Question Group A

1. In IEEE 802.15.4, what part of the CSMA/CA algorithm helps in collision avoidance.
2. Differentiate between Bluetooth piconets and scatternets.
3. In what situations would you use LoRaWAN instead of ZigBee?
4. State one reason why IEEE 802.15.4 frame size was kept small.

[3 + 3 + 2 + 2 marks]

Question Group B

1. In what way, is the ZigBee cluster-tree better than the mesh topology?
2. Elaborate on the process of establishing Bluetooth connection between two devices.
3. Provide the use-cases for LoRaWAN class A and class C devices.
4. Illustrate the 6LoWPAN encapsulation header stack using a diagram.

[2 + 3 + 3 + 2 marks]

A

1

Specifically the backoff part – waiting a random amount of time reduces the chances of collision, coz each node picks its own random timer.

2

Piconet is one master connected to up to seven slaves. Master controls the piconet.

Scatternet is an interconnection of multiple piconets. A node joins two or more piconets and acts as a bridge for communication b/w piconets. That node can't be master in both.

In scatternet, each piconet continues to operate independently.

3

When long distance connectivity for sensor nodes is required, data rates requirements are quite low, and prolonged battery life is important.

4

L12 slide 6

B

1

Cluster-tree is less expensive to set up, while still providing the advantage of coverage over a larger area.

2

L10, slide 9

3

Class A is to be used when a longer battery life is desired, but downlink latency is tolerable.

Class C devices are always listening, so these used when a real time action is expected (in response to a command from the server).

4

L12, slide 20