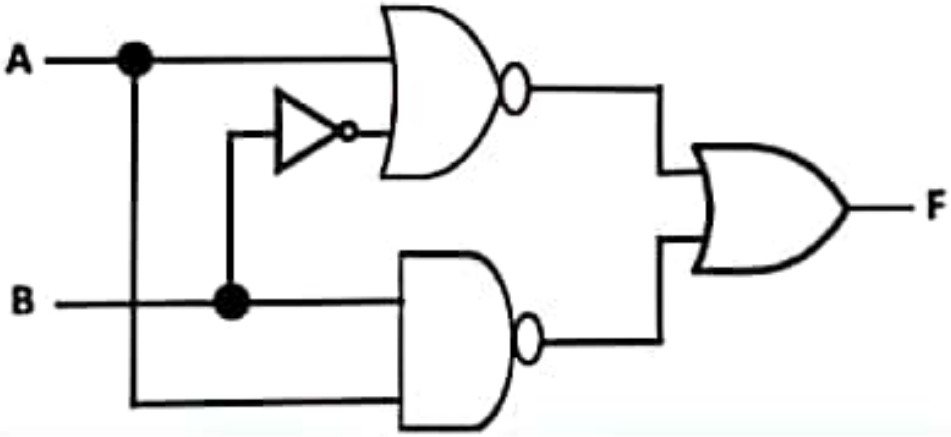
8

Given the above circuit, write F as a SoM expression. *
(8 Points)



- F(A,B) = m0 + m1 + m2 + m3
- F(A,B) = m0 + m1
- F(A,B) = m2 + m3
- **F(A,B) = m0 + m1 + m2**
- F(A,B) = m0 + m1 + m3

9

11

Given that $F(X,Y,Z) = X \oplus Y \oplus Z'$.
Which of the following is an equivalent expression for F ?
Note: $\odot$ is the XNOR operation.
Note: $\oplus$ is the XOR operation. *
(8 Points)

- $F(X,Y,Z) = (X \oplus Y) \odot Z$
- $F(X,Y,Z) = (X \oplus Y) \odot Z'$
- $F(X,Y,Z) = (X' \odot Y) \oplus Z$

12

Given the above k-map. What is the number of prime implicants? *

- [ ] $F'(A, B, C, D) = D' + A'C'$
- [ ] $F(A, B, C, D) = (C' + D')(A'$ ✓

21

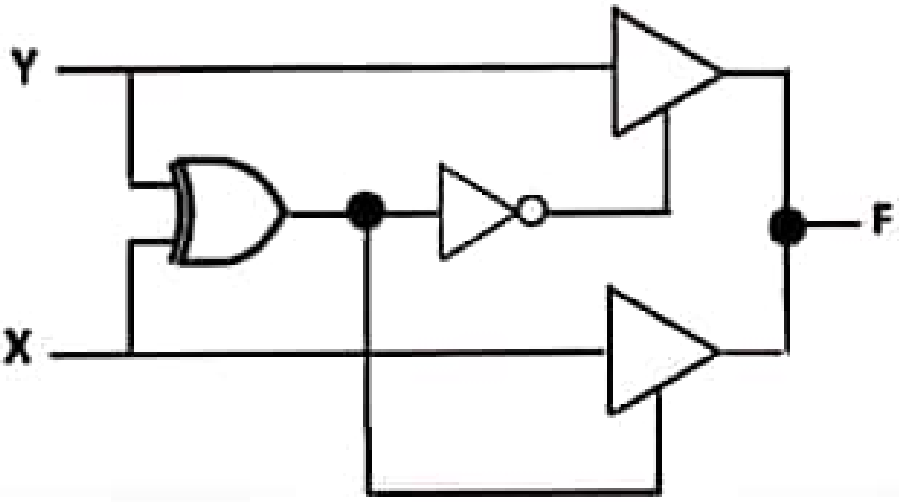
Which of the following expressions is implemented as a two-level network? (Choose all correct answers) *
(1/1 Points)

- [x] $AB' + ABC + B'CD$ ✓
- [x] $A(A' + C + D)(B + C + D')$ ✓
- [ ] $ABCD + A'BCD' + AB(C + D)$
- [ ] $A(B + C + D) + C'(A + B + D)$
- [ ] None of these expressions.

22

What is the gate input cost

Given the above circuit, write F as an optimized SoP expression. * (8 Points)



- F(X,Y) = Y
- F(X,Y) = Y'
- F(X,Y) = X' Y + X Y'
- **F(X,Y) = X**
- F(X,Y) = X'
- F(X,Y) = X' Y' + X Y

12

What is the gate input cost (G) of the following function expression:

(write your answer as a number e.g. 3 or 7 or 19...) *
(1/1 Points)

$f(w,x,y,z) = w(xz' + yz) + w'y'$

12 ✓

13

How many prime implicants are there in the K-map of the following function F(A,B,C,D)? *
(1/1 Points)

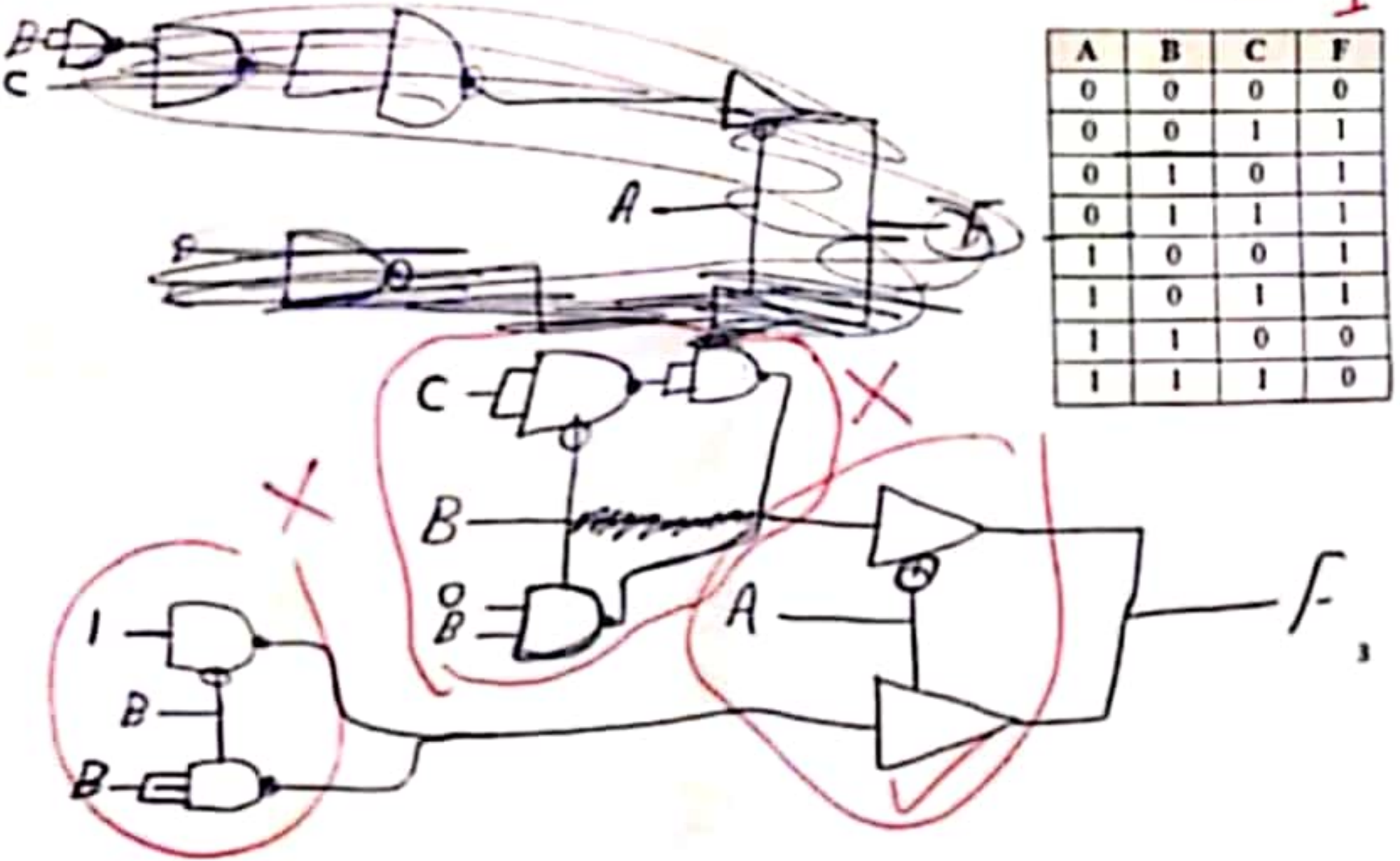
$F(A,B,C,D) = \sum_m (0,2,3,4,6,7,9,11,15)$

4 ✓

Problem 3. The following table is the truth table for F(A,B,C). Draw the implementation of the function using ***only*** ***<u>two</u>*** Tri-state buffers and ***<u>any number</u>*** of 2-input NAND gates.

(3 points) 1

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0



h) Write the following function in the standard SOM form

$$F(A,B,C) = \bar{C} + BC$$

$F = \sum_m ($ [redacted] $)$ 1.5

$F = \bar{C} + BC$

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

$A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + \bar{A}\bar{B}\bar{C} + ABC + \bar{A}BC$

$m_4 + m_0 + m_2 + m_0 + m_3 + m_7$

$\sum (0, 2, 3, 4, 6, 7)$

i) If $F(A,B,C,D) = \sum_m(0,1,8,9,11)$ then $\bar{F} = \prod_M(\quad)$

j) The dual of the Boolean expression $F = \bar{A} + \bar{B}\bar{C} + 1$ is:

[redacted]

$\bar{A}\bar{B}\bar{C} + 0$

$A \cdot B \cdot C$

$\bar{A} + \bar{B} + \bar{C} + 1$ ✗

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

k) Fill in the K-map of $F(A,B,C)$ given that $\bar{F}(A,B,C) = \overline{A\bar{B} + \bar{A}C}$

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

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

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

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

Problem 2: Given the following function F:

$$F(W,X,Y,Z) = WXY + \bar{Z} + (WY)\cdot(X + Y)$$

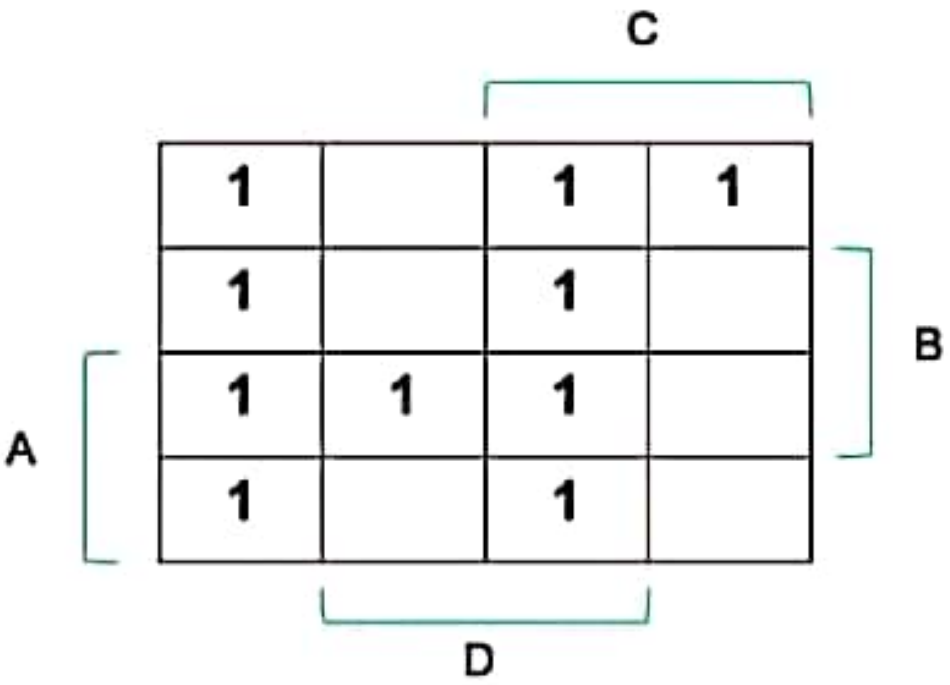
What is the literal cost (L), the gate-input cost (G) and the gate-input cost with (GN), of F?

L = 5

G = 8+3 = 11

GN = 11+3 = 14

Given the above k-map. What is the number of essential prime implicants? *
(4 Points)



- 1
- 2
- 3
- 4

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- $ABCD + A'BCD' + AB\,(C + D)$
- $A\,(B + C + D) + C'\,(A + B + D)$
- None of these expressions.

