

SECR1013 DIGITAL LOGIC QUIZ 2 (SET 2)

TIME: 30 MINUTES

18/18

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

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Section:	2

1. Given the rules of Boolean Algebra, which of the following expressions is equivalent to  $A + AB$ . (1M)

- A.  $B$   
~~B.  $A$~~   
 C.  $A + B$   
 D.  $A.B$

$$A + AB = A(1 + B) = A$$

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

- A.  $(AC + \overline{B})\overline{D}$   
 B.  $\overline{AC} + \overline{BD}$   
 C.  $ABCD$   
~~D.  $(AC)(\overline{B} + D)$~~

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

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

$$\begin{aligned} & ABC + BC + A(B + C) \\ &= BC(A + 1) + A(B + C) \\ &= BC + AB + AC \\ &= 3(C + A) + AC \end{aligned}$$

- A.  $X = AB + BC$   
 B.  $X = AB + AC + BC$   
 C.  $X = AC + A + BC$   
 D.  $X = A$

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

$$ABC + BC + AB + AC$$

$$BC(A + 1) + AB + AC$$

$$BC + AB + AC \rightarrow$$

$$\begin{aligned} A + 0 &= A \\ A + 0 &= 0 \end{aligned}$$

$$A + 1 = 1$$

$$A + 1 = A$$

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

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

SOP

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

1

$$\overline{AC} + A + BC \rightarrow$$

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

$$= A + BC$$

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

$$= ABC + A\overline{B}\overline{C} + A\overline{B}C + A\overline{B}\overline{C} + A\overline{B}C + A\overline{B}\overline{C} + A\overline{B}C + A\overline{B}\overline{C}$$

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

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

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

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

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

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

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

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

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

AB \ CD	00	01	11	10
00	0 0	0 1	1	1 2
01	0 4	1	1	0 6
11	1	1	0 15	1
10	1	1	1	0 10

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, 6, 10, 15



8. Determine how many groups are created for the following SOP KMAP. (2M) product = 1

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

9. Get the minimum SOP expression for KMAP below. (2M) product = 1

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

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

C.  $BD + AB + BD$

☒ D.  $\bar{B}\bar{D} + AB + BD$

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

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

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

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

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

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

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

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

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

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

Answers Table:

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

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

$$= A\bar{C} + A + BC$$

$$\cancel{ABC} + \cancel{A\bar{B}C} + \cancel{AB\bar{C}} + \cancel{A\bar{B}\bar{C}} + A\bar{B}C + A\bar{B}\bar{C} + \cancel{ABC} + \cancel{A\bar{B}C}$$

101  
001  
001  
001