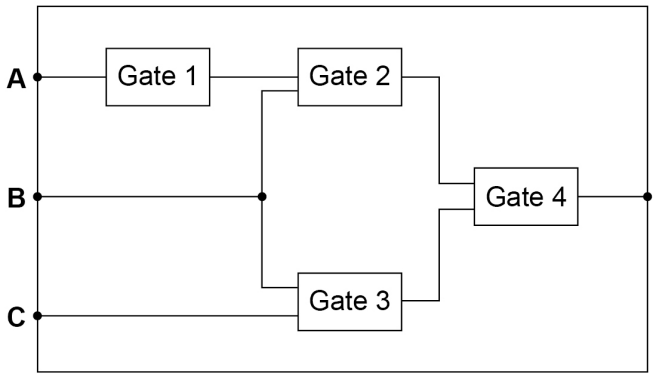
Do not write outside the box

0 5 The expression `(B AND (NOT A)) OR (B AND C)` can be represented by the logic circuit shown in **Figure 5**. In the circuit the logic gates are marked with labels instead of their proper symbols.

Figure 5



0 5 . 1 State the name of the logic gate used at Gate 1 in **Figure 5**.

[1 mark]

0 5 . 2 State the name of the logic gate used at Gate 2 in **Figure 5**.

[1 mark]

0 5 . 3 Draw the logic circuit symbol in the space below for the logic gate used at Gate 3 in **Figure 5**.

[1 mark]

0 5 . 4 Draw the logic circuit symbol in the space below for the logic gate used at Gate 4 in **Figure 5**.

[1 mark]

Do not write outside the box

0 5 . 5 Complete the truth table for the Boolean expression:

```
(X AND Y) OR (NOT X)
```

[3 marks]

X	Y	X AND Y	NOT X	(X AND Y) OR (NOT X)
0	0			
0	1			
1	0			
1	1			

0 5 . 6 A truth table for the complex Boolean expression:

```
(A1 AND (NOT A2) AND A3) OR (A1 AND A2 AND A3)
```

is shown in **Figure 6**.

Figure 6

A1	A2	A3	OUTPUT
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

Shade **one** lozenge which shows a simpler expression which is the equivalent of the original, more complex, expression.

[1 mark]

A NOT A1 ⬭

B A2 OR A3 ⬭

C A1 AND (NOT A2) ⬭

D A1 AND A3 ⬭

8

Turn over ►