22

What is the gate input cost with inverters (GN) of the following function? *
(1/1 Points)

$F\,(A, B, C, D) = (A' + B + C)\,(B + C' + D')\,(A'$

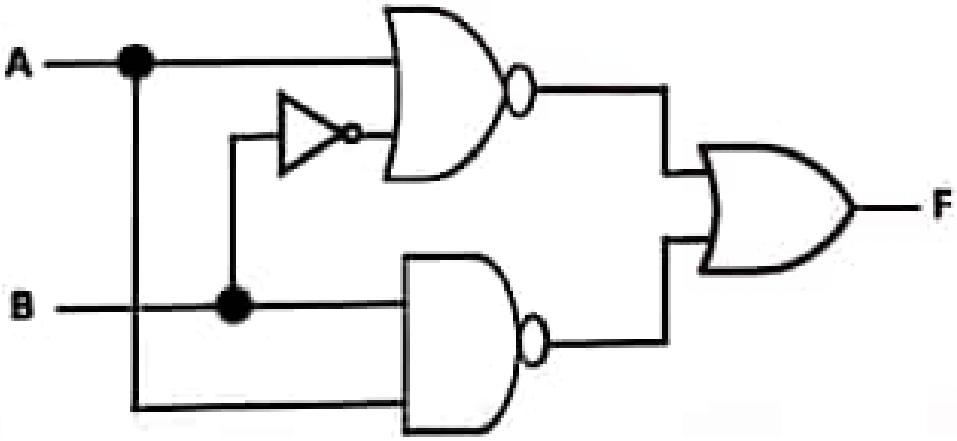
14 ✓

23

How many essential prime implicants are there in the following K-map? *
(0/1 Points)

8

Given the above circuit, write F as a SoM expression. *
(8 Points)



- F(A,B) = m0 + m1 + m2 + m3
- F(A,B) = m0 + m1
- F(A,B) = m2 + m3
- **F(A,B) = m0 + m1 + m2**
- F(A,B) = m0 + m1 + m3

16

Given that F(X,Y,Z) = X Y' Z + X' Z' + X'.
Select the boolean algebra theorems/identities that can be used to simplify F(X,Y,Z) in two steps to become: F(X,Y,Z) = X' + Y' Z. *
(4 Points)

- Minimization then Absorption
- Distributive Law then Simplification
- Consensus then Minimization
- Simplification then Minimization

three inverters and two tri-

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15

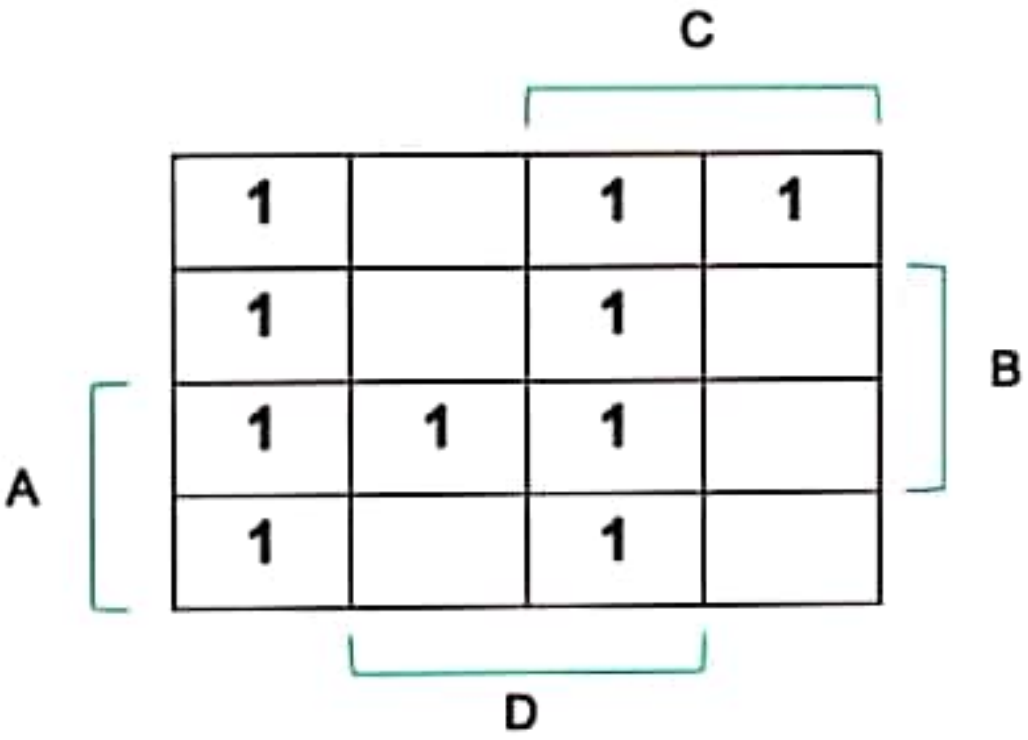
Given that F(X,Y,Z) = X' Y' + Y' Z + X Z + X Y + Y Z'.
Select the boolean algebra theorem/identity that can be used to simplify F(X,Y,Z) in one step to become: F(X,Y,Z) = X' Y' + Y' Z + X Y + Y Z'. *
(4 Points)

- Simplification Theorem
- Distributive Law
- Consensus Theorem
- Absorption Theorem

12

Given the above k-map. What is the number of prime implicants? *

(8 Points)



- 4
- 5
- 6
- 7

"Given th...uit of F?" SHARE QUOTE

7

What is the minimal number of bits needed to assign binary codes to 71 colors?
(10 Points)

- 6
- 5
- **7**
- 8

8

If N = 234.125 in decimal, what is the value of N in base r = 4 ?
(15 Points)

Copy Share Select all ... RE QUOTE

12

What is the value of the maximum number (in decimal) for a number system with base r = 5 and number of digits n = 4 ?
(10 Points)

- (•) 624
- ( ) 124
- ( ) 255
- ( ) 1023

[✓] Send me an email receipt of my responses

Back Submit

" Back Submit " SHARE QUOTE

8

If N = 234.125 in decimal, what is the value of N in base r = 4 ?
(15 Points)

- 1113.2
- 1113.02
- **3222.02**
- 3222.2
- 3111.2

9

if N = 100000 in binary, and N = 112 in base r, then what is the value of r ?
(15 Points)

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Given that the SoM expression for F(A,B,C) = m0 + m1 + m2 + m5 + m7. What is the minimal number of inverters and tri-state buffers needed to build the circuit of F? *

(8 Points)

- two inverters and two tri-state buffers
- two inverters and four tri-state buffers
- three inverters and four tri-state buffers
- three inverters and two tri-state buffers

18

You are given the following facts about three boolean variables A, B, and C:

A + B + C = 1

A B = 0

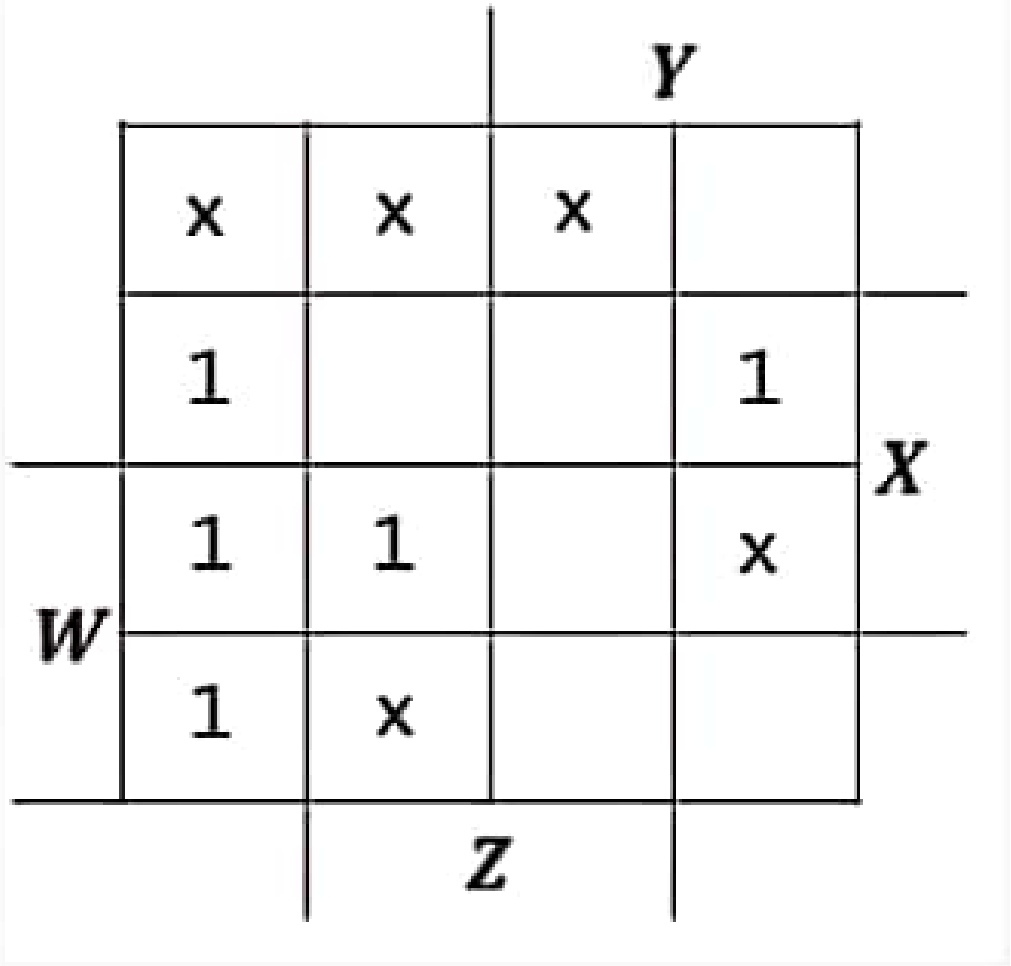
Which of the following statements is always guaranteed to be correct? *

(8 Points)

- A is not equal to B
- A' + B' + C' = 1
- C = 1
- A + B + C' = 0
- C = 0

the optimized SoP expression of F? *

(1/1 Points)



- WY' + XZ' ✓
- WY'+Y'Z'
- XZ'+Y'Z'
- WY'+Y'Z'+XZ'

6

Given that the PoM expression for F(W,X,Y,Z) = M0 + M1 + M4 + M10 + M11 + M14 + M15. What is the optimal SoP expression for F? *

(8 Points)

- W Y' + W' Y
- **W Y' + W' Y + X Y' Z**
- W Y + W' X' Y' + W' Y' Z'
- W Y' + W' Y + X Z
- (W + X' + Y') (W + X + Y') (W + Y' + Z)
- (W + X' + Y') (W + X + Y') (W + Y' + Z) (W + Y' + Z')

Given that F(A,B,C) = A' B' + A C'.
Which of the following is a correct SoM expression for F? *
(8 Points)

- F(A,B,C) = A' B' C' + A B' C' + A B C'
- F(A,B,C) = A' B' C' + A B' C' + A B C'
- **F(A,B,C) = A' B' C' + A' B' C + A B' C' + A B C'**
- F(A,B,C) = A' B' C' + A' B C + A B' C' + A B' C'
- F(A,B,C) = (A' + B' + C') (A' + B' + C) (A + B' + C') (A + B + C')
- F(A,B,C) = (A' + B' + C') (A' + B' + C') (A + B' + C') (A + B' + C')

"Given th...uit of F?" SHARE QUOTE

7

10

What is the odd parity bit if N = 1011100101100 ?
(10 Points)

1

0

cannot be determined

11

Assume you have a memory that has 16777222 bits. what is the size of this memory in Megabytes (choose the most accurate answer)?

