

## 2011 Paper 8 Question 4

### System-on-Chip Design

- (a) Define the terms *interface*, *protocol* and *flow control* with respect to the electrical connections between sub-circuits or instantiated components in a SoC (system on chip). [2 marks each]
- (b) Why is it critical that a protocol embodies the concept of being idle when an interface joins two different clock domains? [2 marks]
- (c) When a pair of components are modelled using separate classes in an object-oriented language, describe **two** techniques for modelling the data transferred between them and emphasise how each technique incorporates flow control. One technique should use shared variables to model wires. [3 marks each]
- (d) Describe and compare **two** methods for modelling the delays experienced when a pair of components communicate over a resource that may become congested (such as a SoC bus or network on chip). [3 marks each]