

SECR1013 DIGITAL LOGIC QUIZ 2 (SET 2)

TIME: 30 MINUTES

16/18

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. $A.B$

$$ABC + AB + BC + AC$$

$$AB + BC + AC$$

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

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

$$\overline{AC} \cdot \overline{BD}$$

$$AC \cdot \overline{BD}$$

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

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

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

$$= ABC + BC + AB + AC = BC(A + 1) + A(B + C)$$

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

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

$$= B(A + C)$$

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

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

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

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

$$AB\overline{C} + A\overline{B}\overline{C} + AB\overline{C} + A\overline{B}C + \dots$$

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

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

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

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

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

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

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

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

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

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

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

7. Represent the following KMAP using pi notation π^{POS} (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. $\pi_{ABCD}(0, 1, 4, 6, 10, 14)$

$$01461015$$

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

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

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

C. $BD + AB + BD$

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

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

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

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

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

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

$\begin{array}{c} \text{BC} \\ \text{A} \end{array}$	00	01	11	10
0	0	1	0	X
1	0	1	1	X

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

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

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

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

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

Answers Table:

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