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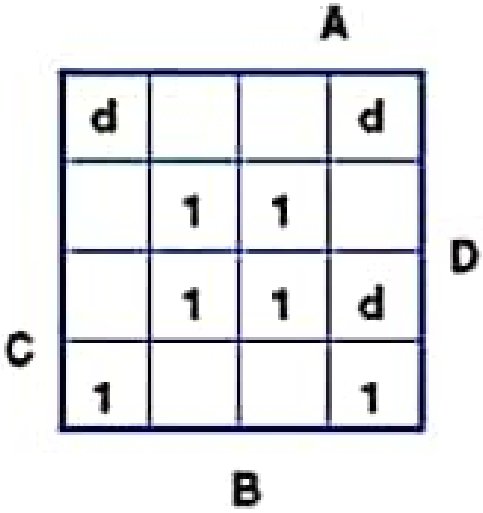


10. The most reduced expression which can be obtained from the K-map illustrated is:

1. BD + A'B'CD' + AB'C
2. BD + B'CD'
3. C'D' + CD
4. B'D' + BD
5. none of the above

11. The most reduced expression which can be

11

Assume you have a memory that has 16777222 bits. what is the size of this memory in Megabytes (choose the most accurate answer)?
(15 Points)

- 2.2 Megabytes
- 2.0 Megabytes
- 16.0 Megabytes
- 2.1 Megabytes
- **16.7 Megabytes**

12

" Back Submit " SHARE QUOTE

11

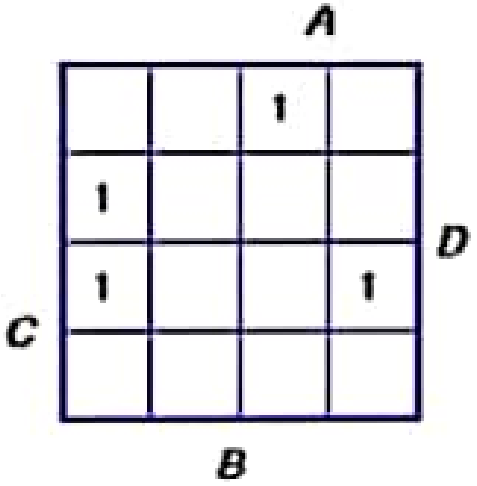
Given that F(X,Y,Z) = X ⊕ Y ⊕ Z' .
Which of the following is an equivalent expression for F ?
Note: ⊙ is the XNOR operation.
Note: ⊕ is the XOR operation. *
(8 Points)

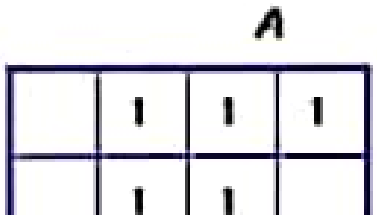
- F(X,Y,Z) = (X ⊕ Y) ⊙ Z
- **F(X,Y,Z) = (X ⊕ Y) ⊙ Z'**
- F(X,Y,Z) = (X' ⊙ Y) ⊕ Z

12

Given the above k-map. What is the number of prime implicants? *
(8 Points)

2. Identify the function which generates the K-map shown
    1. F= Sum m(1,3,11,12)
    2. F= Sum m(1,2,11,12)
    3. F= Sum m(1,3,8,15)
    4. F= Sum m(1,3,8,14
    5. F= Sum m(2,3,8,14)





3. Identify the most simple SOP expression from the K-map shown.
    1. B'C + AD + CD

3. When converting the binary number 10110111.01 to decimal, octal, and hexadecimal, the values in order are: *

(-/1 Points)

- 183.25, 556.2, B7.2
- 183.25, 267.1, B7.2
- **183.25, 267.2, B7.4**
- 366.25, 556.2, B7.2
- 366.25, 267.2, B7.4

- [ ] 00111001
- [x] 01010111
- [ ] 1010111

12. Which of the following code words has even parity?
Choose all correct answers. *
(-/1 Points)

- [ ] 10000
- [x] 10001
- [ ] 11001
- [x] 00000
- [ ] 10101

10. The equivalent gray code for the binary code 1101 in a system that encodes 16 elements is: *
(-/1 Points)

- 1010
- 1100
- 0011
- 1011
- 1111

11. What is the BCD code of the decimal number 57? *
(-/1 Points)

- 101111
- 111101
- 00111001
- 01010111

8. What is the maximum number of elements that the octal numbers 00-47 can be used to encode? *
(-/1 Points)

- 39
- 40
- 47
- **48**
- 64

9. What is the minimum number of bits required in order to encode 1000 elements? *
(-/1 Points)

- 7
- 8
- 9
- **10**

6. Convert the number 1BA.6 which is in base 12 to decimal.
Note: enter your answer without adding any spaces. *
(-/1 Points)

286.5

7. Convert the number 2335 which is in base 6 to binary.
Note: enter your answer without adding any spaces. *
(-/1 Points)

1000110011

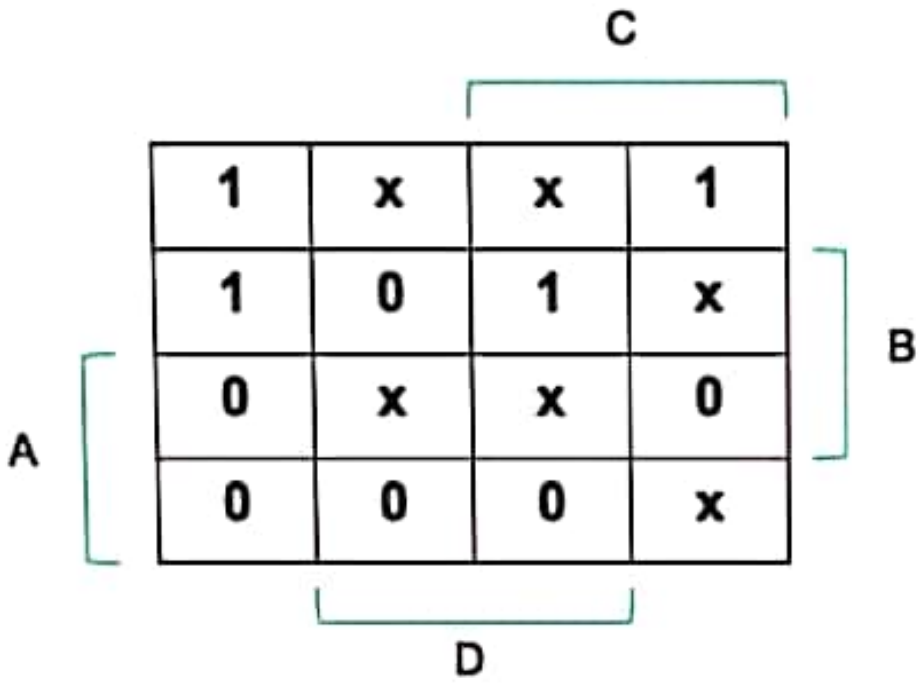
8. What is the maximum number of elements that the octal numbers 00-47 can be used to encode? *
(-/1 Points)

39

40

9

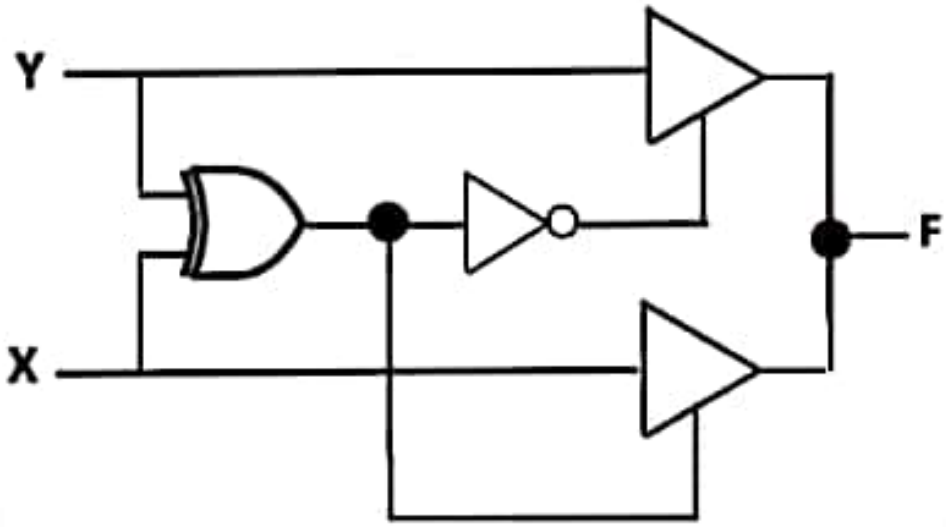
Given the above k-map for F(A,B,C,D). What is the optimal PoS for F(A,B,C,D)? *
(8 Points)



- F(A,B,C,D) = A + C' D
- F(A,B,C,D) = A D' + A' C
- F(A,B,C,D) = A (C' + D)
- **F(A,B,C,D) = A' (C + D')**

"Given th...uit of F?" SHARE QUOTE

Given the above circuit, write F as an optimized SoP expression. *
(8 Points)



- F(X,Y) = Y
- F(X,Y) = Y'
- F(X,Y) = X' Y + X Y'
- **F(X,Y) = X**
- F(X,Y) = X'
- F(X,Y) = X' Y' + X Y

4. When converting the hexadecimal number CE to decimal and octal, the values in order are: *
(-/1 Points)

- 26, 316
- 26, 634
- 206, 634
- **206, 316**
- 206, 716

5. Convert the decimal number 193.372 to its equivalent in base 5 showing two digits to the right of the radix point.
Note: enter your answer without adding any spaces. *
(-/1 Points)

1233.14

17

Given that W = A (B' C' + A' D).
Which of the following is the dual expression of W ? *
(8 Points)

- A (B' + C') (A' + D)
- A' (B + C) (A + D')
- A' + (B + C) (A + D')
- A + (B' + C') (A' + D)
- A + B' C' + A' D
- A' + B C + A D'

18

Which of the following is a correct SoM expression for F? * (8 Points)

- F(A,B,C) = A' B' C' + A B' C' + A B C'
- F(A,B,C) = A' B' C' + A B' C' + A B C'
- **F(A,B,C) = A' B' C' + A' B' C + A B' C' + A B C'**
- F(A,B,C) = A' B' C' + A' B C + A B' C' + A B' C
- F(A,B,C) = (A' + B' + C') (A' + B' + C) (A + B' + C') (A + B + C')
- F(A,B,C) = (A' + B' + C') (A' + B' + C') (A + B' + C') (A + B' + C')

12

Given the following equation, what is the value of r? *
(/1 Points)

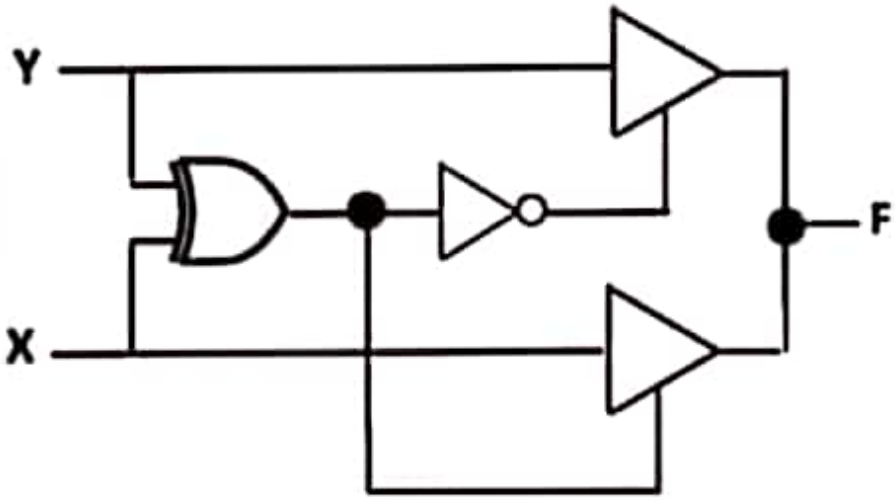
$(3233)_4 = (357)_r$

8

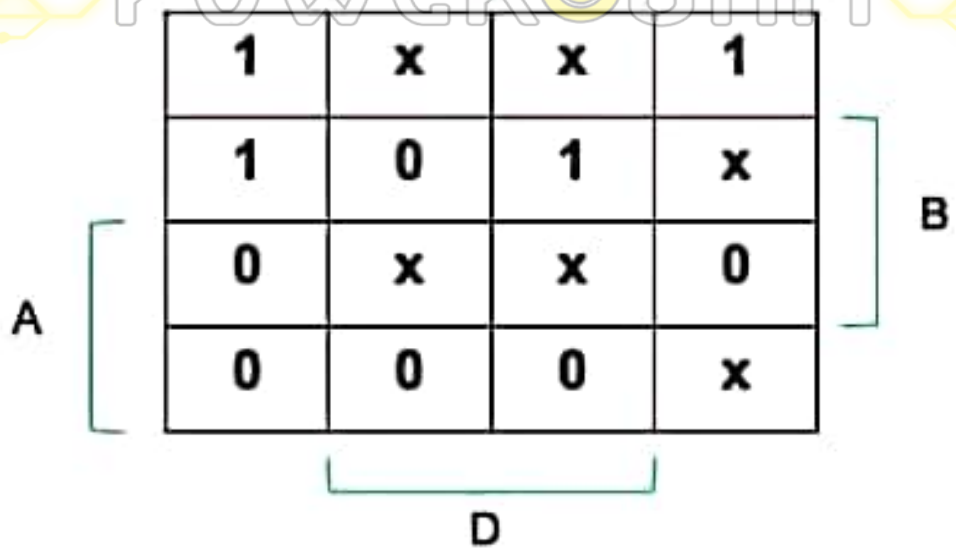
13

Which of the following expressions is implemented as a two

Given the above circuit, write F as an optimized SoP expression. * (8 Points)



- F(X,Y) = Y
- F(X,Y) = Y'
- F(X,Y) = X' Y + X Y'
- **F(X,Y) = X**
- F(X,Y) = X'
- F(X,Y) = X' Y' + X Y



- F(A,B,C,D) = A + C' D
- F(A,B,C,D) = A D' + A' C
- F(A,B,C,D) = A (C' + D)
- **F(A,B,C,D) = A' (C + D')**
- F(A,B,C,D) = (A' + C') (A + D)
- F(A,B,C,D) = A' D'

0

cannot be determined

11

Assume you have a memory that has 16777222 bits. what is the size of this memory in Megabytes (choose the most accurate answer)?
(15 Points)

2.2 Megabytes

2.0 Megabytes

16.0 Megabytes

2.1 Megabytes

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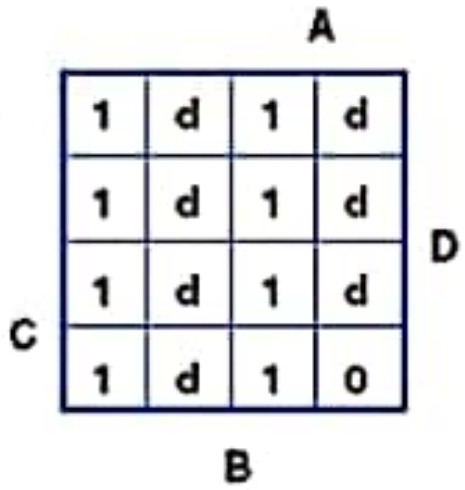
9. The most simple SOP expression which can be obtained from the K-map illustrated is:

    1. C'+ D
    2. A'+ B + C' + D
    3. A'+ B + C' + D
    4. AB + A'B'
    5. none of the above



A

7

10

What is the odd parity bit if N = 101110010110 0 ?
(10 Points)

1

0

cannot be determined

11

Assume you have a memory that has 16777222 bits. what is the size of this memory in Megabytes (choose the most accurate answer)?

