

# Department of Electronics & Communication Engineering

## Question Bank

BTEC-905A-18 (Routing & Switching) 5<sup>th</sup> Semester

---

### **Q #1) What is Networking?**

**Answer:** Networking is used to connect or operate with a network. It is the process of creating and using wired or wireless networks for exchanging information, ideas, files, and other electronic communication.

### **Q #2) What does Protocol mean?**

**Answer:** Protocol is defined as the rules that connect two or more devices to transfer the information from one device to another. It helps to know how data is being transferred from one network to another network for communication.

### **Q #3) What is the OSI reference model?**

**Answer:** OSI is a reference model that tells how information and data are communicated over a network. It is a conceptual framework that understands the relationships of transmission.

### **Q #4) What are the different layers of the OSI model?**

**Answer:** Basically, there are 7 layers of the OSI model. Each layer has its own functionality in the OSI model.

**They are:**

- Layer 1 – Physical
- Layer 2 – Data Link Layer
- Layer 3 – Network
- Layer 4 – Transport
- Layer 5 – Session
- Layer 6 – Presentation
- Layer 7- Application

### **Q #5) What is a Switch and why we are using Switches?**

**Answer:** Switch is used to receive the signal to create a frame. It forwards the packets between various LAN segments. It supports packet control when the data is sent to the Data Link layer or Network layer of the OSI model.

While sending packets, the signal gets enabled and can be accessed by reading the destination address and forwards the frame to the appropriate frame, hence we use switches.

### **Q #6) What are Routers?**

**Answer:** Routing is the process to find the path on which the information or data can pass from the source to its destination. The device by which routing is done is called Routers.

### **Q #7) What is the difference between Switch, Routers, and Hub?**

**Answer:**

**Switch:** A Switch is used to receive the signal to create a frame. It forwards the packets between various LAN segments. It is the platform for packet control when the data is sent at a Data Link

layer or Network layer of the OSI model. It supports a single broadcast domain and multiple collision domains.

**Routers:** Router is defined as a networking gateway device that is used to forward data packets to the computer networks. A router is connected by at least a single LAN with its IP address or with LAN or WAN. A router supports two broadcast domains.

**Hub:** In the hub, if anything comes in its port then it sends it out to the others. It is less expensive and the least complicated. It has a single collision domain and a single broadcast domain.

**Q #8) What is Half-duplex and Full-duplex?**

**Answer:** In half-duplex, the transmission of information or communication is from one direction only.

**Example:** Walkie-talkie

In full-duplex, the transmission of information or communication is from both the directions.

**Example:** Talking on the telephone.

**Q #9) Define Network Congestion?**

**Answer:** The process in which a network node is carrying more data that can't be handled on the network, and owing to which loss of packets or information happens on the network node and the receiver can't receive appropriate information is termed as Network Congestion.

**Q #10) What is the difference between LAN, MAN, and WAN?**

**Answer:**

**LAN:** It is a local area network where computers and network devices are connected with each other, usually within the same area or building. Connections in LAN must be of high speed. **Example:** Ethernet

**MAN:** It is a metropolitan area network where the networks are connected widely within several buildings in the same city. **Example:** The IUB Network

**WAN:** It is a wide area network where the networks are limited to one enterprise or organization and can be accessed by the public. It connects several LANs. Connection in WAN is of high speed and expensive too. **Example:** Internet.

**Q #11) Define IP Address?**

**Answer:** Internet Protocol (IP Address) is a 32-bits to 128-bits identifier for a device on TCP/IP protocol. The IP address of a device must be uniquely defined for communication.

It has 2 principal functions which include **host and location address**. And it has two versions which are **IPv4 (32-bits) and IPv6 (128-bits)**.

**Q #12) In how many ways can data be transferred in CCNA?**

**Answer:** Data can be transferred in 3 ways:

- Simplex
- Half-duplex
- Full-duplex

**Q #13) What is the difference between Unicast, Multicast, Broadcast, and Anycast?**

**Answer: Unicast:** It is the exchange of messages between a single source and a single destination. In Unicast, packets sent from the sender contains data address of the receiver so that it can go to the receiver directly.

**Broadcast:** It is the exchange of messages between one sender to all possible multiple receivers. It works only on a local network. Broadcasting of data can't be done on the public internet due to a massive amount of unrelated and unnecessary data.

**Multicast:** It is the exchange of messages between one sender and multiple receivers. In multicast, the network settings determine your receiving clients and sort of broadcasting.

**Anycast:** It is the exchange of messages between one host to another host. It uses TCP and UDP protocols. The copy of each data packet goes to every host that requests it.

**Q #14) What are the different types of networks in CCNA?**

**Answer:** There are two types of network:

- Server-based network
- Peer-to-Peer network

**Q #15) What is a Network subnet?**

**Answer:** It is the subdivision of an IP address which is divided into two parts such as **Network prefix** and **Host identifier**.

