

## 1998 Paper 6 Question 3

### Digital Communication I

You are required to design a topology discovery protocol for a network of switching nodes interconnected by links. There are  $n$  nodes,  $l$  links, the maximum degree of any node is  $k$  and there is a path between any two nodes of not more than  $d$  hops. All links are bi-directional.

Each node has a unique identifier of four bytes which it knows.

- (a) Design a protocol (including message formats) for a node to learn about its immediate neighbours. [5 marks]
- (b) Design a protocol (including message formats) for distributing this information across the network. [10 marks]
- (c) Give a bound on the total amount of information which is transmitted to ensure that every node acquires complete topology information. [5 marks]