Copy Share Select all

More

6

Which of the following represents the optimized SoP expression for the function F(A,B,C,D). *
(0/1 Points)

$F(A, B, C, D) = (B' + C' + D)(A + B' + D')(A' +$

- $BD + BC$
- $B' + C'D'$ ✓
- $A'B' + AB' + C'D'$
- $B' + CD'$ ✗
- $B(C + D)$

7

When encoding 150 elements using a numbering system with

(example answer: 0.4213) *
(1/1 Points)

$(0.532)_{10} = (\ldots\ldots\ldots)_7$

0.3503 ✓

10

Given the following equation, what is the value of r? *
(1/1 Points)

$(3233)_4 = (357)_r$

8 ✓

11

Which of the following functions is represented by the following K-map?
(Choose all correct answers) *
(0/1 Points)

10. The equivalent gray code for the binary code 1101 in a system that encodes 16 elements is: *
(-/1 Points)

- 1010
- 1100
- 0011
- 1011
- 1111

11. What is the BCD code of the decimal number 57? *
(-/1 Points)

- 101111
- 111101
- 00111001
- 01010111

5. Find value of the following numbers when we limit the number of the digits to the right of the decimal point to 3. Find the answer for the **round** and **truncate** scenarios
   a. $(FE.AB39)_{16}$
   b. $(FE.1568)_{16}$
   c. $(34.1314)_{8}$
   d. $(12.1235)_{16}$
   e. $(12.1235)_{10}$
   f. $(12.1235)_{8}$

3111.2

9

if N = 100000 in binary, and N = 112 in base r, then what is the value of r ?
(15 Points)

- 5
- 4
- 6
- 7

10

What is the odd parity bit if N = 10111001011002

" Back Submit " SHARE QUOTE

10

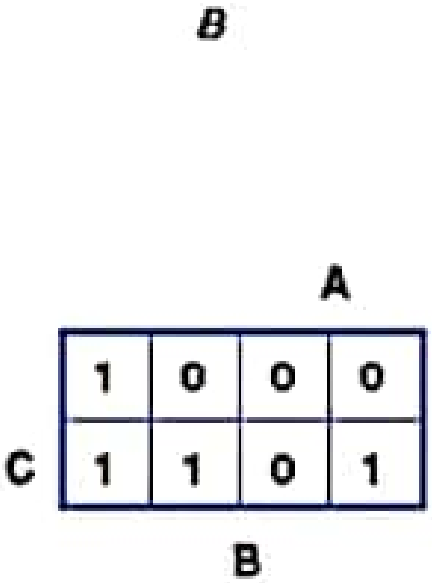
Given that F(A,B,C,D) = (A + B' + C' D') (A' + B'). Determine the gate-input cost with inverters (GN) cost? *
(8 Points)

- 12
- 13
- 14
- 15
- **16**

11

Given that F(X,Y,Z) = X ⊕ Y ⊕ Z' .

6. Identify the most simple POS expression which generates the K-map shown.
    1. (A+C')(A+B+C)
    2. (A+B)(A+C')(B+C')
    3. (A'+B')(A'+C)(B'+C)
    4. (A'+C)(A'+B'+C')
    5. (A+B)(A'+C)(B'+C)



16

Given that F(X,Y,Z) = X Y' Z + X' Z' + X'.
Select the boolean algebra theorems/identities that can be used to simplify F(X,Y,Z) in two steps to become: F(X,Y,Z) = X' + Y' Z. *
(4 Points)

- Minimization then Absorption
- Distributive Law then Simplification
- Consensus then Minimization
- Simplification then Minimization

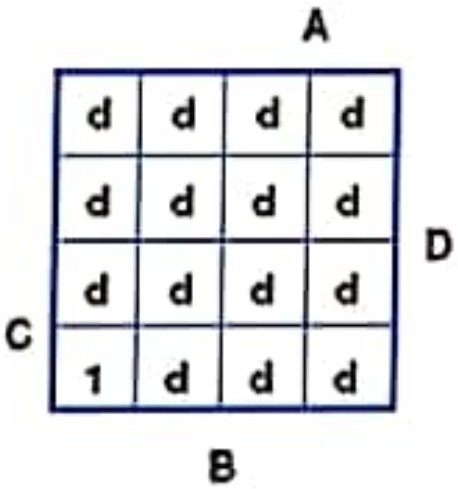
10

Given that F(A,B,C,D) = (A + B' + C' D') (A' + B'). Determine the gate-input cost with inverters (GN) cost? *
(8 Points)

- 12
- 13
- 14
- 15
- **16**

11

Given that F(X,Y,Z) = X ⊕ Y ⊕ Z' .



12. The most simple expression which can be obtained from the K-map illustrated is:

1. 1
2. 0
3. A'
4. B'D'
5. A'C

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7

10

What is the odd parity bit if N = 1011100101100 ?
(10 Points)

1

0

cannot be determined

Assume you have a memory that has 16777222 bits. what is the size of this memory in Megabytes (choose the most accurate answer)?

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11

Assume you have a memory that has 16777222 bits. what is the size of this memory in Megabytes (choose the most accurate answer)?
(15 Points)

- 2.2 Megabytes
- 2.0 Megabytes
- 16.0 Megabytes
- 2.1 Megabytes

8. What is the maximum number of elements that the octal numbers 00-47 can be used to encode? * (-/1 Points)

- 39
- 40
- 47
- 48
- 64

10. Which of the following code words has odd parity?
Choose all correct answers. *
(1 Point)

- [x] 10000
- [ ] 10001
- [x] 11001
- [ ] 00000
- [ ] 10111

8. What is the maximum number of elements that the octal numbers 00-47 can be used to encode? *
(-/1 Points)

- 39
- 40
- 47
- **48**
- 64

14

Given that the SoM expression for F(A,B,C) = m0 + m1 + m2 + m5 + m7. What is the minimal number of inverters and tri-state buffers needed to build the circuit of F? *

(8 Points)

- (●) two inverters and two tri-state buffers
- ( ) two inverters and four tri-state buffers
- ( ) three inverters and four tri-state buffers
- ( ) three inverters and two tri-state buffers

More

○ 100110

12. Which of the following code words has **odd parity**?
Choose all correct answers. *
(1 Point)

- [x] 10000
- [x] 10001
- [x] 11001
- [x] 00000
- [x] 10111

Send me an email receipt of my responses

Submit

10:00 - 11:30

8. What is the minimum number of bits in binary needed to encode 1230 items? * (1 Point)

- ○ 10 bits
- ◉ 11 bits
- ○ 12 bits
- ○ 9 bits

9. الرقم الجامعي *

- ○ 179.25, 263.1, B3.1

8. Convert the decimal number 193 to its equivalent in base 5 showing two digits to the right of the radix point. *
(1 Point)

- ◉ 133
- ○ 1333
- ○ 1133
- ○ 1233
- ○ 10133
- ○ 10233

9. When converting the hexadecimal number C02A to octal the answer is: *

- (●) 11 bits
- ( ) 12 bits
- ( ) 9 bits

7. Given N = 35 in octal, what is N in BCD ? *
(1 Point)

- ( ) 110101
- ( ) 00110101
- ( ) 01001001
- (●) 00101001

8. Convert the decimal number 193 to its equivalent in
radix point *
(1 Point)

Required

1. Convert the decimal number 193 to its equivalent in base 5 showing two digits to the right of the radix point. *
(1 Point)

- 133
- 1333
- 1133
- 1233
- 10133
- 10233

2. Given N = 35 in octal, what is N in BCD ? *

* Required

1. Given N = 35 in octal, what is N in BCD ? * 
(1 Point)

- ○ 110101
- ○ 00110101
- ◉ 01001001
- ○ 00101001

2. What is the minimum number of bits in binary needed to encode 1230 items? *
(1 Point)

6. Given that N = 26 in decimal, and N = 122 in base r, what is r ? * (1 Point)

- ○ 3
- ◉ 4
- ○ 5
- ○ 6
- ○ 7

7. Convert the number 233 which is in base 4 to binary. *

○ section 2 eng saadeh 11:30-12:30

○ section 3 Dr. Fahed 11:30 - 1:00

◉ Section 4 Dr. Fahed 10:00 - 11:30

4. Which of the following code words has odd parity? Choose all correct answers. * (1 Point)

- ☐ 10000
- ☐ 10001
- ☐ 11001
- ☐ 00000
- ☐ 10111

5. Convert the number 1AB.6 which is in base 12 to decim

- (●) 00101001

2. What is the minimum number of bits in binary needed to encode 1230 items? * (1 Point)

- ( ) 10 bits
- (●) 11 bits
- ( ) 12 bits
- ( ) 9 bits

3. Convert the decimal number 193 to its equivalent in base 5 showing two digits to the

- [x] 140052
- [ ] 144052

5. Given N = 35 in octal, what is N in BCD ? * (1 Point)

- [ ] 110101
- [ ] 00110101
- [ ] 01001001
- [ ] 00101001

6. Convert the decimal number 193 to its equivalent in base 5 showing two digits to the right of th radix point. *

Problem 3. Assume designing a display system for a weight scale. The minimum weight is 0 kilos and the maximum weight is 140 kilos and weights can only be integers (the weight range is 0, 1, 2, …, 140). **(5 points)**

a) What is the minimum number of digits required to represent the weight in binary?

b) What is the minimum number of digits required to represent the weight in octal?

c) What is the minimum number of digits required to represent the weight in BCD?

d) What is the minimum radix of a number system that can represent the weight in two digits only?

0907231 Digital Logic	First Exam	Fall 2015
5 Problems, 3 Pages	70 Minutes	November 11, 3:00 PM

الاسم: .... الرقم الجامعي: .... الشعبة: ....

Problem 1. Solve the following short problems. **(8 points)**

a) $(A5)_{16}$ is equal to (165)$_{10}$

b) $(0.712)_{8}$ is equal to (.E5)$_{16}$

.111001010

c) $(10010110)_{BCD}$ is equal to (1100000)$_{2}$

96

d) Given a binary code with 3-bit in the integer part and 2-bit in the fraction part, the maximum number of elements that can be represented using this code is ....32......

e) Assume N is a 3-digit number represented in hexadecimal. The minimum number of digits needed when representing N in BCD is ....12 digits...

f) Given $F(A,B,C) = (A+B)(\bar{C}+\bar{A}B)$. Determine $\bar{F}(A,B,C) = \sum_m(0,1,5,7)$

$\bar{F} = \bar{A}\bar{B} + \bar{A}\bar{B}\bar{B}(AC+AB)$

g) Given $F(A,B,C) = A + B(A+C) + \bar{A}B$. The simplest SOP form of F is ....A+B....

h) Given $F(A,B,C) = \sum_m(1,4,5)$. The simplest POS form of F is ....$\bar{B}(A+C)$....

