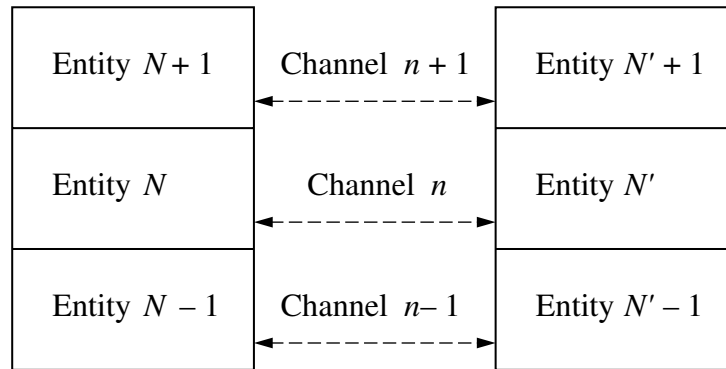


## 2008 Paper 5 Question 3

### Digital Communication I

(a) Describe *five* physical properties of a communications channel. [5 marks]

(b) Consider the figure below. Entities  $N$  and  $N'$  use an ARQ system.



(i) Explain how the latency of channel  $n - 1$  can have a direct effect on the capacity of channel  $n$ . [6 marks]

(ii) Define *windowing* as it relates to an ARQ system and describe how the capacity of the ARQ system may be improved through its use. [4 marks]

(iii) If an ARQ system is used for an interactive session, the ARQ system can lead to many small packets, each under-full and perhaps sent with significant overhead. Design and describe an algorithm that overcomes the limitation of sending many mostly-empty packets for an interactive session. [5 marks]