**Q #16) Can IP address be assigned to Layer 2?**

**Answer:** No, IP addresses cannot be assigned to Layer2.

**Q #17) What is PING used for?**

**Answer:** PING is a Packet Internet Groper. It is used to test the reachability of a host on an Internet Protocol (IP) network. When any data is sent via the network through the IP addresses, then it will PING the receiver to receive the data from the sender.

**Q #18) What are the different class and ranges of IP addresses?**

**Answer:** There are 5 different classes of IP address:

Class	Range
A	1-126
B	127-191
C	192-223
D	224-239
E	240-254

**Q #19) What is Private IP and Public IP?**

**Answer:**

**Private IP:** It is used within the local LAN.

**Public IP:** It is used across the Internet.

**Q #20) Define Topology.**

**Answer:** It is an arrangement of elements in a specific order.

**The various types of Topology include:**

- Bus
- Star
- Mesh
- Ring
- Hybrid
- Tree

**Q #21) Define MAC Address.**

**Answer:** MAC address is Media Access Control address. It is stored in ROM and is uniquely defined. It is identified as the Media Access Control layer in the network architecture.

**Q #22) Why is VLAN used?**

**Answer:** It is a Virtual LAN network which is used to make a separate domain in a single switch.

**Q #23) What are the different types of passwords that you can use in Cisco routers?**

**Answer:** Different types of passwords that are used in Cisco routers are enabled, enable secret, auxiliary (AUX), console and virtual terminal (VTY).

**Q #24) How many types of memories are used in Cisco router?**

**Answer:** Given below are the different types of memory that are used:

- **Flash memory:** It stores the system IOS. It is electronically erasable and a re-programmable memory chip.
- **RAM:** Stores configuration file which is being executed. It loses its information when a router is restarted or shut down.
- **NVRAM:** Store startup configuration file and IOS reads this file when the router boots up.
- **ROM:** Read Only Memory. It saves the information if the router is shut down or restarted. It maintains the instructions for POST diagnostics.

**Q #25) What is meant ARP and RARP?**

**Answer:** ARP is Address Resolution Protocol which is used to map an IP address to a physical machine.

RARP is Reverse Address Resolution Protocol which is used to map MAC address to the IP address.

**Q #26) What are the different types of cables that are used in routing?**

**Answer:** Three different types of cables that are used include:

- Straight cable(switch-router)
- Cross cable(PC-PC, switch-switch)
- Rollover cable(Console port to computer)

**Q #27) Define Logical Topology.**

**Answer:** Logical Topology is the network from where the data packets are sent from the source to destination, which we can see as well.

**Q #28) What is the difference between static and dynamic IP addresses?**

**Answer:** Static IP address will not change over time and is reserved statically whereas dynamic IP address changes each time when you connect to the Internet.

**Q #29) What is Peer to Peer network?**

**Answer:** The P2P network is a distributed and decentralized network where individual nodes i.e. Peers in the networks act as both suppliers and consumers of the resources.

**Q #30) What is the IEEE standard for wireless networking?**

**Answer:** IEEE 802.11

**Q #31) What do you understand by 'Protocol' in networking?**

**Answer:** A protocol enables two devices to connect and transmit the information or data to one another.

**Q #32) What do you understand by PoE (Power over Ethernet)?**

**Answer:** It is defined by the IEEE standard and it passes electric power supply to the network devices over the existing data connection.

**Q #33) What is OSPF? Describe it.**

**Answer:** OSPF stands for Open Shortest Path First. It uses the Dijkstra algorithm and is a link-state routing protocol that is used to connect to a large number of networks without having any limitation on the number of hops.

**Q #34) What does Multiple Access mean?**

**Answer:** In Multiple Access, it allows more than one device to transmit the data at the same time.

**For Example,** Star or Mesh Topology.

**Q #35) Explain the difference between Collision Domain and Broadcast Domain.**

**Answer:**

**Broadcast Domain**

In the Broadcast Domain, all the juncture can reach each other by broadcast at the Data Link Layer and every device is ready to receive their respective data. It can bind to the same LAN segments or the other LAN segment.

Broadcast Domain uses a local network for broadcasting the data packets to the receiver. While broadcasting, massive data are broadcasted, hence the speed of receiving the data is less and it also takes more time to receive the data of their address.

**Collision Domain**

In the Collision Domain, data collision occurs more due to the sending of more frames simultaneously.

If more than two frames are sent simultaneously then the data will collide with each other in between and the information gets lost. Hence, the devices will not accept the data and due to this, the communication between the sender and receiver side will collide.

Thus, the sender has to send the data again and like this, it will take more time to receive the data at the receiver's side.

**Q #36) Frame Relay Technology works on which layer of the OSI model?**

**Answer:** It works on the Data Link Layer.

**Q #37) What does Round Trip Time mean?**

**Answer:** Round-trip time or round-trip delay is defined as the time taken by a signal to send the data plus the time it receives the acknowledgment from the receiver of that signal.

**Q #38) What is MTU and what is its size for transmission?**

**Answer:** MTU stands for Maximum Transmission Unit and its size is 1500 bytes.

**Q #39) What is the difference between CSMA/CD and CSMA/CA?**

**Answer:** Carrier Sense Multiple Access with Collision detection (CSMA/CD) is a media access control method that is used in local area networking. It uses early Ethernet technology to overcome collision when it occurs.