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

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

$\bar{F} = \bar{A}\bar{B} + AC + \bar{B}C$

g) $A + AB + BC + \bar{A}B$

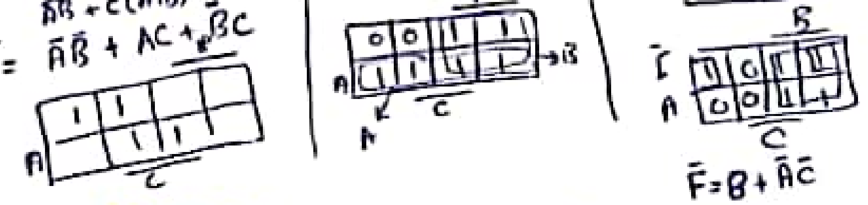
$A + BC + \bar{A}B$

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

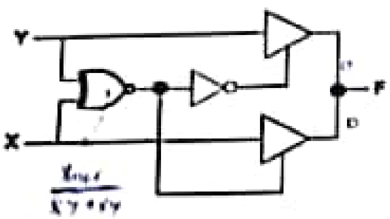
$\bar{B}(A+C)$

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

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



Problem 2. Write the truth table for the following circuits **(4 points)**



Z	X	Y	F
0	0	0	0
1 0	0	1	0
10	1	0	01
0	1	1	01

10. The equivalent gray code for the binary code 1101 in a system that encodes 16 elements is: *
(1/1 Points)

- 1010
- 1100
- 0011
- 1011 ✓
- 1111

14052

5. Given N = 35 in octal, what is N in BCD ? *
(1 Point)

110101

00110101

01001001

00101001

6. Convert the decimal number 193 to its equivalent in base 5 showing two digits to the right

5. Find value of the following numbers when we limit the number of the digits to the right of the decimal point to 3. Find the answer for the **round** and **truncate** scenarios
    a. $(FE.AB39)_{16}$
    b. $(FE.1568)_{16}$
    c. $(34.1314)_{8}$
    d. $(12.1235)_{16}$
    e. $(12.1235)_{10}$
    f. $(12.1235)_{8}$

4. Perform the following binary/octal/hexadecimal conversions
   a. $(2460.573)_8 = ?_2 = ?_{16}$
   b. $(ACE.FED)_{16} = ?_2 = ?_8$

5. Find value of the following numbers when we limit the number of the digits to the right of the decimal point to 3. Find the answer for the **round** and **truncate** scenarios
   a. $(FE.AB39)_{16}$
   b. $(FE.1568)_{16}$
   c. $(34.1314)_8$
   d. $(12.1235)_{16}$
   e. $(12.1235)_{10}$
   f. $(12.1235)_8$

6. Convert the following decimal numbers using the division and multiplication method.
   a. $(97.8125)_{10} = ?_2$

(1100 1011 0011) Excess3=()10

11. Find the equivalent code for the following decimal number

a. $(1315)_{10}=(?)_{BCD}$

b. $(9759)_{10}=(?)_{Excess3}$

c. $(15)_{10}=(?)_{8,4,-2,-1}$

I. 1010 ✓ II. 1110 III. 1001 IV. 0110 ✗ V. None

h) If the value of the parity bit for the code word (101101110111 1) is 1. The type of the used parity is.... odd .....

i) The *Dual* for the function $F = (A + \bar{D}).BC + \bar{A}\bar{B} + C$ is:

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

j) Given $F(A, B, C) = (\bar{A}C + \bar{B})(\bar{B} + \bar{C})$ → ((A + $\bar{C}$) . B) + (B . C)

Determine $F(A, B, C) = \Sigma_m$ (2, 3, 6, 7)

A	B	C	F
0	0	0	0 →
0	0	1	0
0	1	0	1

8. What is the maximum number of elements that the octal numbers 00-47 can be used to encode? *

(-/1 Points)

- 49
- 50
- 47
- 48
- 64

9. What is the minimum number of bits required in order to encode 1000 elements? *

(-/1 Points)

- 7
- 9
- 8
- 10
- 11

10. The equivalent gray code for the binary code 1101 in a system that encodes 16 elements is: *

5 Problems, 3 Pages	70 Minutes	November 11, 3:00 PM
الشعبة:	الرقم الجامعي:	الاسم :

Problem 1. Solve the following short problems. **(8 points)**

a) $(A5)_{16}$ is equal to ( )$_{10}$

b) $(0.712)_8$ is equal to ( )$_{16}$

c) $(10010110)_{BCD}$ is equal to ( )$_2$

d) Given a binary code with 3-bit in the integer part and 2-bit in the fraction part, the maximum number of elements that can be represented using this code is .....

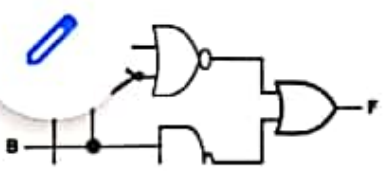
e) Assume N is a 3-digit number represented in hexadecimal. The minimum number of digits needed when representing N in BCD is .....

f) Given $F(A,B,C) = (A+B)(\bar{C}+\bar{A}B)$. Determine $\bar{F}(A,B,C) = \sum_m($)

g) Given $F(A,B,C) = A + B(A+C) + \bar{A}B$. The simplest SOP form of F is .....

h) Given $F(A,B,C) = \sum_m(1,4,5)$. The simplest POS form of F is .....

Problem 2. Write the truth table for the following circuits **(2 points)**



A	B	F
0	0	
0	1	
1	0	

5. Find value of the following numbers when we limit the number of the digits to the right of the decimal point to 3. Find the answer for the **round** and **truncate** scenarios
    a. $(FE.AB39)_{16}$
    b. $(FE.1568)_{16}$
    c. $(34.1314)_{8}$
    d. $(12.1235)_{16}$
    e. $(12.1235)_{10}$
    f. $(12.1235)_{8}$

Chapter_1_Practice_problems_

1. Perform the following number system conversions.
   a. $(1100101.1011)_2 = ?_{10}$
   b. $(1A9.D)_{16} = ?_{10}$
   c. $(617)_8 = ?_{10}$
   d. $(1011)_{10} = ?_2$
   e. $(1100101.1011)_2 = ?_8 = ?_{16}$
   f. $(1A9.D)_{16} = ?_8 = ?_2$
   g. $(617)_8 = ?_{16} = ?_2$
   h. $(110)_{16} = ?_{10} = ?_2$

2. Find the base (radix) of the following numbers given their decimal equivalents.
   a. $(35)_x = (26)_{10}$
   b. $(1A5)_x = (269)_{10}$

3. How many bits are required to represent the following numbers in binary:
   a. A 3-decimal digit pin code
   b. The number of days in a year

4. Perform the following binary/octal/hexadecimal conversions
   a. $(2460.573)_8 = ?_2 = ?_{16}$
   b. $(ACE.FED)_{16} = ?_2 = ?_8$

5. Find value of the following numbers when we limit the number of the of the decimal point to 3. Find the answer for the **round** and **truncate**
   a. $(FE.AB39)_{16}$
   b. $(FE.1568)_{16}$
   c. $(34.1314)_8$
   d. $(12.1235)_{16}$
   e. $(12.1235)_{10}$
   f. $(12.1235)_8$

6. Convert the following decimal numbers using the division and multiplication method.
   a. $(97.8125)_{10} = ?_2$

expression for function M.

4. Prove the following Boolean expressions using algebraic manipulation

   a. ABC' + BC'D' + BC + C'D = B + C'D
   b. AD' + A'B + C'D + B'C = (A' + B' + C' + D')(A + B + C + D)

6. Convert the following decimal numbers using the division and multiplication method.
   a. $(97.8125)_{10} = ?_2$

   b. $(1337.625)_{10} = ?_8$
   c. $(61.64)_{10} = ?_5$

7. Answer the following question regarding ASCII codes
   a. What is the range of letters a-z in ASCII
   b. What is the range of letters A-Z in ASCII
   c. What bit position in an ASCII code must be complemented to change the ASCII letter represented from the uppercase to lower case and vice versa.
8. Base 20 has been historically used for number systems
   a. Write the digits for the base 20 numbers
   b. Convert $(BCI.G)_{20}$ to decimal

9. Find the parity bit for the following numbers:
   a. $(10111011101)_2$ Even Parity→____ Odd Parity → ____
   b. $(BCD)_{16}$ Even Parity→____ Odd Parity → ____
   c. $(755)_8$ Even Parity→____ Odd Parity → ____

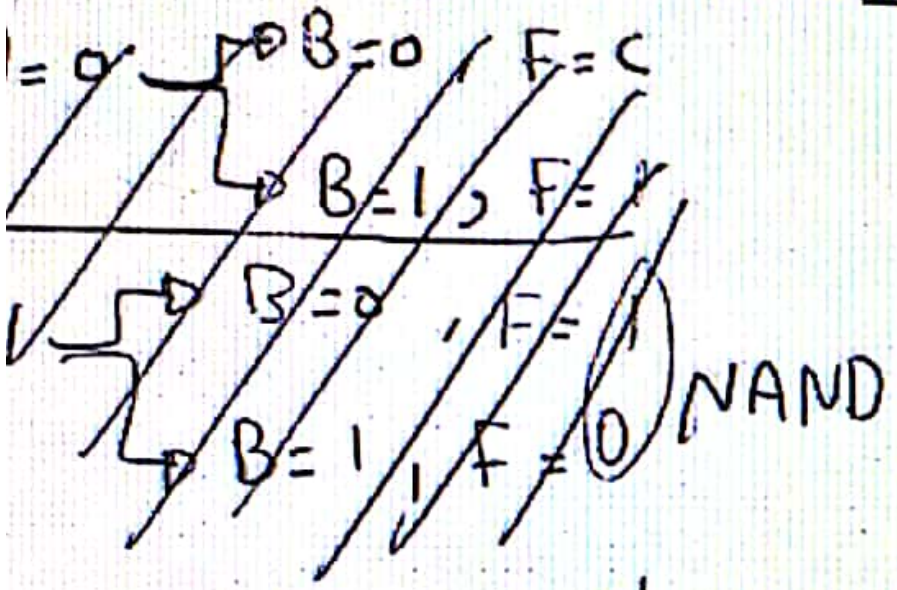
10. What is the equivalent decimal number for the following codes
   a. $(0101\ 1000\ 0011)_{Excess3} = ()_{10}$
   b. $(1100\ 1011\ 0011)_{Excess3}$-$()_{10}$

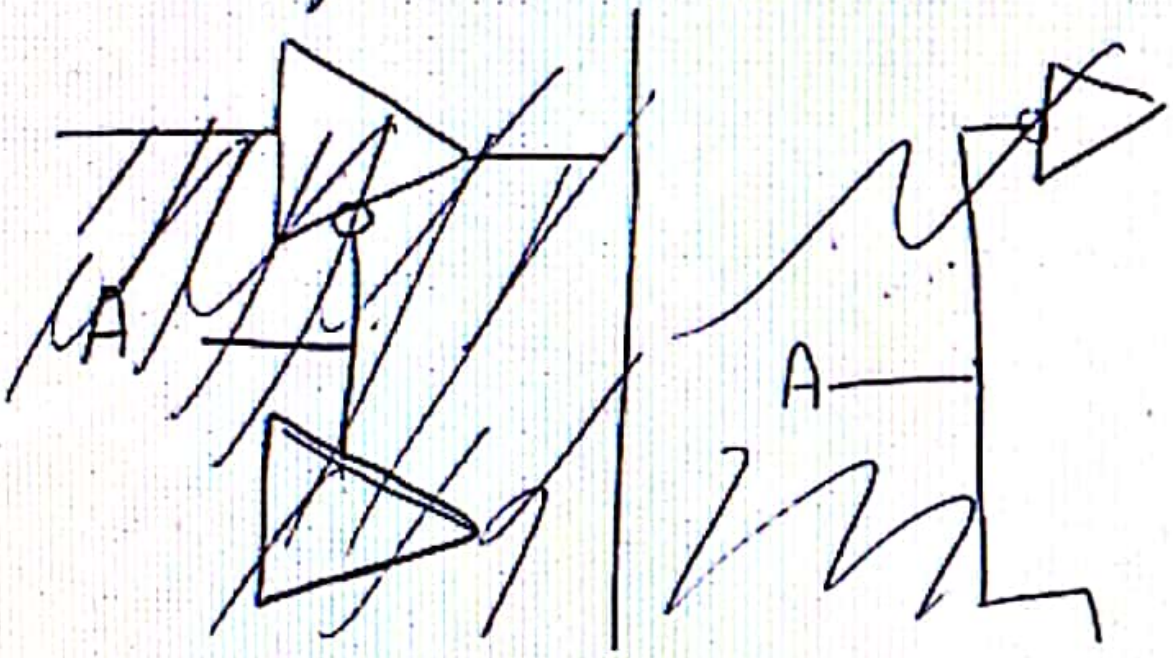
11. Find the equivalent code for the following decimal number
   a. $(1315)_{10}=(?)_{BCD}$
   b. $(9759)_{10}=(?)_{Excess3}$
   c. $(15)_{10}=(?)_{8,4,-2,-1}$

Problem 3. The following table is the truth table for F(A,B,C). Draw the implementation of the function using *only* ***two*** Tri-state buffers and ***any number*** of 2-input NAND gates.

