

$$\frac{16}{18} \bigg/ 18$$

TIME: 30 MINUTES

Instruction: Please answer the following objective questions in answers table on the last page.

Name:	Safiyu Nursyahadah bt Masnoor
Metric Number:	A23C50176
Section:	01

1. Given the rules of Boolean Algebra, which of the following expressions is equivalent to

$$A + AB. \quad (1M)$$

A. B

 $\mathcal{B} \supset A$

C. $A + B$

 $\text{D. } A.B$
$$A + AB = A$$

$$A + \bar{A}B = A + B$$

$$(A + B)(A + C) = A + (BC)$$

2. Solve

$$\overline{AC} + B\overline{D}$$

$$(\overline{AC}) + \overline{B\overline{D}}$$

$$AC + \overline{B} + D$$

2. Solve this Boolean Expression $\overline{AC} + B\overline{D}$? (2M)

A. $(AC + \bar{B})\bar{D}$

B. $A\bar{C} + \bar{B}D$

C. $ABCD$
$$\textcircled{D} (AC)(\bar{B} + D)$$

3. Which of the following is the CORRECT answer for the simplification of this Boolean expression? (2M)

$$X = ABC + BC + A(B + C)$$

$$BC(C + A) + AB + AC$$

B C (1)

- A. $X = AB + BC$

- $$B \cdot X = AB + AC + BC$$

- C. $X = AC + A + BC$

- D. $X = A$

4. Which of the following is the CORRECT truth table for this Boolean expression? (2M)

$$X = A\bar{C} + A(C + 1) + BC$$

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

\bar{C}	$A\bar{C}$	A	BC	X	1
1	0	0	0	0	
0	0	0	0	0	
1	0	0	0	0	
0	0	0	1	0	
1	0	1	0	1	
0	0	1	0	1	
1	0	1	1	1	
0	0	1	1	1	

C.				D.			
A	B	C	X	A	B	C	X
0	0	0	1	0	0	0	0
0	0	1	1	0	0	1	1
0	1	0	0	0	1	0	1
0	1	1	1	0	1	1	0
1	0	0	1	1	0	0	1
1	0	1	0	1	0	1	1
1	1	0	0	1	1	0	1
1	1	1	0	1	1	1	1

5. Determine which Boolean expression is POS. (1M)

A. $\overline{ABC} + \overline{ABC}$

B. $(B + \overline{C} + D)(\overline{A} + B)$

C. $AB\overline{C}D + A\overline{C} + \overline{B}C$

D. $(A + C)(B + D)$

(ABC)
 $(\overline{A}BC)$ $(A\overline{B}C)$
 $AB + C\overline{C}$
 $\overline{A}B + C\overline{C}$

6. Convert the following Boolean expression to standard POS. (2M)

$F = (A + B + C)(A + C)(B)$

A. $F = (A + \overline{B} + C)(A + \overline{B} + \overline{C})(A + \overline{B} + C)(\overline{A} + B + C)(\overline{A} + B + \overline{C})$

B. $F = (A + B + C)(\overline{A} + \overline{B} + C)(A + B + \overline{C})(\overline{A} + B + C)(A + B + \overline{C})$

C. $F = (\overline{A} + \overline{B} + \overline{C})(A + \overline{B} + C)(A + B + \overline{C})(\overline{A} + B + C)(A + B + \overline{C})$

D. $F = (A + B + C)(A + \overline{B} + C)(A + B + \overline{C})(\overline{A} + B + C)(\overline{A} + B + \overline{C})$

$B + A\overline{A}$

7. Represent the following KMAP using pi notation π . (2M)

AB \ CD	00	01	11	10
00	0 ✓	0 ✓	1	1
01	0 ✓	1	1	0 ✓
11	1	1	0 ✓	1
10	1	1	1	0 ✓

A. $\pi_{ABCD}(0, 1, 4, 6, 11, 15)$

B. $\pi_{ABCD}(0, 1, 4, 6, 10, 15)$

C. $\pi_{ABCD}(0, 1, 4, 5, 10, 15)$

D. $\pi_{ABCD}(0, 1, 4, 6, 10, 14)$

$0, 1, 4, 15, 6, 10$

8. Determine how many groups are created for the following SOP KMAP. (2M)

AB \ CD	00	01	11	10
00	1	0	0	1
01	0	1	1	0
11	1	1	1	1
10	1	0	0	1

A. 2

B. 3

C. 4

D. 5

$$A + \bar{A}B = A + B$$

9. Get the minimum SOP expression for KMAP below. (2M)

AB \ CD	00	01	11	10
00	1	0	0	1
01	0	1	1	0
11	1	1	1	1
10	1	0	0	1

A. $\bar{B}\bar{D} + AB + B\bar{D}$

B. $\bar{B}\bar{D} + \bar{A}\bar{B} + BD$

C. $\bar{B}\bar{D} + AB + BD$

D. $\bar{B}\bar{D} + AB + BD$

$$\bar{D}(\bar{A}\bar{B} + A) + BD$$

$$\bar{D}(\bar{A} + \bar{B}) + BD$$

$$\begin{array}{r} 0000 \\ 0010 \\ \hline \bar{A}\bar{B}\bar{D} \end{array}$$

$$\bar{A}\bar{B}\bar{D} + BD + A\bar{B}$$

$$\bar{D}(\bar{A}\bar{B} + A) + BD$$

$$\bar{D}(A + \bar{B}) + BD$$

$$A\bar{D} + \bar{D}\bar{B} + BD$$

$$\begin{array}{r} 0101 \\ 0111 \\ 1101 \\ 1111 \\ \hline B\bar{D} \end{array}$$

$$\begin{array}{r} 1100 \\ 1110 \\ 1000 \\ 1010 \\ \hline A\bar{D} \end{array}$$

$$(A+B)(A+C)$$

10. Get the minimum POS expression for KMAP below. (2M)

A \ BC	00		01	11	10
	0	1	0	1	0
0	0	1	0	0	X
1	0	1	1	1	X

A. $\bar{A}B + \bar{C}$

B. $(\bar{A} + B)(\bar{C})$

C. $A\bar{B} + C$

D. $(A + \bar{B})(C)$

$$\begin{array}{r} 000 \\ 100 \\ 010 \\ 110 \\ \hline C \end{array}$$

$$(A+B)(C)$$

Answers Table:

1. B	2. D	3. B	4. A	5. B
6. D	7. B	8. B	9. B	10. D