IN1006 Systems Architecture (PRD1 A 2022/23)

Started on	Thursday, 17 November 2022, 4:31 PM
State	Finished
Completed on	Thursday, 17 November 2022, 4:41 PM
Time taken	10 mins 18 secs
Grade	**10.00** out of 10.00 (**100**%)

Question **1**

Correct

Mark 1.00 out of 1.00

Which of the following equations correctly reflects the truth table shown below? A, B and C are inputs and F is the output.

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

Select one:
- a. Don't know/no answer
- b. None of these expressions
- ● c. $F = A'B'C + A'BC' + AB'C + ABC$ ✔
- d. $F = A'B'C' + A'BC + AB'C' + ABC'$
- e. $F = A'B'C' + A'B'C + AB'C' + ABC'$
- f. $F = (A'B'C + A'BC' + AB'C + A'B'C + ABC)'$

Your answer is correct.

The F output is given as a sum-of-products expression where each product (AND) should correspond to a row where F = 1.

The correct answer is: $F = A'B'C + A'BC' + AB'C + ABC$

Which of the following equations correctly reflects the truth table shown below? A,B and C are inputs and F is the output.

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

Select one:

- a. None of these expressions
- b. F = (AB'C + A'BC' + A'BC' + A'B'C + A'B'C')'
- c. F = A'BC' + A'BC + AB'C' + ABC' + ABC ✔
- d. F = (A'BC ' + A'BC + AB'C' + ABC' + ABC)'
- e. F = AB'C + A'BC' + A'BC' + A'B'C + A'B'C'
- f. Don't know/no answer

Your answer is correct.

The F output is given as a sum-of-products expression where each product (AND) should correspond to a row where F = 1.

The correct answer is: F = A'BC' + A'BC + AB'C' + ABC' + ABC

Which of the following statements is *the most accurate* description for the sum-of-products expression below?

$$F = A'B'C + A'BC' + AB'C'$$

Select one:

- a. Don't know/no answer
- b. The truth table has three rows where F = 1 and C must be one to return one.
- c. The truth table has four rows where F = 1 and no more than two zeros must be in the inputs to return one.
- d. The truth table has three rows where F =1, and no zeros need to be in the inputs to return one.
- e. The truth table has two rows where F = 1 and C must be zero to return one.
- f. The truth table has three rows where F = 1 and no more than two zeros must be in the inputs to return one. ✔

The number of OR-ed terms above specifies the number of input cases that lead to a true expression (rows of truth table that give F = 1). Each of the barred variables shows where the input needs to be zero for that input case.

The correct answer is: The truth table has three rows where F = 1 and no more than two zeros must be in the inputs to return one.

What is the effect of a bitwise-XOR operation on the following 12-bit words: 1000 1010 1101, 0110 1110 0101?

Select one:

- a.   0000 1100 0101
- ◉ b.   1110 0100 1000 ✔
- c.   0001 0001 0010
- d.   Don't know/no answer
- e.   1111 0011 1010
- f.   1110 1110 1101

The XOR operation is applied to each of the pairs of bits at the same position in each word, moving from left to right.
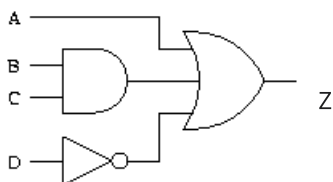
The correct answer is: 1110 0100 1000

Which of the following is the correct Boolean expression for the logic circuit below (with output Z).

Select one:

- a.   Z = A' + (BC) + D'
- b.   Don't know/no answer
- ◉ c.   Z = A + (B•C) + D' ✔
- d.   Z= A + (BC) + D
- e.   Z = A + (B+C)D'

Input D feeds directly into a NOT gate so is inverted to D'. Inputs B and C are AND-ed together. Then all are OR-ed together with A to give the expression:

$$Z = A + (BC) + D'.$$

The correct answer is: Z = A + (B•C) + D'

Which of the following equations correctly reflects the truth table shown below? A, B and C are inputs and F is the output.

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

Select one:

- a. Don't know/no answer
- b. F = A'B'C' + A'BC + AB'C' + ABC'
- c. None of these expressions
- d. F = A'B'C + A'BC' + AB'C + ABC ✔
- e. F = (A'B'C + A'BC' + AB'C + A'B'C + ABC)'
- f. F = A'B'C ' + A'B'C + AB'C' + ABC'

The F output is given as a sum-of-products expression where each product (AND) should correspond to a row where F = 1.

The correct answer is: F = A'B'C + A'BC' + AB'C + ABC

What is the effect of a bitwise-OR operation on the following 12-bit words: 1000 1010 1101, 0110 1110 0101?

Select one:

- a. 1111 0011 1010
- b. 1110 0100 1000
- c. Don't know/no answer
- d. 0001 0001 0010
- e. 1110 1110 1101 ✔
- f. 0000 1100 0101

The OR operation is applied to each of the pairs of bits at the same position in each word, moving from left to right.

The correct answer is: 1110 1110 1101

Which of the following equations correctly reflects the truth table shown below? A,B and C are inputs and F is the output.

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

Select one:

- a. F = A'BC' + A'BC + AB'C' + ABC' + ABC ✔
- b. F = AB'C + A'BC' + A'BC' + A'B'C + A'B'C'
- c. Don't know/no answer
- d. None of these expressions
- e. F = (AB'C + A'BC' + A'BC' + A'B'C + A'B'C')'
- f. F = (A'BC ' + A'BC + AB'C' + ABC' + ABC)'

The F output is given as a sum-of-products expression where each product (AND) should correspond to a row where F = 1.

The correct answer is: F = A'BC' + A'BC + AB'C' + ABC' + ABC

What is the effect of a bitwise-NAND operation on the following two 12-bit words: 1000 1010 1101, 0110 1110 0101 ?

Select one:

- a. 0000 1100 0101
- b. 1110 0100 1000
- c. 0001 0001 0010
- d. 1110 1110 1101
- e. Don't know/no answer
- f. 1111 0101 1010 ✔

Your answer is correct.

The NAND operation is applied to each of the pairs of bits at the same position in each word, moving from left to right.

The correct answer is: 1111 0101 1010

Which of the following statements is *the most accurate* description for the sum-of-products expression below?

F = A'BC + ABC' + AB'C'

Select one:

○ a.   The truth table has three rows where F = 1 and at least one zero must be in the inputs to return one. ✔

○ b.   The truth table has three rows where F = 1 and B must be one to return one.

○ c.   The truth table has two rows where F = 1 and no zeros need to be in the inputs to return one.

○ d.   Don't know/no answer.

○ e.   The truth table has four rows where F = 1 and no zeros need to be in the inputs to return one.

○ f.   The truth table has three rows where F = 1 and no zeros need to be in the inputs to return one.

Your answer is correct.

The number of OR-ed terms above specifies the number of input cases that lead to a true expression (rows of truth table that give F = 1). Each of the inverted variables shows where the input needs to be zero for that input case.

The correct answer is: The truth table has three rows where F = 1 and at least one zero must be in the inputs to return one.

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