Name: Class: Mark:

1. State the output from each of the following six logic diagrams and express the diagram in the form of Boolean algebra. For example:

A = 0

B = 1

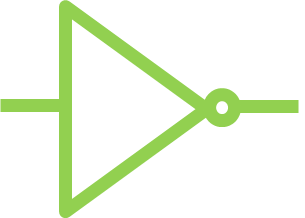
P = **0** Boolean algebra: P = **A AND B**

|  |  |  |
| --- | --- | --- |
| (a) | A = 0  P = Boolean algebra: P =  B = 1 | [2] |
| (b) | A = 1  B = 1  P = Boolean algebra: P = | [2] |
| (c) | A = 1  P = Boolean algebra: P = | [2] |
| (d) | A = 0  P = Boolean algebra: P =    B = 1 | [2] |

(e) Complete the truth table for the final logic diagram in (d) above: [2]

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | R = A AND B | P = NOT (A AND B) |
| 1 |  |  |  |
| 1 |  |  |  |
| 0 |  |  |  |
| 0 |  |  |  |

2. Show on the diagram below the output from each of the gates, including   
the output P. [2]

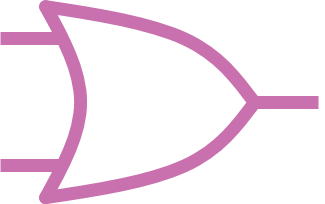
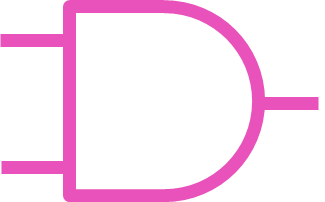


0

1

0

P =



3. A car has two doors. If the ignition is on, and either of the doors is not properly closed, a warning light is displayed.

(a) Complete the truth table below. [4]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Door 1 open (D1) | Door 2 open (D2) | Ignition on (I) | Working space | Warning light on (W) |
| 0 | 0 | 0 |  |  |
| 0 | 0 | 1 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

(b) Draw a logic circuit diagram for this scenario. [4]

D1

W

I

D2

[Total marks 20]