MODULE Q BOOLEAN LOGIC · Q1

Logic gates: AND, OR and NOT

Original practice questions · 20 marks · ~25 minutes · Cambridge 0478 syllabus 10.1, 10.2, 10.3

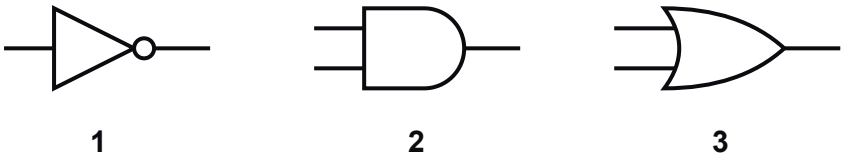
Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **20 marks**. Use the standard logic gate symbols when you draw a logic circuit. All scenarios are made up.

1

Total: 3 marks

(a) Identify the logic gate shown by each symbol. **[3]**



1 2 3

Symbol 1

Symbol 2

Symbol 3

2

Total: 3 marks

(a) Complete the table by writing the name of the logic gate (AND, OR or NOT) that each description matches. **[3]**

Description	Logic gate
The output is 1 only when both inputs are 1.	
The output is the opposite of its single input.	
The output is 0 only when both inputs are 0.	

3

Total: 4 marks

(a) Complete the truth table to show the output of an AND gate and of an OR gate for every combination of inputs A and B. **[4]**

A	B	A AND B	A OR B
0	0		
0	1		
1	0		
1	1		

4 **Total: 3 marks**

A sign at the entrance of a car park lights up (X = 1) when the car park is **not** full. A sensor gives input **F**: F = 1 when the car park is full and F = 0 when it is not full.

(a) Write the logic expression for X. **[1]**

X =

(b) Draw the logic circuit for the sign. Connect input F to output X. **[2]**



5 **Total: 7 marks**

A cold store in a food warehouse has a warning buzzer. The buzzer sounds (X = 1) if the door is open **or** the temperature is above the safe limit.

Input	Input of 1 means	Input of 0 means
D	the door is open	the door is closed
T	the temperature is above the safe limit	the temperature is at or below the safe limit

(a) Write the logic expression for this problem statement. **[1]**

X =

(b) Draw the logic circuit for the buzzer. Connect inputs D and T to output X. **[2]**



(c) State the output X when D = 0 and T = 1. **[1]**

(d) Explain why an AND gate would **not** be suitable for this buzzer. Use one combination of input values in your answer. **[3]**

Total for this worksheet: 20 marks