1. **Briefly explain that how the Banyan Network (Self-routing fabrics) work? What is the complexity of Banyan Network?**

Ans:

The Banyan network is a clever arrangement of 2x2 switching elements that routes all packets to the correct output without collisions if the packets are presented in ascending order.

The Banyan network is made from simple 2x2 switching elements that switch based on just one bit in the self-routing header of packets(route the packet toward the upper output if the bit is clear,"0",or toward the lower output if the bit is set,"1").

Complexity : Banyan : $n \log_2 n$

2. **What is head of line blocking?**

Ans:

HOL blocking : When the packet at the head of the queue is blocked, all packets behind it are prevented from being transmitted, even if the output port they are destined to is idle.

3.

How to sense the carrier in wireless network?
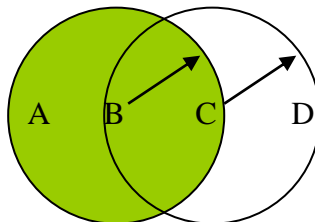
Ans:

The sender transmits a Request to Send (RTS) frame to the receiver.

The receiver replied with a Clear to Send (CTS) frame.

Any node that sees the CTS frame knows that it is close to the receiver, and therefore can't transmit.

3. **What are the exposed and hidden nodes problems?**

Ans:

The hidden node problem:

Suppose both A and C want to communicate with B and so they each send it a frame. A and C are unaware of each other since their signals do not carry that far.

These two frames collide with each other at B. A and C are said to be hidden nodes with respect to each other.

The exposed node problem:
Suppose B is sending to A. Node C is aware of this communication because it hears B's transmission. It would be a mistake for C to conclude that it cannot transmit to node D. But C's transmission to D will not interfere with A's ability to receive from B.

4. Run Spanning-Tree-Algorithm and indicate which port is blocked. (Fig. 1)
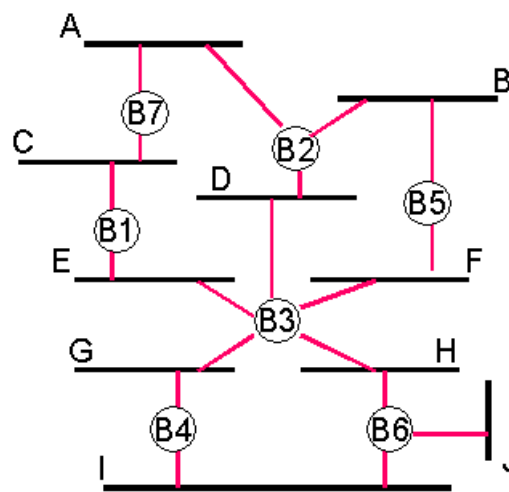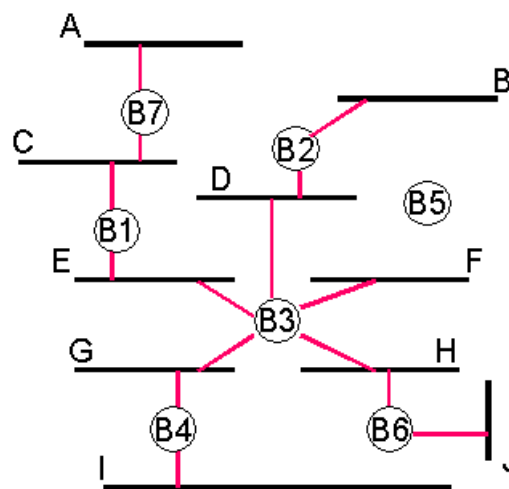

Fig. 1: Looped Extended LAN

Ans:

B1 is the root. B1 periodically broadcast control packets (BPDU: Bridge Protocol Data Unit). The port of B2 to Network A is blocked, since the BPDU bridge ID (B7)

from Network A is higher than the bridge ID (B3) from Network D. Similarly, the port of B6 to Network I is blocked. For B5, both ports are blocked.