Logic Gates Homework

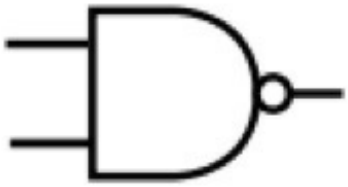
You should refer to the **homework policy** for details on how this homework should be submitted.

Attempt all questions and show all working.

This homework may not appear correctly in Dillinger due to the boolean expressions used. However, it will work correctly in both StackEdit and Haroopad (with the Maths preferences turned on)

Question 1

Fill in the following truth tables for the given logic gates.



NAND gate: $\overline{A.B}$

Input A	Input B	Output Q
0	0	1
0	1	1
1	0	1
1	1	0

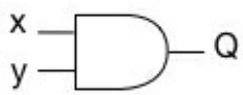
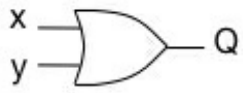
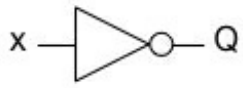
OR gate: $A + B$

Input A	Input B	Output Q
0	0	0
0	1	1
1	0	1
1	1	1

(**4 marks**)

Question 2

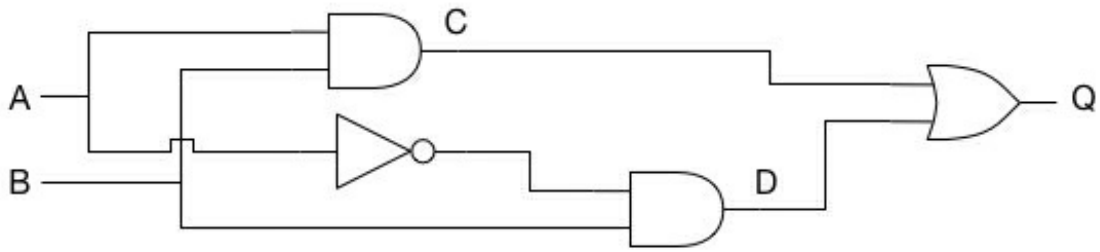
What are the boolean notations for the following gates:

Logic Gate	Boolean Expression
	Q = x.y
	Q = x+y
	Q = A (inverted)

(**3 marks**)

Question 3

Complete the truth table for this circuit



Input A	Input B	Output C	Output D	Output Q
0	0	0	0	0
0	1	0	1	1
1	0	0	0	0
1	1	1	0	1

(**4 marks**)

Question 4

The alarm in your kitchen will sound if it senses heat or smoke.

Complete the truth table for this circuit.

Senses heat	Senses smoke	Alarm Active
0	0	0
0	1	1
1	0	1
1	1	1

State which logic gate would be used to determine whether the alarm will go off: **An OR function will be used to determine whether the alarm will go off.**.

(**2 marks**)

Total 13 marks