(3 points)

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0





0,1 ⇒ 1

NOR ⇒ NAND

b) $(43.84)_{10}$ is equal to ( )$_5$

c) $(472.163)_8$ is equal to ( )$_{16}$

d) $(01100011)_{BCD}$ is equal to ( )$_8$

e) $(1110)_3$ is equal to ( )$_2$

1

---

f) If the total number of parking spots at the University of Jordan is 530. What is the ***minimum*** number of digits needed to assign each parking spot a unique code in the numbering system of base 6 (i.e. radix = 6): .....

g) If A, B, and C are three ***consecutive*** gray codes. A= 1011 and C=1110. Which of the following codes is a valid value for B:

I. 1010 II. 1110 III. 1001 IV. 0110 V. None

h) If the value of the parity bit for the code word (1011011101111) is 1. The type of the used parity is.....

i) The ***Dual*** for the function $F = (A + \bar{D}).BC + \bar{A}\bar{B} + C$ is:

.....

j) Given $F(A,B,C) = (\bar{A}C + \bar{B})(\bar{B} + \bar{C})$

Determine F(A,B,C) = $\sum_m$ ( )

8. What is the maximum number of elements that the octal numbers 00-47 can be used to encode? *

(-/1 Points)

- 39
- 40
- 47
- 48
- 64

9. What is the minimum number of bits required in order to encode 1000 elements? *
(-/1 Points)

- 7
- 8
- 9
- 10
- 11

10. The equivalent gray code for the binary code 1101 in a system that encodes 16 elements is: *
(-/1 Points)

Given the following equation, what is the value of r?

$(11.4)_{16}=(101.1)_r$

- a. 2
- b. 6
- c. 5
- d. 4

Which of these statements is **False**, if the domain for all variables consists of all integers.

a. $\exists n \exists m(n + m = 4 \wedge n - m = 2)$

b. $\exists n \forall m(n < m^2)$

c. $\exists n \forall m(nm = m)$

d. $\exists m \forall n(n^2 < m)$

Digital Logic (CPE 231)

Chapter 1 Practice Problems

1. Perform the following number system conversions.
   a. $(1100101.1011)_2 = ?_{10}$
   b. $(1A9.D)_{16} = ?_{10}$
   c. $(617)_8 = ?_{10}$
   d. $(1011)_{10} = ?_2$
   e. $(1100101.1011)_2 = ?_8 = ?_{16}$
   f. $(1A9.D)_{16} = ?_8 = ?_2$
   g. $(617)_8 = ?_{16} = ?_2$
   h. $(110)_{16} = ?_{10} = ?_2$

2. Find the base (radix) of the following numbers given their decimal equivalents.
   a. $(35)_x = (26)_{10}$
   b. $(1A5)_x = (269)_{10}$

3. How many bits are required to represent the following numbers in binary:
   a. A 3-decimal digit pin code
   b. The number of days in a year

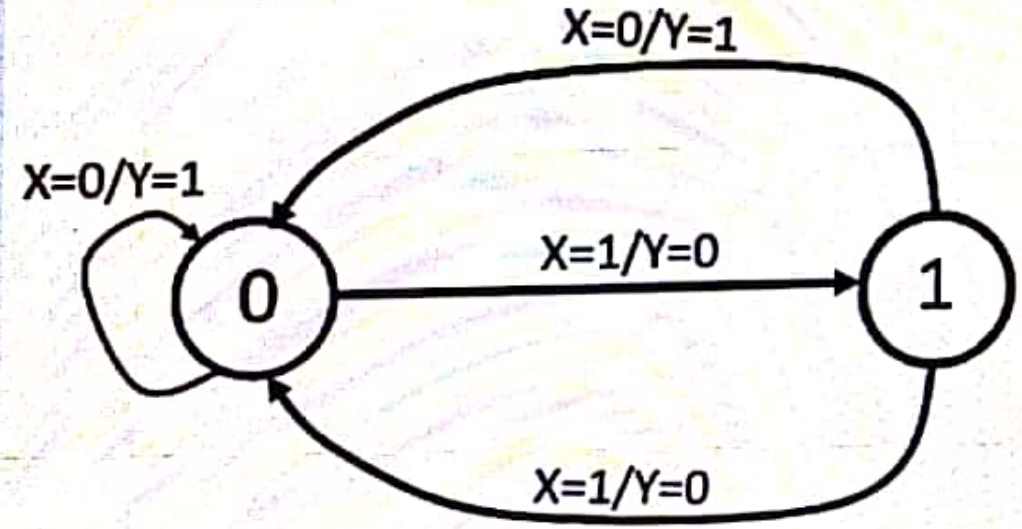
4. Perform the following binary/octal/hexadecimal conversions
   a. $(2460.573)_8 = ?_2 = ?_{16}$
   b. $(ACE.FED)_{16} = ?_2 = ?_8$

5. Find value of the following numbers when we limit the number of the digits to the right of the decimal point to 3. Find the answer for the **round** and **truncate** scenarios
   a. $(FE.AB39)_{16}$
   b. $(FE.1568)_{16}$
   c. $(34.1314)_8$
   d. $(12.1235)_{16}$
   e. $(12.1235)_{10}$
   f. $(12.1235)_8$

6. Convert the following decimal numbers using the division and multiplication method.
   a. $(97.8125)_{10} = ?_2$

   b. $(1337.625)_{10} = ?_8$
   c. $(61.64)_{10} = ?_5$

Consider the below state diagram of a sequential circuit and answer the below questions.



a. What is the output equation of Y? X'

b. Assuming we are using a JK flip-flop in the circuit, what is the input equation of J? X

c. Assuming we are using a JK flip-flop in the circuit, what is the input equation of k? 1

d. Assuming we are using a D flip-flop in the circuit, what is the input equation of D? A' X

Next p

What is the GN cost for the below expression? Note: do not simplify.

$W' (X' + Y Z' + Y')$

- a. 11
- b. 8
- c. 12
- d. 9
- e. 10

For a function $F(X,Y,Z) = X'Y'Z' + XY'Z + X'YZ + XYZ'$, which one of the following statements is invalid?

- a. $F(X,Y,Z) = \sum_m (0,5,3,6)$
- b. $F'(X,Y,Z) = \pi_M (0,5,3,6)$
- c. $F(X,Y,Z) = \pi_M (1,2,4,7)$
- d. $F'(X,Y,Z) = \sum_m (0,5,3,6)$

DIGITAL LOGIC/جميع الشعب

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Time le

Question 13

Not yet answered

Marked out of 3.00

Flag question

Let N = 101110 and M = 010101

Assuming signed 2s complement form, What is the overflow bit when computing N – M ? 1

Assuming signed 2s complement form, What is the overflow bit when computing N + M ? 1

Assuming unsigned representation, What is the overflow bit when computing N + M ? 0

Question 14

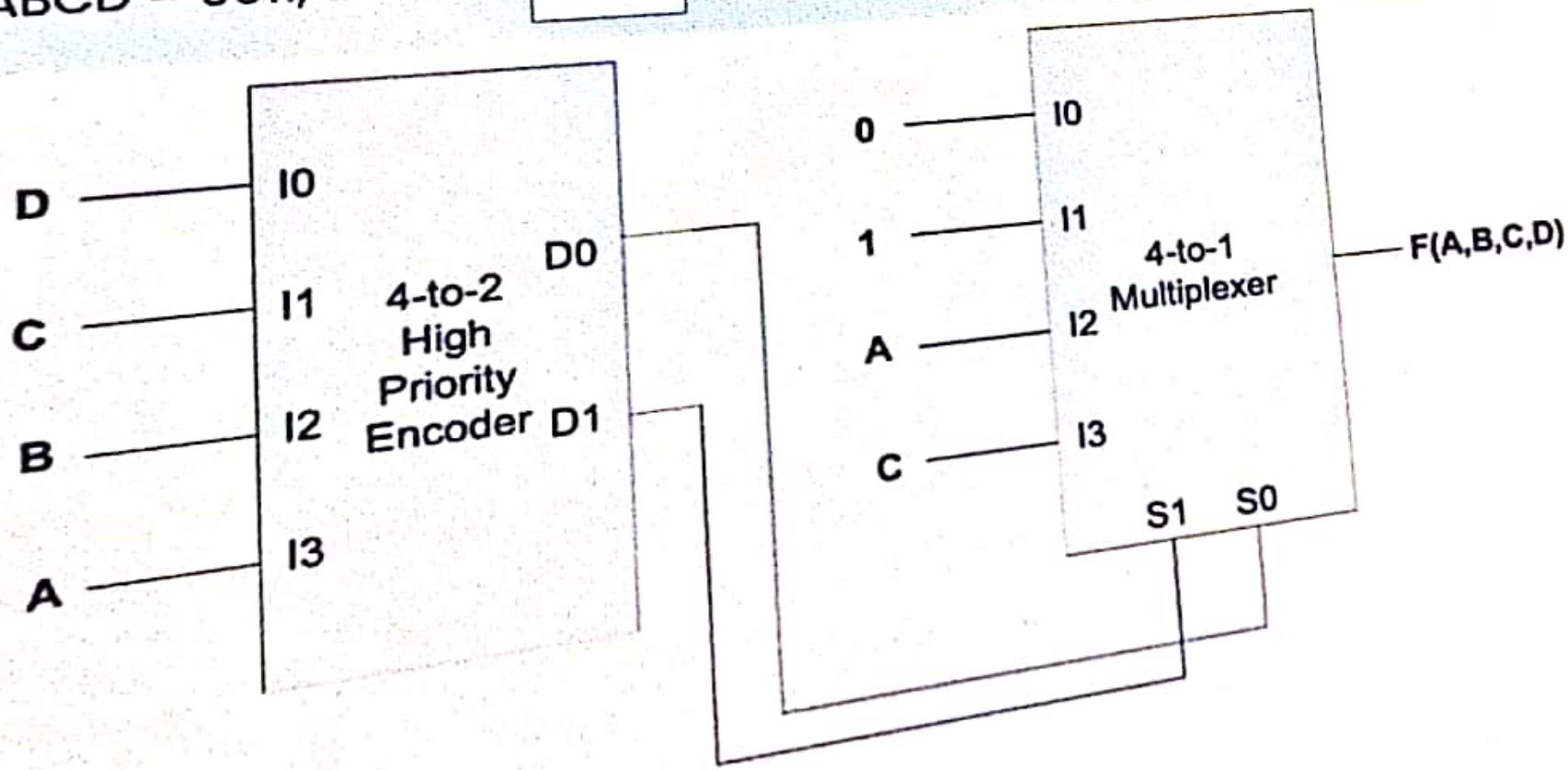
Given the below circuit:

F = 1

Given the below circuit:

If ABCD = 1010, then F = 1

If ABCD = 0011, then F = 1



Let N = - 20.

Assuming we are using seven bits, what is N in the following number representations?

N in sign-magnitude representation is 1010100

N in 2s complement representation is 1101100

N in 1s complement representation is 1101011

Consider the below state diagram of a sequential circuit.

Present State A	Inputs X	Y	Next State A+	Output y
0	0	0	0	1
0	0	1	1	1
0	1	0	0	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	1	0
1	1	1	0	0

a. Is the sequential circuit Moore or Mealy? Moore

b. Assuming we are using a T flip-flop, what is the input equation of T? X' Y + A Y

Question 18

Not yet answered

Marked out of 3.00

Flag question

Consider the below state diagram of a sequential circuit.

Present State A	Inputs X	Y	Next State A+	Output Y
0	0	0	0	1
0	0	1	1	1
0	1	0	0	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	1	0
1	1	1	0	0

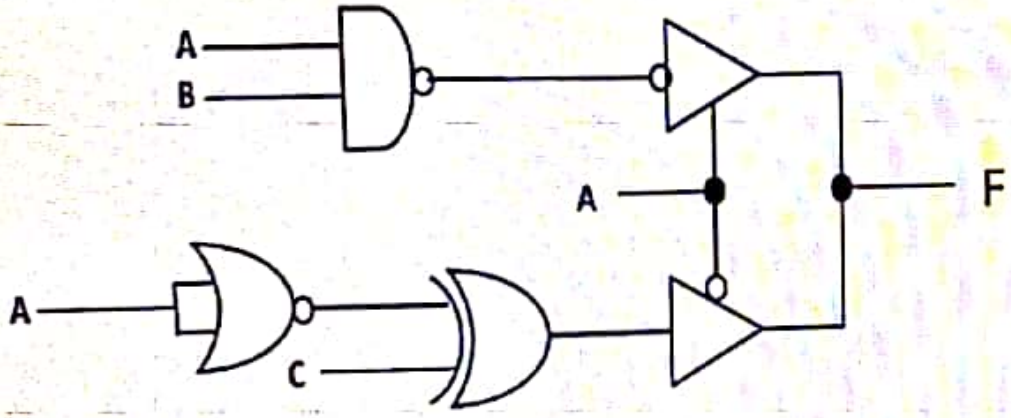
a. Is the sequential circuit Moore or Mealy? Moore ÷

b. Assuming we are using a T flip-flop, what is the input equation of T? $X'Y + AY$ ÷

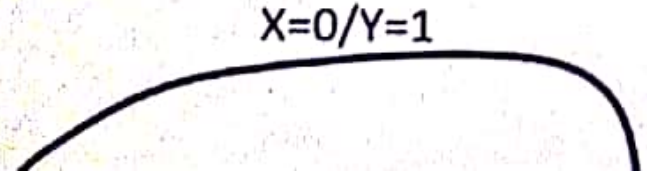
Given the below circuit:

If ABC = 010, then F= 1

If ABC = 101, then F = 0



Consider the below state diagram of a sequential circuit and answer the below questions.

