## ⭐ FULL SUMMARY (SHORT FOR REVISION)

**Networking = connecting devices to share data.**

**Topologies:**

- Mesh → expensive but reliable
- Star → common, central device
- Hierarchical → multiple stars

**Network Types:**

- LAN → small
- MAN → city
- WAN → country
- PAN → personal
- Internet → global
- Intranet → private

**Architecture:**

- Client-Server → centralized
- Peer-to-Peer → equal devices
- Infrastructure → router based
- Ad-Hoc → direct connection

**Models:**

- OSI = 7 layers
- TCP/IP = 4 layers

**Physical Layer handles:**

- Bits
- Cables
- Signals

**Transmission Mediums:**

- Wireless → Air
- Wired → Cat5–Cat8, Optical Fiber

**Devices:**

- NIC, Switch, Router, Modem, AP, Gateway

## ⭐ SUPER SHORT REVISION SUMMARY

**MAC Layer**

- Ethernet: 10 Mbps → Fast → Gigabit → 10G
- Wi-Fi: 802.11 a/b/g/n/ac
- 802.15 = Bluetooth
- 802.15.4 = ZigBee
- 802.16 = WiMAX
- CSMA/CA = Wi-Fi collision avoidance

**Switching**

- Circuit (telephone)
- Message (email)
- Packet (internet)

**IP Addressing**

- IPv4: 32-bit
- IPv6: 128-bit

**Network Layer Protocols**

- IP = routing
- ICMP = error messages / ping

## ⭐ FULL CHAPTER SUMMARY (Exam Revision Guide)

**Transport Layer**

- TCP: reliable, connection-oriented
- UDP: fast, unreliable
- Connection establishment: 3-way handshake
- Connection release: 4-way handshake
- Sockets used for endpoint communication

**Application Layer**

- DNS: converts domain → IP
- FTP: file upload/download
- HTTP1.1/1.2/2.0: transfer web pages
- HTTPS: secure HTTP (using SSL/TLS)
- SMTP: sending emails
- MIME: attachments
- POP3: receiving emails
- Webmail: browser-based email