جامعة بيرزيت
BIRZEIT UNIVERSITY

Department of Electrical and Computer Engineering

Summer Semester - 2021/2022

ENCS2340 | Digital Systems

First Exam, August 8, 2022

Time Allowed: 60 Minutes

16

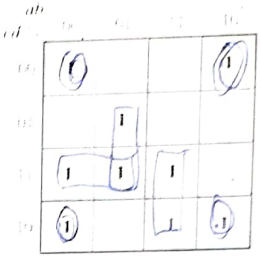
Name	Yazan AbuAlouh
ID	1210115
Section	03

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

11	12	13	14	15	16	17	18	19	20
E	C A	A B	A D	B D E	D	A	B	D	C

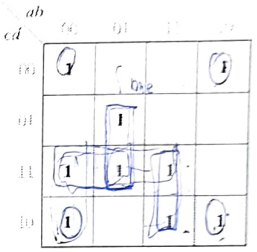
Choose the correct answer of the following questions:

1. The following K-Map is a representation of the following function:



   A. f = b'c'd' + bcd + acd' + a'b'c + a'bc'd
   B. f = b'c'd' + bd' + acd' + a'bc'd
   C. f = b'c'd' + bcd + acd' + a'b'c + a'bc
   D. f = bcd + acd' + a'b'c + a'bc'd
   E. f = b'c'd' + acd' + a'b'c + a'bc'd

2. For the following K-Map, there are:



   A. 4 prime implicants and all of them are essential
   B. 4 prime implicants and none of them are essential
   C. 5 prime implicants and 2 of them are essential
   D. 7 prime implicants and 2 of them are essential
   E. 5 prime implicants and 1 of them are essential

3. The minimum sum-of-products expression for the following function is:

   f(a, b, c, d) = Π(1, 9, 11, 12, 14)

   A. F = a'c + b'd' + bd + a'd
   B. F = a'c + b'd' + bd + a'b
   C. F = a'c + b'd' + bd + a'b
   D. F = a'c + b'd' + bd + ad'
   E. None of the above

4. The minimum products-of-sum expression for the following function is:

   f(a, b, c, d) = Σ m(1, 3, 4, 11) + Σ d(2, 7, 8, 12, 14, 15)

   A. f = (a'+ c')(b')(b + d)(c'+ d')
   B. f = (a'+ c)(b'+ d')(b' + d)(c+ d)
   C. f = (a'+ c)(b'+ d')(b + d)
   D. f = (a'+ c)(b'+ d')(b + d)(b'+ c')
   E. none of the above

5. The implementation of the following function using NAND gates is:

   F = wxy + wx'y' + wz

   A. (wxy)' + (wx'y') + (wz)
   B. (wxy) + (wx'y')' + (wz)'
   C. (w+x+y) . (w+x'+y')' . (w+z)'
   D. (wxy)' + (wx'y')' + (wz)'
   E. ((wxy)' . (wx'y')' . (wz)')'

even parity

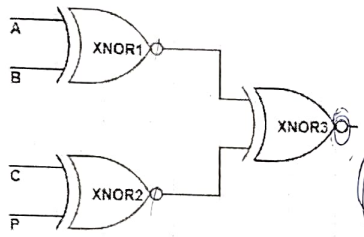
A ; checker 3 bit

6. The following circuit represents:

A. 3 Bit Odd Parity Checker circuit
B. 3 Bit Even Parity Checker circuit
C. 4 Bit odd Parity Generator circuit
D. 4 Bit Even Parity Generator circuit
E. None of the above

even parity odd

A B C



$((A \oplus B)' \oplus (C \oplus P)$

7. Given the following expression, which of the following is the most simplified equivalent:

F = (AB)'.(A'+B).(B'+B)

A. (A'+B)
B. A'
C. (AB)'.(B'+B)
D. (B'+B)
E. (AB)'.(A'+B)

$(A'+B').(A'+B)(1)$

$(A'+B')(A') + (A'+B')(B)$

$A' + A'B' + A'B + 0$

8. Given F(x,y,z) = x + y z, then the representation of F' in product of maxterms is:

A. Π(3, 4, 5, 6, 7)
B. Σ(3, 4, 5, 6, 7)
C. Σ(0,1)
D. Π(0,1,2)
E. Π(0,1)

$A'(B'+B)$

$A'+A'$

9. The dual of the following expression is:

(AB' +C)D' + E

A. AB'D' + CD' + E
B. (A + B' + D')(C + D')E
C. (A' + B + D)(C' + D)E'
D. None of the above

$((A+B').C)+d').E$

$(A+B'+d').(C+d').E$

10. The largest fraction value if m fraction digits are used in radix r is:

A. $-r^{-m}$
B. $1 - r^{-m}$
C. $r^m - 1$
D. $1 - r^m$
E. None of the above

$1 - \frac{1}{4}$ 0.25

$1 - 2^{-2}$

m = 2 bits

100.

$1 \times 2^{-1} + 2^{*2}$

$\frac{1}{2} + \frac{1}{4}$ 0.5+0.25 = 0.75

11. The 8-bit binary representation of -27 using signed magnitude is:

A. 111111011
B. 000011011
C. 100011011
D. 000011011
E. None of the above

	27
1	13
1	6
0	3
1	1
1	0

10011011

12. The (670 – 831) using 9's complement method is

A. 168
B. 838
C. 9's complement of 161
D. 9's complement of 838
E. –(9's complement of 838)

13. The binary number of the following gray code is

10010010

A. 11100011
B. 00010010
C. 10010001
D. 11101101
E. None of the above

14. The octal value of the following decimal value is:

$(57.5)_{10}$

A. 71.4
B. 74.625
C. 17.25
D. 47.526

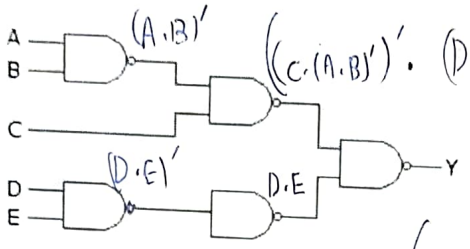
15. Given that A, B, and C are numbers, and let C = A + B or C = A - B, the overflow will occurred if:

A. (+A) + (+B) = –C
B. (–A) + (–B) = +C
C. (+A) – (–B) = –C
D. (–A) – (+B) = +C
E. All of the above

16. In 2's complement representation, the number 11100101 represents the decimal value of:

A. 37
B. -31
C. 27
D. -27
E. -101

17. The circuit of the following figure realizes the function:

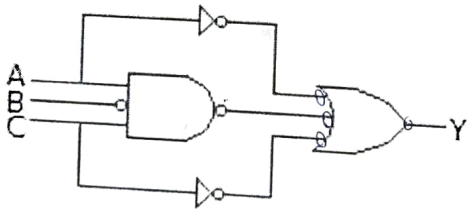


A. $Y = (A' + B')C + (DE)'$
B. $Y = A' + B' + C' + D' + E'$
C. $Y = AB + C + DE$
D. $Y = AB + C(D + E)$
E. None of the above

18. The department of computer engineering has 50 courses, if we assign a code to each course, what is the minimum number of bits required:

A. 5
B. 6
C. 7
D. 4
E. None of the above.

19. For the logic circuit of the given figure, the minimize expression is:



A. $Y = A + B + C$
B. $Y = A + B$
C. $Y = ABC$
D. $Y = (AB'C)'$
E. None of the above

20. There are ..... Minterms for an n input variables:

A. n
B. $n - 1$
C. 2^n
D. $2^n - 1$
E. $n^{n-1} - 1$