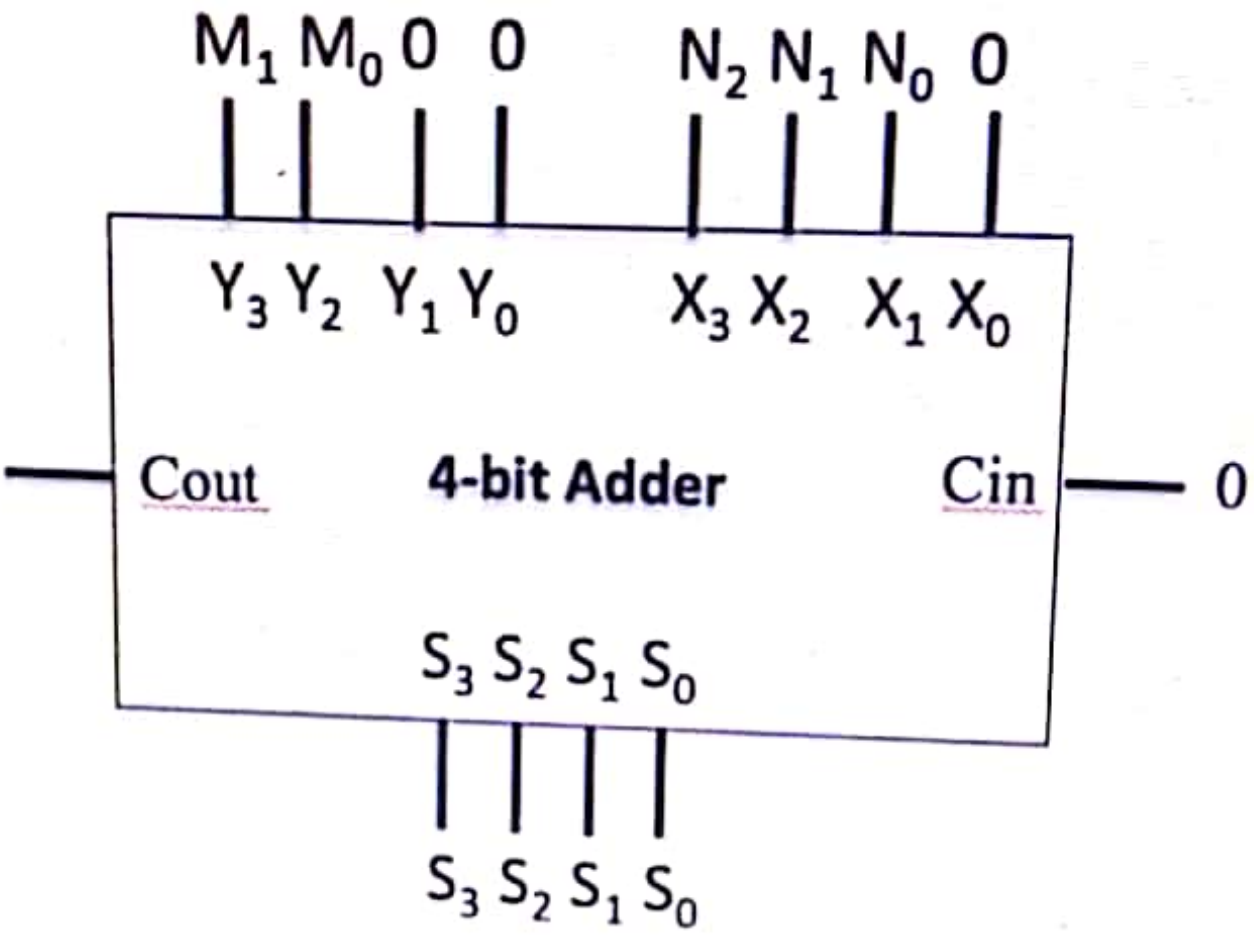


A 1-to-8 Demultiplexer can also be used as

- a. 8-to-1 Multiplexer
- b. 3-to-8 regular Decoder
- c. 8-to-3 Encoder
- d. 3-to-8 Decoder with enable

Assume N, M and S are 4-bit unsigned numbers.

Which operation is computed by the following circui



- i. $S = M + 2 * N$
- ii. None of the answers is correct
- iii. $S = 2 * M + 2 * N$
- iv. $S = 2 * M + N$
- v. $S = 4 * M + 2 * N$
- vi. $S = 2 * M + 4 * N$
- vii. $S = 4 * M + 4 * N$

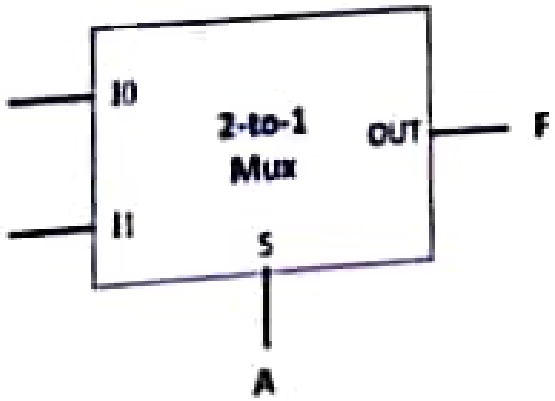
We want to implement the below function using the 2:1 MUX shown in below. Note that the selection line has bee

connected to A.

What should be connected to I0 ? B ⊙ C ÷

What should be connected to I1 ? C' ÷

A	B	C	F
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0



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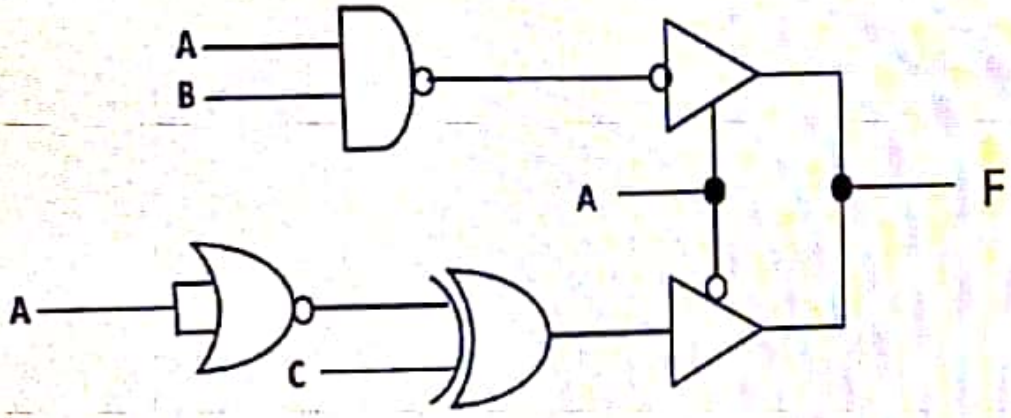

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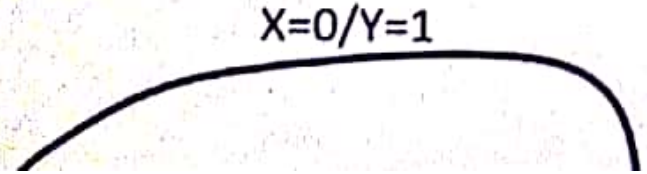

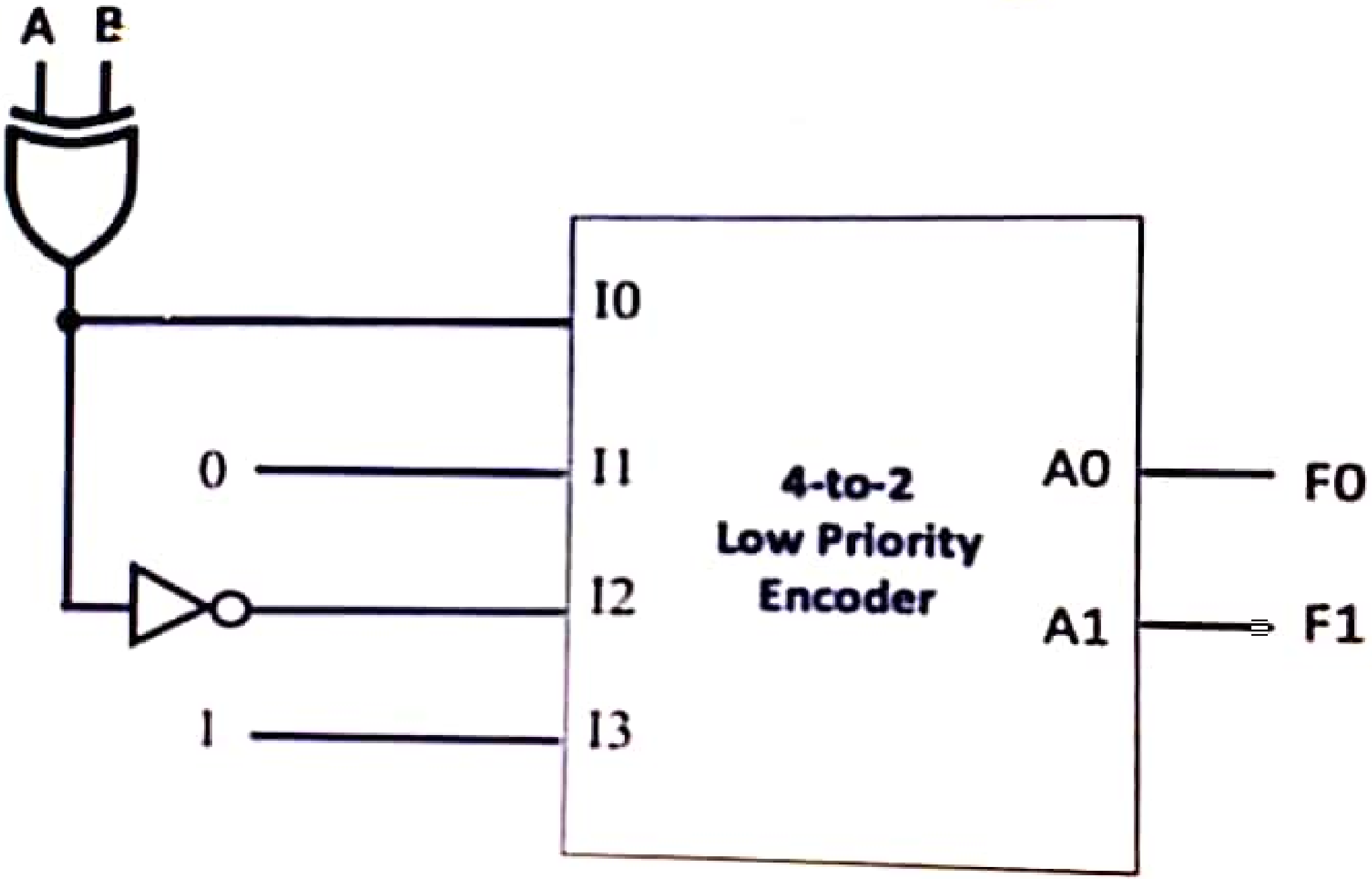

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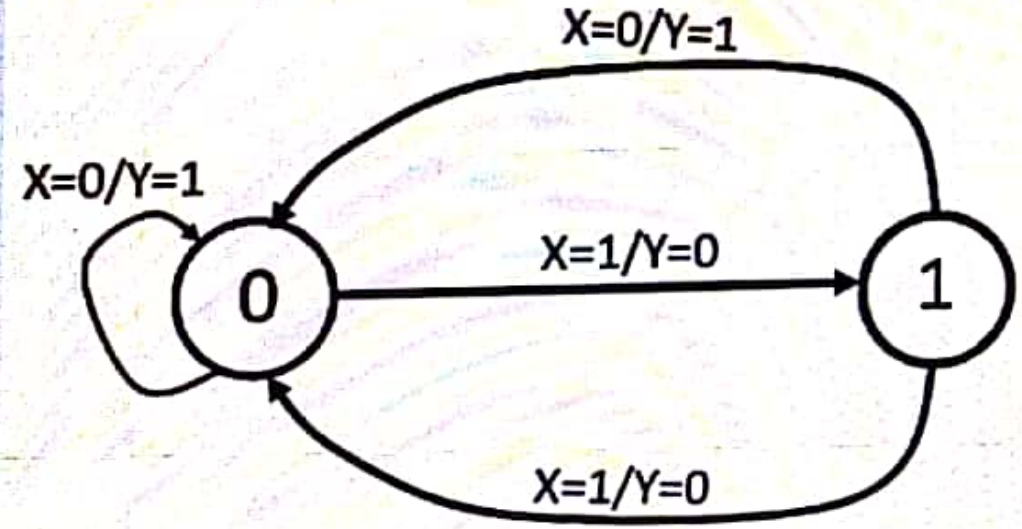


a. What is the output equation of Y? X'

b. Assuming we are using a JK flip-flop in the circuit, what is the input equation of J? X

c. Assuming we are using a JK flip-flop in the circuit, what is the input equation of k? 1

d. Assuming we are using a D flip-flop in the circuit, what is the input equation of D? A' X

Next p

Assuming 8-bit signed 2s complement representation, what is the result of the following operation?

