**3. Please list all the MAC layer functionalities in all Management, Control and Data plane**

**1. Management Functions:**

These functionalities help in network setup, connection maintenance, and optimization.

* **Scanning:**  
  Devices search for available wireless networks (active/passive).
* **Client Association:**  
  Connects a device to an Access Point for communication.
* **Security Management:**  
  Handles authentication and encryption to keep communication secure.
* **QoS Management:**  
  Manages traffic priority (voice, video, etc.) for better performance.
* **Power Management:**  
  Saves energy by controlling device sleep/wake cycles.
* **Load Balancing:**  
  Distributes clients across APs to avoid overloading a single AP.

**2. Control Functions:**

These functions regulate how the wireless medium is accessed.

* **Flow Control:**  
  Manages the rate of data flow to prevent congestion or buffer overflow.
* **Medium Access Control (MAC):**  
  Decides when a device can use the wireless medium (like CSMA/CA).

**3. Data Plane Functions:**

These are directly involved in the actual transmission of user data.

* **AMSDU (Aggregated MAC Service Data Unit):**  
  Combines multiple MSDUs into a single MPDU to improve efficiency.
* **AMPDU (Aggregated MAC Protocol Data Unit):**  
  Combines multiple MPDUs into one physical layer transmission.
* **AMSDU in AMPDU:**  
  Uses both techniques together for better throughput and reduced overhead.