Unit 1: Introduction to Data Communications

1. Q: Define data communication. A: Exchange of data between devices via transmission medium
2. Q: List the 5 components of data communication. A: Sender, receiver, message, medium, protocol
3. Q: What are the 3 types of networks by geographical coverage? A: LAN, MAN, WAN
4. Q: Which OSI layer handles routing? A: Network layer (Layer 3)
5. Q: What are the 4 layers of TCP/IP model? A: Application, Transport, Internet, Network Access
6. Q: Name 3 functions of Presentation layer. A: Translation, encryption, compression
7. Q: Why are standards important in networking? A: Ensure interoperability between devices
8. Q: What does IEEE stand for? A: Institute of Electrical and Electronics Engineers
9. Q: Give 2 examples of IoT devices. A: Smart thermostat, fitness tracker
10. Q: What technology enables work-from-home using personal devices? A: BYOD (Bring Your Own Device)
11. Q: Which protocol is used for massively online gaming? A: WebSocket
12. Q: What does VPN stand for? A: Virtual Private Network
13. Q: Which organization develops web standards? A: W3C
14. Q: What is the main advantage of packet switching? A: Efficient bandwidth utilization
15. Q: Name 2 wireless communication technologies. A: WiFi, Bluetooth

Unit 2: Application Layer

1. Q: What are the 5 application architectures? A: Host-based, client-based, client-server, cloud, P2P
2. Q: Which HTTP method creates resources? A: POST
3. Q: What port does HTTPS use? A: 443
4. Q: List 3 email protocols. A: SMTP, POP3, IMAP
5. Q: What does MIME stand for? A: Multipurpose Internet Mail Extensions
6. Q: Which protocol provides remote terminal access? A: Telnet
7. Q: What is the main advantage of cloud computing? A: Scalability
8. Q: Which architecture has no central server? A: P2P
9. Q: What does REST stand for? A: Representational State Transfer

10. Q: Which protocol is used for video conferencing? A: RTP/RTCP
11. Q: What is the function of DNS? A: Domain name to IP resolution
12. Q: Which HTTP header field identifies the browser? A: User-Agent
13. Q: What does AJAX stand for? A: Asynchronous JavaScript and XML
14. Q: Which protocol is used for file transfer? A: FTP
15. Q: What is the main disadvantage of host-based architecture? A: Server overload

Unit 3: Physical Layer

1. Q: What are the 3 circuit configurations? A: Point-to-point, multipoint, broadcast
2. Q: List 3 multiplexing techniques. A: FDM, TDM, WDM
3. Q: Which cable type has highest bandwidth? A: Fiber optic
4. Q: What does UTP stand for? A: Unshielded Twisted Pair
5. Q: Which wireless technology uses 2.4GHz frequency? A: WiFi (802.11b/g/n)
6. Q: What modulation technique converts digital to analog? A: QAM
7. Q: What is the standard Ethernet frame size? A: 1518 bytes
8. Q: Which satellite type has geostationary orbit? A: GEO
9. Q: What does DSL stand for? A: Digital Subscriber Line
10. Q: Which media has highest latency? A: Satellite
11. Q: What is the purpose of line coding? A: Convert bits to signals
12. Q: Which transmission mode is bidirectional simultaneously? A: Full-duplex
13. Q: What does SONET stand for? A: Synchronous Optical Networking
14. Q: Which VoIP codec provides best quality? A: G.711
15. Q: What is the maximum Cat6 cable length for 10Gbps? A: 55 meters

Unit 4: Data Link Layer

1. Q: What are the 2 sublayers of DLL? A: LLC and MAC
2. Q: What does CSMA/CA stand for? A: Carrier Sense Multiple Access with Collision Avoidance
3. Q: List 3 error detection methods. A: Parity, Checksum, CRC
4. Q: What is the purpose of ARP? A: IP to MAC address resolution
5. Q: Which protocol provides flow control? A: Sliding Window
6. Q: What does FCS stand for in frames? A: Frame Check Sequence
7. Q: Which access method is used in WiFi? A: CSMA/CA

8. Q: What is the purpose of preamble in frames? A: Synchronization
9. Q: Which error correction method retransmits? A: ARQ
10. Q: What does HDLC stand for? A: High-Level Data Link Control
11. Q: Which field identifies VLAN membership? A: VLAN tag
12. Q: What is the purpose of jumbo frames? A: Increase throughput
13. Q: Which protocol replaces STP? A: RSTP
14. Q: What does MTU stand for? A: Maximum Transmission Unit
15. Q: Which device operates at Data Link layer? A: Switch

Unit 5: Network and Transport Layers

1. Q: What are the 2 main transport protocols? A: TCP and UDP
2. Q: Which protocol provides connectionless service? A: UDP
3. Q: What is the purpose of sequence numbers? A: Packet ordering
4. Q: List 3 routing protocols. A: RIP, OSPF, BGP
5. Q: What does NAT stand for? A: Network Address Translation
6. Q: Which field in IP header prevents loops? A: TTL
7. Q: What is the purpose of sliding window? A: Flow control
8. Q: Which protocol resolves MAC addresses? A: ARP
9. Q: What does QoS stand for? A: Quality of Service
10. Q: Which TCP feature ensures reliability? A: Acknowledgments
11. Q: What is the purpose of subnet mask? A: Network/host portion identification
12. Q: Which routing metric counts hops? A: Hop count
13. Q: What does ICMP stand for? A: Internet Control Message Protocol
14. Q: Which TCP state comes after SYN-RECEIVED? A: ESTABLISHED
15. Q: What is the default HTTP port? A: 80

