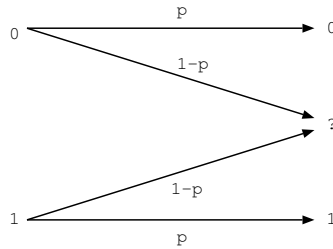# 1995 Paper 7 Question 3

Information Theory and Coding

Give definitions and formulae for the mutual information and the capacity of a discrete memoryless channel. [8 marks]

The *binary erasure channel* (shown above) takes as input symbols '0' and '1' and outputs '0', '1', and '?' with the probability of correct reception of a symbol being p and of erasure $1 - p$. What is the capacity of this channel? [8 marks]

A particular serial line device acts as a binary erasure channel. It transmits characters as 8 bits, 7 bits of data and 1 parity check bit (obtained by an exclusive-or operation of the data bits); what is the probability that a received character cannot be decoded? [4 marks]

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