IN1006 Systems Architecture (PRD1 A 2022/23)

Started on	Thursday, 17 November 2022, 4:23 PM
State	Finished
Completed on	Thursday, 17 November 2022, 4:38 PM
Time taken	15 mins
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. F = A'B'C + A'BC' + AB'C + ABC ✔
- b. F = A'B'C ' + A'B'C + AB'C' + ABC'
- c. Don't know/no answer
- d. None of these expressions
- e. F = (A'B'C + A'BC' + AB'C + A'B'C + ABC)'
- f. F = A'B'C' + A'BC + 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

Question 2

Correct

Mark 1.00 out of 1.00

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

Select one:

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

Your answer is correct.

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

Question 3

Correct

Mark 1.00 out of 1.00

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

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

Question 4

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

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

Question 5

Correct

Mark 1.00 out of 1.00

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

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.

Question 6

Correct

Mark 1.00 out of 1.00

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 no zeros need to be in the inputs to return one.
- b. The truth table has two rows where F = 1 and no zeros need to be in the inputs to return one.
- c. The truth table has three rows where F = 1 and at least one zero must 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 B must be one 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 inverted variables shows where the input needs to be zero for that input case.

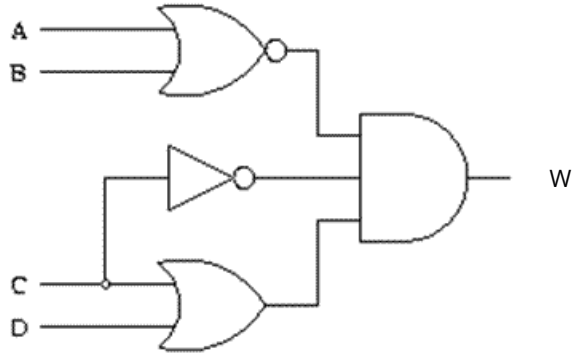
The correct answer is: The truth table has three rows where F = 1 and at least one zero must be in the inputs to return one.

Question 7

Correct

Mark 1.00 out of 1.00

Given the logic circuit (with output W) and table below, which line of the table does *not* correspond with the behaviour of the logic circuit?



Row	A	B	C	D	Z
1	0	0	0	0	0
2	0	0	0	1	1
3	0	0	1	0	0
4	0	0	1	1	0
5	0	1	0	0	0
6	0	1	0	1	0
7	0	1	1	0	0
8	0	1	1	1	1
9	1	0	0	0	0
10	1	0	0	1	0
11	1	0	1	0	0
12	1	0	1	1	0
13	1	1	0	0	0
14	1	1	0	1	0
15	1	1	1	0	0
16	1	1	1	1	0

Select one:

- a. Row 1
- b. Row 3
- c. Row 5
- d. Row 15
- e. Don't know/no answer
- f. Row 8 ✔
- g. Row 7
- h. Row 12
- i. Row 10

Row 8 is in error as all inputs to the AND gate must be one for W to be one, and this only occurs when the conditions in row two are met.

The correct answer is: Row 8

Question 8

Correct

Mark 1.00 out of 1.00

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

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

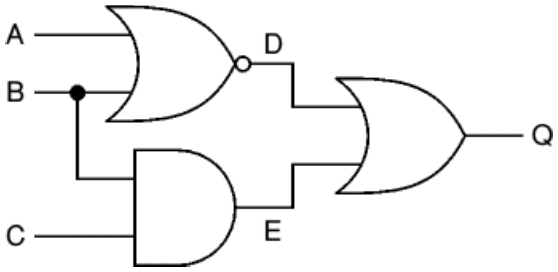
The correct answer is: 1111 0101 1010

Question 9

Correct

Mark 1.00 out of 1.00

Given the logic circuit and table below (with output Q), which line of the table does *not* correspond to the behaviour of the logic circuit?



Row	A	B	C	Q
1	0	0	0	1
2	0	0	1	1
3	0	1	0	1
4	0	1	1	1
5	1	0	0	0
6	1	0	1	0
7	1	1	0	0
8	1	1	1	1

Select one:

- a. Don't know/no answer
- b. Row 3 ✔
- c. Row 8
- d. Row 1
- e. Row 7
- f. Row 6
- g. Row 2
- h. Row 4
- i. Row 5
- j. All rows are correct

Row 3 is in error as the output of the NOR-gate (D) and AND-gate (E) are zero, leading to an output of the OR-gate (Q) of zero.

The correct answer is: Row 3

Question 10

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

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

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