2006 Paper 9 Question 3

Digital Communication II

(*a*) Switches are used in a variety of different communications networks.

(*i*) Describe how switch architectures that are used to forward samples in Time Division Multiplexed networks, such as the digital telephone network, are designed to scale to large numbers of input and output ports. [5 marks]

(*ii*) In asynchronous networks such as Asynchronous Transfer Mode (ATM) or Internet Protocol (IP) packet networks, switches are also used to forward packets. What are the basic components of a router with input and output buffering? [5 marks]

(*b*) Distributed routing algorithms in communications systems are designed to provide a fault-tolerant computation of end-to-end paths in the event of link or router failure (or repair).

(*i*) Describe how this occurs, using as an example the distance-vector algorithm. [5 marks]

(*ii*) Distance-vector routing is said to be slow to react to changes. Explain why, and outline why link-state protocols are therefore preferred in today's Internet. [5 marks]