UNIT–1: WIRELESS NETWORK ARCHITECTURES (3-MARK ANSWERS)

1) Wireless Network Architectures
- Defines how wireless nodes communicate
- Cellular networks use cells and base stations
- WLANs use access points; multi-hop networks use intermediate nodes

2) System Architecture of IEEE 802.11 WLAN
- Station (STA): wireless device
- Access Point (AP): connects to wired LAN
- BSS/ESS: single or multiple APs
- Distribution System (DS)

Diagram:
STA ■■
STA ■■■■ AP ■■■ DS ■■■ Internet
STA ■■

3) Protocol Architecture of IEEE 802.11
- Physical Layer (PHY): transmission, modulation
- MAC Layer: CSMA/CA, framing
- LLC Layer: logical link control

Layers:
Application
LLC
MAC
PHY

4) IEEE 802.11a vs IEEE 802.11b
- 802.11a: 5 GHz band, up to 54 Mbps, low interference
- 802.11b: 2.4 GHz band, up to 11 Mbps, high interference

5) HiperLAN
- European WLAN standard by ETSI
- Operates in 5 GHz band
- Supports QoS and multimedia

6) Wireless ATM (WATM)
- Wireless extension of ATM networks
- Supports real-time multimedia
- Used in broadband wireless access

7) Broadband Radio Access Networks (BRAN)
- ETSI standard
- Provides broadband wireless access
- Used for last-mile connectivity

8) HiperLAN2
- Connection-oriented architecture
- Supports IP, ATM, Ethernet
- High QoS and data rate

9) Bluetooth Architecture & Protocol Stack
- Piconet: master-slave structure
- Stack: Radio, Baseband, LMP, L2CAP, Applications

Diagram:
Application
L2CAP
LMP
Baseband
Radio

10) WPAN
- Short-range personal area network
- Low power and low data rate
- Used in wearables and IoT

11) IEEE 802.15.4
- Low-rate WPAN standard
- Very low power consumption
- Basis for Zigbee and 6LoWPAN

12) Zigbee Architecture
- PHY & MAC (802.15.4)
- Network layer for routing
- Application layer for services

13) 6LoWPAN
- IPv6 over low-power networks
- Header compression
- Enables IoT connectivity

14) WirelessHART
- Industrial wireless standard
- Secure and reliable mesh network
- Used in process automation

15) Comparison of Wireless Systems
Wi-Fi: medium range, high data rate
Bluetooth: short range, low power
Zigbee: short range, very low power
Cellular: long range, high data rate