Unit 6: Wired and Wireless LANs

1. Q: What are the 3 WiFi standards? A: 802.11a/b/g/n/ac/ax
2. Q: Which device operates at Layer 2? A: Switch
3. Q: What is the purpose of SSID? A: Network identification
4. Q: List 3 Ethernet cable categories. A: Cat5, Cat6, Cat7
5. Q: What does WAP stand for? A: Wireless Access Point
6. Q: Which security protocol uses AES? A: WPA2

7. Q: What is the purpose of VLAN? A: Network segmentation
8. Q: Which WiFi frequency has less interference? A: 5GHz
9. Q: What does PoE stand for? A: Power over Ethernet
10. Q: Which device creates collision domains? A: Switch
11. Q: What is the purpose of MAC filtering? A: Device access control
12. Q: Which WiFi generation introduced OFDMA? A: WiFi 6 (802.11ax)
13. Q: What does MIMO stand for? A: Multiple Input Multiple Output
14. Q: Which Ethernet standard uses fiber? A: 1000BASE-SX
15. Q: What is the maximum WiFi channel width? A: 160MHz

Unit 7: Backbone Networks

1. Q: What are the 2 backbone types? A: Switched and routed
2. Q: Which device connects LAN segments? A: Router
3. Q: What is the purpose of STP? A: Prevent switching loops
4. Q: List 3 routing protocols. A: OSPF, EIGRP, BGP
5. Q: What does VRRP stand for? A: Virtual Router Redundancy Protocol
6. Q: Which technology creates logical networks? A: VLAN
7. Q: What is the purpose of core layer? A: High-speed backbone
8. Q: Which protocol replaces STP? A: RSTP
9. Q: What does ECMP stand for? A: Equal Cost Multi-Path
10. Q: Which device operates at Layer 3? A: Router
11. Q: What is the purpose of OSPF areas? A: Reduce routing overhead
12. Q: Which backbone type uses MPLS? A: Routed backbone
13. Q: What does FHRP stand for? A: First Hop Redundancy Protocol
14. Q: Which protocol provides VLAN tagging? A: 802.1Q
15. Q: What is the purpose of distribution layer? A: Policy-based connectivity

Unit 8: WAN Technologies

1. Q: What are the 3 WAN connection types? A: Leased lines, circuit-switched, packet-switched
2. Q: Which technology uses virtual circuits? A: Frame Relay
3. Q: What is the purpose of CSU/DSU? A: Digital signal conversion
4. Q: List 3 VPN types. A: Site-to-site, remote-access, extranet
5. Q: What does PPP stand for? A: Point-to-Point Protocol

6. Q: Which WAN technology uses cells? A: ATM
7. Q: What is the purpose of GRE? A: Tunnel encapsulation
8. Q: Which protocol provides site-to-site VPN? A: IPsec
9. Q: What does QoS stand for? A: Quality of Service
10. Q: Which WAN technology is packet-switched? A: MPLS
11. Q: What is the purpose of HDLC? A: Serial line encapsulation
12. Q: Which VPN protocol uses SSL? A: OpenVPN
13. Q: What does L2TP stand for? A: Layer 2 Tunneling Protocol
14. Q: Which WAN technology uses DSL? A: ADSL
15. Q: What is the purpose of BGP? A: Inter-domain routing

Unit 9: The Internet

1. Q: What are the 3 Internet components? A: Backbone, ISPs, access networks
2. Q: Which organization manages IP addresses? A: IANA
3. Q: What is the purpose of IXP? A: Network interconnection
4. Q: List 3 Internet access technologies. A: DSL, cable, fiber
5. Q: What does ISP stand for? A: Internet Service Provider
6. Q: Which protocol assigns IP addresses? A: DHCP
7. Q: What is the purpose of BGP? A: Inter-AS routing
8. Q: Which Internet layer handles addressing? A: Internet layer
9. Q: What does NAT stand for? A: Network Address Translation
10. Q: Which technology provides last-mile wireless? A: WiMAX
11. Q: What is the purpose of root nameservers? A: DNS hierarchy top-level
12. Q: Which protocol transfers web pages? A: HTTP
13. Q: What does ICANN stand for? A: Internet Corporation for Assigned Names and Numbers
14. Q: Which Internet technology uses light? A: Fiber optics
15. Q: What is the purpose of ARIN? A: IP address allocation (North America)

Unit 10: Network Management

1. Q: What are the 5 FCAPS areas? A: Fault, Configuration, Accounting, Performance, Security
2. Q: Which protocol monitors networks? A: SNMP
3. Q: What is the purpose of baselining? A: Performance comparison

4. Q: List 3 network documentation types. A: Diagrams, inventories, policies
5. Q: What does SLA stand for? A: Service Level Agreement
6. Q: Which tool captures packets? A: Wireshark
7. Q: What is the purpose of change management? A: Controlled modifications
8. Q: Which protocol manages devices? A: SNMP
9. Q: What does MIB stand for? A: Management Information Base
10. Q: Which technique reduces broadcast traffic? A: VLAN segmentation
11. Q: What is the purpose of IDS? A: Intrusion detection
12. Q: Which metric measures network delay? A: Latency
13. Q: What does RFP stand for? A: Request for Proposal
14. Q: Which tool tests connectivity? A: Ping
15. Q: What is the purpose of asset management? A: Track network resources