11001100 - 01110001 = 01011011

Does an overflow occur? yes

Which of the following can be built using only three 4-input OR gates?

- a. None of the answers is correct
- b. 2-to-4 Decoder
- c. 4-to-2 Encoder
- d. 4-to-16 Decoder
- e. 8-to-3 Encoder

Clear my choice

An 4-to-1 multiplexer has inputs A, and B connected to the selection inputs S1 and S0, respectively. The data inputs I0 through I3, are as follows:

I0 = 0, I1 =1; I2 =C' , I3 =C , The Boolean function that the multiplexer implements is:

a. $F = \Sigma\, m\ (2, 3, 4, 7)$

b. $F = \Sigma\, m\ (0, 4, 5, 6, 7)$

c. $F = \Sigma\, m\ (0, 1, 5, 6)$

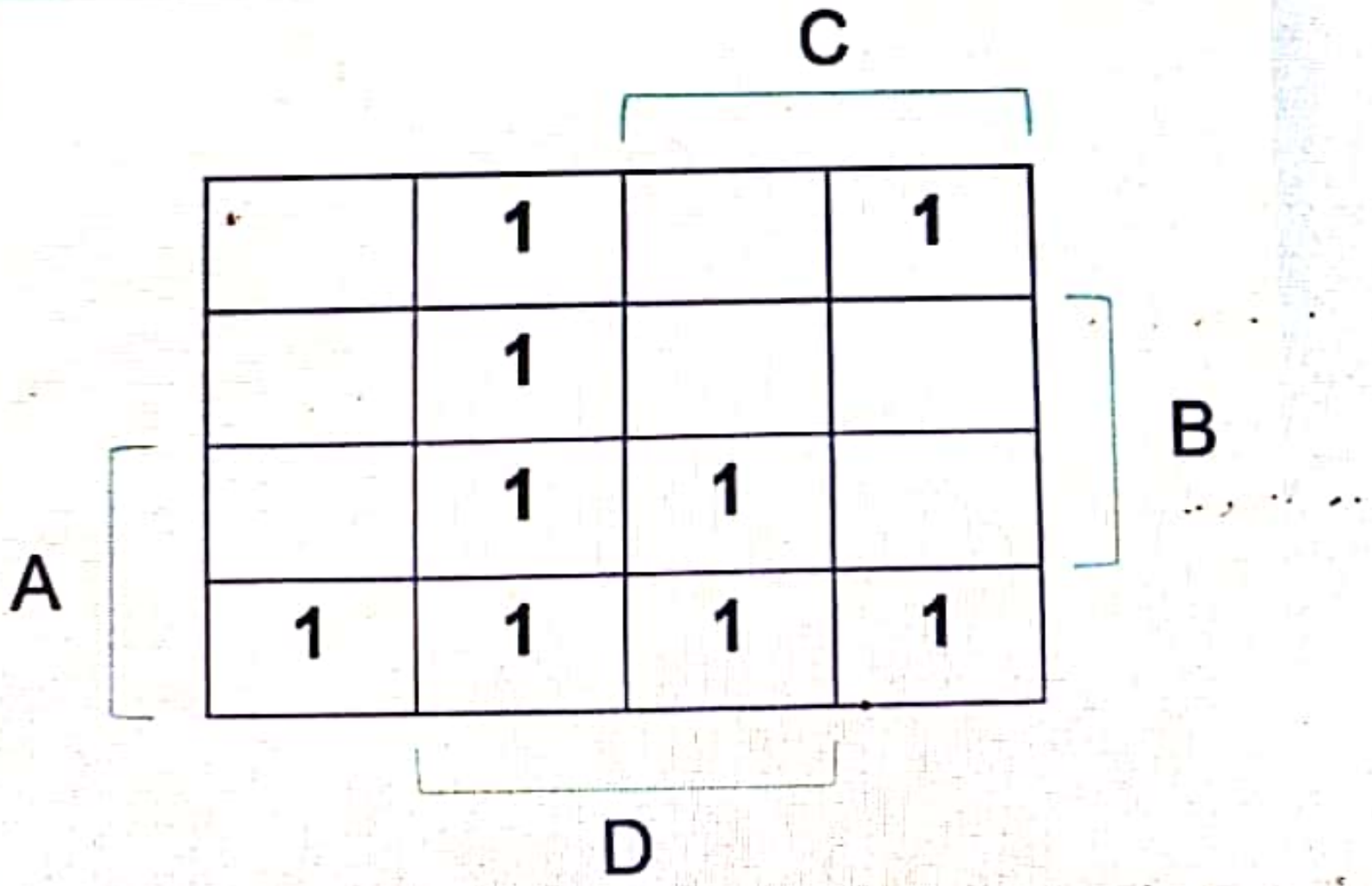
d. $F = \Sigma\, m\ (2, 3, 5, 6)$

Clear my choice

Given the below k-map of the function F(A,B,C,D)

what is the number of prime implicant? 4

what is the number of essential prime implicant? 4



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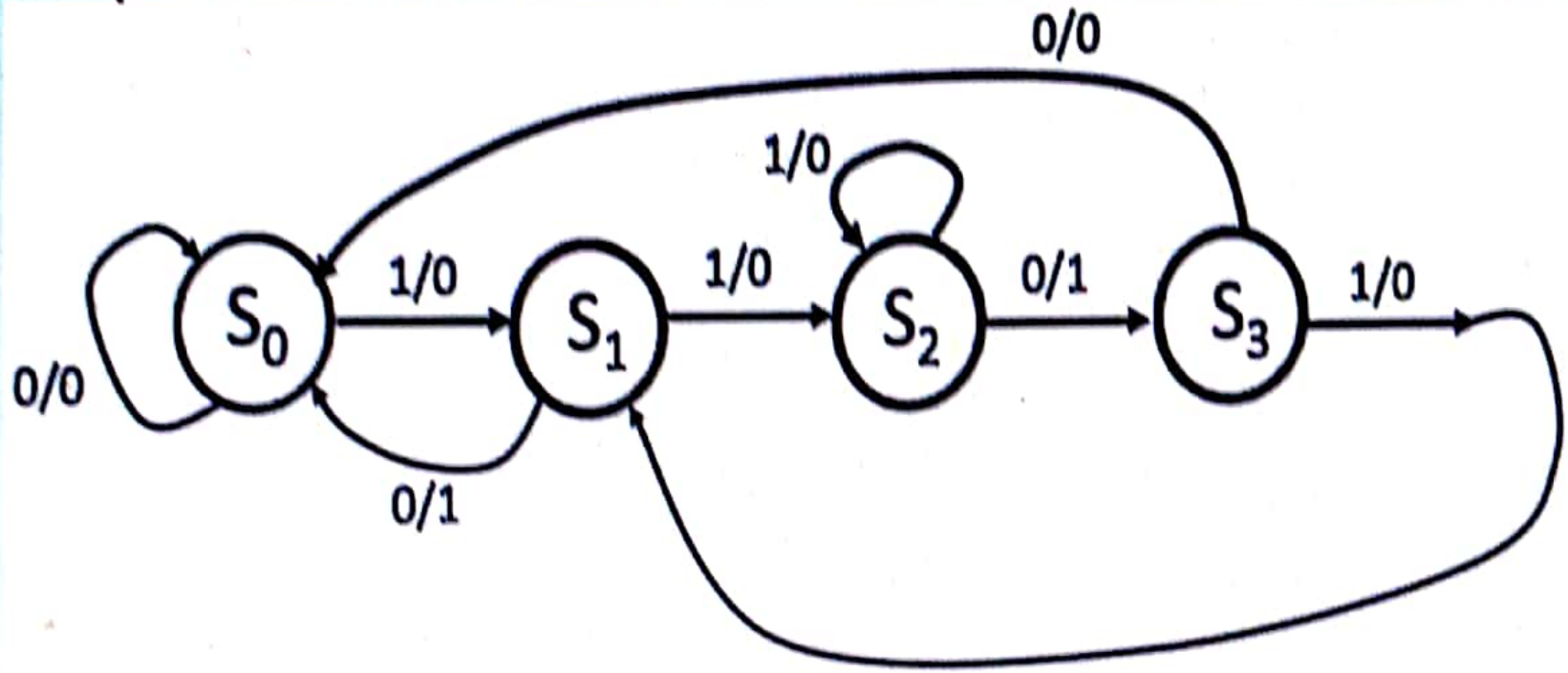
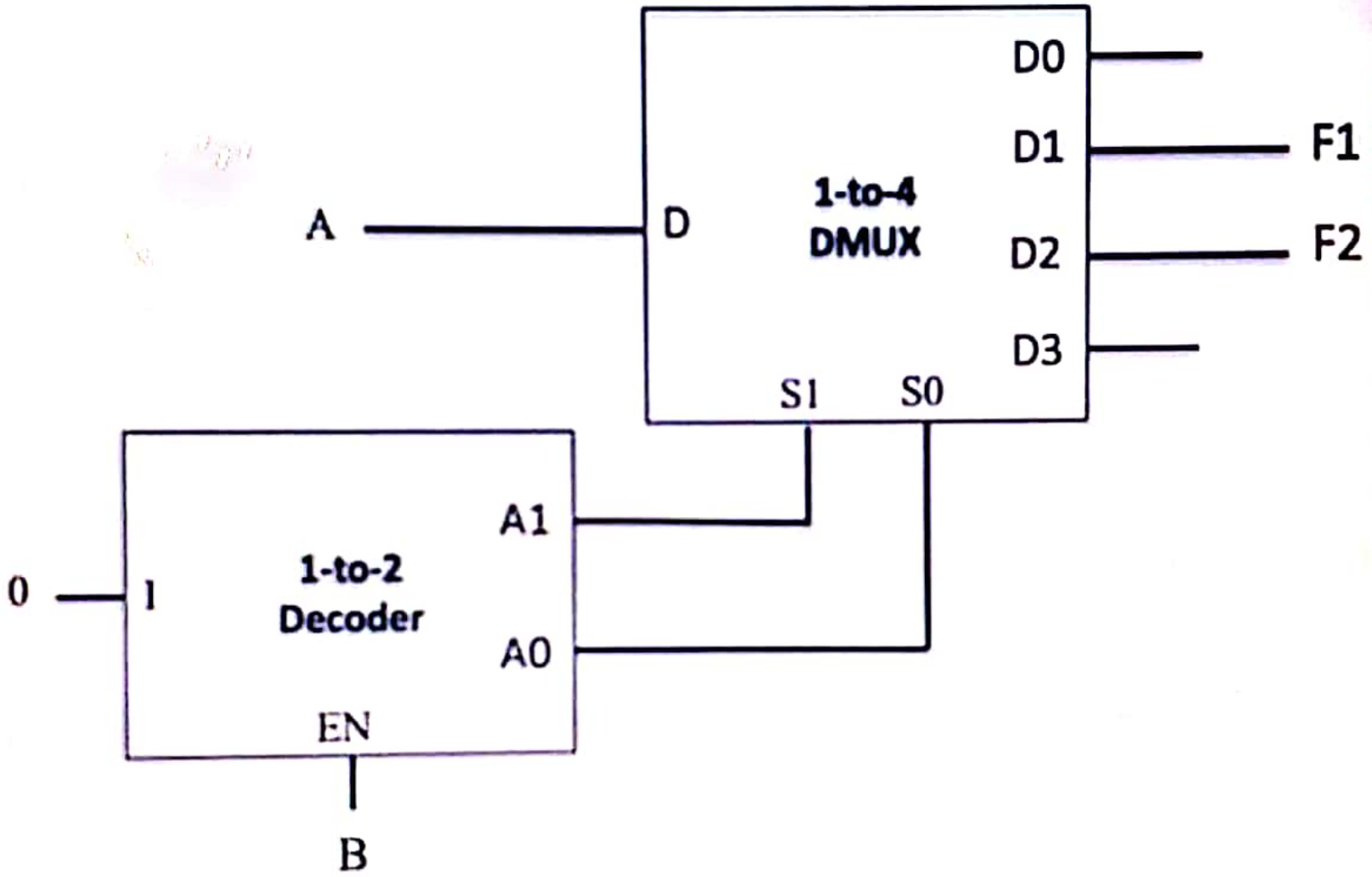


a. Are states S1 and S_2 equivalent ? no

b. Are states S_0 and S_3 equivalent ? yes



Given the above circuit, what are the equations of F1 and F2 ?

i. F1 = A B , F2 = 0

ii. F1 = A , F2 = 0