# N5 Logic





## **Developing Boolean expressions from truth tables**



1 - Look for the rows of the truth table where output Z is high (1).

2 - Create an expression for that row.

3 - Create an overall expression for all of the rows using the OR expression in between.

 $Z = (\overline{A} \cdot \overline{B}) + (A \cdot \overline{B}) + (A \cdot B)$ 

### Completing a truth table from a Logic circuit



(a) Complete the truth table for the logic diagram shown above



A	١	В	С	D	Ε	Z
0	)	0	0	1	1	0
C	)	0	1	1	1	1
C	)	1	0	1	1	0
0	)	1	1	1	1	1
1	L	0	0	0	0	0
1	L	0	1	0	0	0
1	L	1	0	0	1	0
1	L	1	1	0	1	1

#### Developing a circuit from a Boolean expression

#### $(L \cdot M) + \overline{N} = Y$

1 - Start by figuring out how many logic gates you will need and what type they are.

- In this example there are 3 inputs. •
- 2 inputs are going into a AND gate. We know this from ٠ the . between the expressions in the brackets.
- The output from that gate is going into an OR gate with ٠ the 3rd input. We know this from the + in between the 2 expressions.



- To complete this type of question you will need to have a sound knowledge of the different logic gates and their truth tables.
- Column D is the opposite of A because it goes through a NOT gate.
- Column E is dependent on D and B going through an OR gate.
- Column Z is dependent on E and C going through an AND gate.