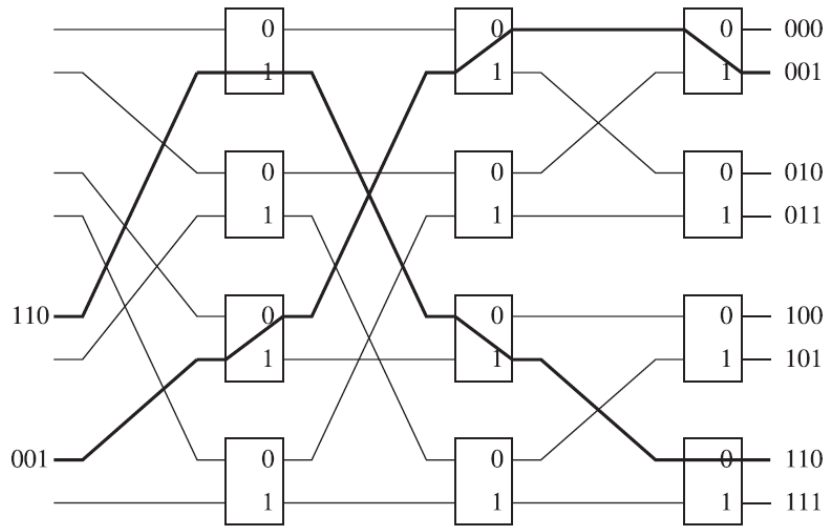**10   Principles of Communications (JAC)**

(a) A simple packet switch fabric, such as that illustrated below, can experience head of line blocking. Explain what this is, and how it can be mitigated by clocking the output lines faster, or by combining queuing and scheduling access to the inputs carefully.

[10 marks]

(b) Weighted fair queueing is a complex system devised to support performance guarantees, e.g. for latency for some users and capacity for other users, in routers in the Internet. Explain how and why we can make use of a much simpler queuing system for data centre networks.

[10 marks]