2.4 Boolean Logic: 10-minute Pack

OCR J277 · Calculators not allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The NOT operator inverts (reverses) the value of a single Boolean input A. Complete the truth table below for NOT A.

A	NOT A
0	
1	

(Total for Question 1 is 2 marks)

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2 A student sets A = 1 and B = 0.

(a) What is the value of A AND B? **(1)**

- ☐ A) 0
- ☐ B) 1
- ☐ C) Cannot be determined
- ☐ D) Both 0 and 1

(b) What is the value of A OR B? **(1)**

- ☐ A) 0
- ☐ B) 1
- ☐ C) Cannot be determined
- ☐ D) Both 0 and 1

(Total for Question 2 is 2 marks)

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3 Consider the Boolean expression X = NOT A AND B, where A and B are single-bit inputs.

(a) Complete the truth table for X. **(4)**

A	B	NOT A	X
0	0		
0	1		
1	0		
1	1		

(b) State how many of the four input combinations of A and B give an output of X = 1. **(1)**

(Total for Question 3 is 5 marks)

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Mark scheme · 2.4 Boolean Logic: 10-minute Pack

Question 1

NOT A = 1 when A = 0 **B1**

NOT A = 0 when A = 1 **B1**

Answer: A=0 -> NOT A=1; A=1 -> NOT A=0

Question 2

(a) A) 0 selected **B1**

(a) Answer: A) 0

(b) B) 1 selected **B1**

(b) Answer: B) 1

Question 3

(a) Row (0,0): NOT A=1, X=0 **B1**

(a) Row (0,1): NOT A=1, X=1 **B1**

(a) Row (1,0): NOT A=0, X=0 **B1**

(a) Row (1,1): NOT A=0, X=0 **B1**

(a) Answer: X values in row order: 0, 1, 0, 0

(b) 1, cao **B1**

(b) Answer: 1

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