

Questions

1) Explain why data is represented in computer systems in binary form. [2]

2) Examine the truth table below:

A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1

Which logic gate does this truth table represent? [1]

3) Complete the truth table below:

A	B	$A \wedge B$
0	0	
0	1	
1	0	
1	1	

[1]

4) Complete the truth table for the Boolean expression $P = \text{NOT}(A \text{ OR } B)$:

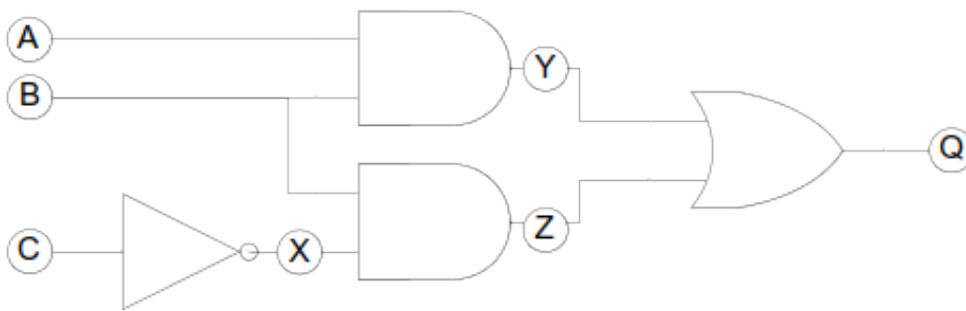
A	B	Q
FALSE	FALSE	
FALSE	TRUE	
TRUE	FALSE	
TRUE	TRUE	FALSE

5) Complete a truth table the following Boolean expressions:

a) $Q = \neg A$ [1]

b) $Q = (A \wedge B) \vee \neg C$ [2]

6) Examine the logic circuit below:



a) Complete the truth table for this logic gate circuit.

[4]

A	B	C	X	Y	Z	Q
0	0	0				
0	0	1				
0	1	0				
0	1	1				
1	0	0				
1	0	1				
1	1	0				
1	1	1				

b) Write a Boolean expression for this logic circuit.

[1]

7) Examine the Boolean expression below.

$$Q = \text{NOT } A \text{ AND } (B \text{ OR } C)$$

a) Create a logic gate circuit for this Boolean expression.

[1]

b) Complete the truth table for this Boolean expression. You may find it helpful to use the two blank columns for interim inputs/outputs.

[3]

A	B	C		Q
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

8) Match the following Boolean expressions by drawing lines to connect them. An example has been done for you.

Q = NOT B AND C

Q = $\neg B \vee C$

Q = NOT(B AND C)

Q = $\neg(B \wedge C)$

Q = NOT B OR C

Q = $\neg(B \vee C)$

Q = NOT(B OR C)

Q = $\neg B \wedge C$

[3]