

## 2001 Paper 2 Question 10

### Structured Hardware Design

- (a) Explain the basic operation of the *parallel port* found on most computers. Include a description of the main signals and give their purpose. [4 marks]
- (b) Similarly, explain the basic operation of the RS232 *serial port* found on most computers. [4 marks]
- (c) What sets the maximum rate of transfer of data for each type of port? What happens if the receiver cannot consume data as quickly as the source would like to send it? [4 marks]
- (d) Both types of port allow data to flow from one piece of equipment to another and these items will normally have independent clock domains. How can synchronisation be achieved? [4 marks]
- (e) When might it be sensible to communicate data using a large number of wires in parallel but with each one behaving more like an individual serial port? [4 marks]