WiFi Module 1

1. **In which OSL layer the Wi-Fi standard/protocol fits.**

The WiFi standard primarily fits on 2 layer

→Physical layer

->Data Link layer

Physical Layer – Gives the modulation rate, coding rate.

Data Link Layer - Manages access to the wireless medium and data framing.

2. **Can you share the Wi-Fi devices that you are using day to day life, share that device's wireless capability/properties after connecting to network. Match your device to corresponding Wi-Fi Generations based on properties**

Laptop, Smartphone are Wi-Fi devices that I usually use.

My laptop has Realtek RTL8852AE WiFi 6 802.11ax PCIe Adapter and hence it supports WIFI 6 technology

My phone on the other hand supports only upto 802.11ac and hence it is WIFI 5 technology

3. **What is BSS and ESS?**

BSS stands for basic Service Set

It basically includes all devices that are under a single Access Point(AP).

They have a unique BSSID

Ex: Home network

ESS stands for Extended Service Set

Several BSS along with a central Distributed system forms an ESS

All APs have same SSID but different BSSID

Ex: Enterprise network

4. **What are the basic functionalities of Wi-Fi Accesspoint**

Basic Functionalities of a WiFi accesspoint Include

> Wireless Signal Transmission & Reception
> Device Authentication & Association
> Data Forwarding

> Multiple SSID & VLAN Support
> Roaming & Handoff Support (ESS)
> Network Traffic Management & QoS

5. Difference between Bridge mode and Repeater mode

Bridge Mode:

> This is used to bridge two different networks. This reduces traffic congestion
> It can also be called as a repeater with an add on function of forwarding

Repeator:

> This is used to regenerate the signals and send it over long distances

6. what are the differences between 802.11a and 802.11b.

802.11a:

> Operates in 5 Ghz
> Uses OFDM technique
> Better speed compared to 802.11b
> Range is shorter

802.11b:

> Operates in 2.4 Ghz
> Uses DSSS Technique
> Lower speed compared to 802.11a
> Longer Range

7. Configure your modem/hotspot to operate only in 2.4Ghz and connect your laptop/Wi-Fi device

, and capture the capability/properties in your Wi-Fi device. Repeat the same in 5Ghz and tabulate all the differences you observed during this

As you can see these are the details observed when connecting in 5 Ghz

Protocol: Wi-Fi 5 (802.11ac)
Security type: WPA2-Personal
Manufacturer: Realtek Semiconductor Corp.
Description: Realtek RTL8852AE WiFi 6 802.11ax PCIe Adapter
Driver version: 6001.10.351.0

Network band (channel):   5 GHz (36)
Aggregated link speed (Receive/   866/866 (Mbps)
Transmit):
Link-local IPv6 address: fe80::82d3:1b30:fd64:2ced%14
IPv6 default gateway: fe80::1%14
IPv6 DNS servers: fe80::1%14 (Unencrypted)
                                         fe80::1%14 (Unencrypted)
IPv4 address: 192.168.1.15
IPv4 DNS servers: 202.88.152.8 (Unencrypted)
                                         202.88.152.10 (Unencrypted)
Physical address (MAC):   3C-55-76-6B-17-9B

We can see the Network Band and it's speed.

Now let me change it and connect to 2.4Ghz and observe the same.

Protocol: Wi-Fi 4 (802.11n)
Security type: WPA2-Personal
Manufacturer: Realtek Semiconductor Corp.
Description: Realtek RTL8852AE WiFi 6 802.11ax PCIe Adapter
Driver version: 6001.10.351.0

Network band (channel):   2.4 GHz (7)
Aggregated link speed (Receive/   300/300 (Mbps)
Transmit):
Link-local IPv6 address: fe80::82d3:1b30:fd64:2ced%14
IPv6 default gateway: fe80::1%14
IPv6 DNS servers: fe80::1%14 (Unencrypted)
                                         fe80::1%14 (Unencrypted)
IPv4 address: 192.168.1.15
IPv4 DNS servers: 202.88.152.8 (Unencrypted)
                                         202.88.152.10 (Unencrypted)
Physical address (MAC):   3C-55-76-6B-17-9B

We can see that the protocol the network band are all changed and speed is reduced.

8.What is the difference between IEEE and WFA

IEEE is a standard. It defines technical standards for Wifi.

WFA stands for WiFi Alliance it is a Non-Profit organisation that only certifies Wifi products for interoperability.

Any WFA certified products are interoperable with each other.

9. List down the type of Wi-Fi internet connectivity backhaul, share your home/college's wireless internet connectivity backhaul name and its properties

> Fiber Optics
> MoCa
> Satellite
> Cellular

My college has Fiber Optics Backhaul

In my home also we have Fiber Optics backhaul.

10. List down the Wi-Fi topologies and use cases of each one.

> Infrastructure Mode – Enterprise
> Adhoc mode – Multiplayer Local Gaming
> Bridge Mode – Two different buildings of an enterprise
> Repeater Mode- Enterprise