

2003 Paper 9 Question 12

Specification and Verification II

The following is an informal specification of a device D

*D has a 1-bit input **in**, a 1-bit input **select** and a 4-bit output **out**. The value at **out** is 0000 if **select** is 0 and is a word consisting of the values input at **in** at the four preceding cycles if **select** is 1.*

- (a) Formalise this informal specification and point out how you have resolved any ambiguities and incompletenesses. [8 marks]
- (b) Using 1-bit unit-delay elements and multiplexers, design a device that implements your formal specification. Draw a diagram of your design. [8 marks]
- (c) Outline how you would go about trying to formally verify your design. [4 marks]