

2001 Paper 12 Question 2

Computer Design

- (a) What is a *pipeline bubble* and why might a branch instruction introduce one or more bubbles? [4 marks]
- (b) Explain, with the aid of an example, how conditional instructions may be used to reduce the number of bubbles in a pipeline. [4 marks]
- (c) What is the difference between *branches*, *interrupts*, *software interrupts* (initiated by a SWI instruction on the ARM) and *exceptions*? [8 marks]
- (d) What is an *imprecise exception* and why might a processor designer prefer it to a precise exception mechanism? [4 marks]