then Karnaugh map then minimum POS).

(a)	$Y = A\,\overline{B}\,\overline{D} + \overline{A}B\overline{D} + \overline{A}\,\overline{B}D + \overline{A}\,\overline{B}\,\overline{D} + ABD$
(b)	$F = \overline{W}XZ + \overline{W}XZ + W\overline{X}\overline{Z} + \overline{W}\,\overline{X}Z + \overline{W}X\,\overline{Z}$
(c)	$Y = \overline{A}\,C\overline{D} + A\overline{C}\,\overline{D} + \overline{A}\,CD + AC\overline{D} + \overline{A}\,C\overline{D}$
(d)	$F = W\,\overline{X}\,Y + \overline{W}X\overline{Y} + W\overline{X}Y + \overline{W}\,\overline{X}Y + \overline{W}X\overline{Y} + WXY$