**And, Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)** is used in the wireless network to avoid a collision.

**Q #40) Define the Autonomous System (AS).**

**Answer:** It is either a single network or a group of networks that are managed by a single directive. It is defined by a unique number or code and is called as an Autonomous System Number (ASN). Sometimes, it is also called as a routing domain. Communication of networks within an AS is done by using Interior Gateway Protocol (IGP).

**Q #41) Why do you use ‘Service Password Encryption’?**

**Answer:** Service Password Encryption is used to encrypt plaintext password into a type 7 password. Security is less and hence it can be easily decrypted.

**Q #42) Explain the DHCP scope.**

**Answer:** Dynamic Host Configuration Protocol (DHCP) is used to automatically assign an IP host with its address to a client.

**Q #43) Explain the difference between Tracert and Traceroute.**

**Answer:** You would use Tracert on a PC while you would use the command Traceroute on a router or switch.

**Q #44) Why is Distributed Processing useful?**

**Answer:** Distributed processing is useful because of its lower cost, improved performance, reliability, and flexibility.

**Q #45) What do you understand by Redundancy?**

**Answer:** Redundancy is a method that provides backup paths in case of network or path failure.

**Q #46) What is the Domain Name System (DNS)?**

**Answer:** DNS is an internet service that translates domain names into IP addresses. Anything connected to the internet i.e. mobile phones, laptops, websites etc. has an IP address that is uniquely defined.

**Q #47) Define Bandwidth.**

**Answer:** Bandwidth is defined as the amount of data that can be transmitted or carried in a fixed interval of time.

**Q #48) Explain the basic difference between TCP/IP and OSI model.**

**Answer:** OSI and TCP/IP protocol are different from their layers. In the OSI model, there are 7 layers whereas in TCP/IP there are 4 layers.

**Q #49) What is the difference between ‘bit rate’ and ‘baud rate’?**

**Answer:** A **bit rate** is defined as the total number of bits transmitted in one second whereas the **baud rate** is defined as the number of signal unit per second that is required to represent those bits.

**Baud rate**=**bit rate** / **N**,

where N = no. of bits represented by each signal shift.

**Q #50) What do we check while configuring the server?**

**Answer: While configuring, the following parameters are checked:**

- Check whether LAN is connected or not.
- The root should be in the NTFS format.
- The server should have a static IP address for communication.

1. **Question 1. What Is Switching?**

**Answer :**

The function of Switching is to Switch data packets between devices on the same network.

2. **Question 2. What Is Switch?**

**Answer :**

A Switch is a device which is used to connect multiple devices inside Local Area Network (LAN). Unlike hubs, switches examine each packet and process it accordingly rather than simply repeating the signal to all ports. Switches operate at Layer Two (Data Link Layer) of the OSI model.

3. **Question 3. What Is The Difference Between A Hub, Switch & Router?**

**Answer :**

Hub is designed to connect hosts to each other with no understanding of what it is transferring. When a Hub receives a packet of data from a connected device, it broadcasts that data packet to all other ports regardless of destination port. HUB operates at Layer 1 (Physical Layer).

Switch also connects hosts to each other like a hub. Switch differs from a hub in the way it handles packets. When a switch receives a packet, it determines what hosts the packet is intended for and sends it to that hosts only. It does not broadcast the packet to all the hosts as a hub does which means bandwidth is not shared and makes the network more efficient. Switch operates at Layer 2 (Data Link Layer).

Router is different from a switch or hub since its function is to route data packets to other networks, instead of just the local network. Routers operates at Layer 3 (Network Layer).

**Q 4. Describe OSI MODEL .**

The following reviews the OSI model by giving you a description of each layer and examples of protocols and devices that run at each layer.

Layer	Description	Examples
7.Application	Responsible for initiating or services the request.	SMTP, DNS, HTTP, and Telnet
6.Presentation	Formats the information so that it is understood by the receiving system.	Compression and encryption depending on the implementation
5.Session	Responsible for establishing, managing, and terminating the session.	NetBIOS
4.Transport	Breaks information into segments and is responsible for connection and connectionless communication.	TCP and UDP
3.Network	Responsible for logical addressing and routing	IP, ICMP, ARP, RIP, IGRP, and routers
2.Data Link	Responsible for physical addressing, error correction, and preparing the information for the media	MAC address, CSMA/CD, switches, and bridges
1.Physical	Deals with the electrical signal.	Cables, connectors, hubs, and repeaters

### Network Cabling for the Cisco ICND1 Certification Exam

The ICND1 certification exam tests you on the different types of cabling that is used in different network scenarios. The following are some key points to remember about network cabling.

- **Rollover Cable:** A rollover cable is also known as a console cable and gets the name rollover because the order of the wires from one end of the cable to the other are totally reversed, or rolled over. The rollover/console cable is used to connect a computer to the console port or auxiliary port of the router for administration purposes.



- **Back-to-back Serial Cable:** The back-to-back serial cable is used to connect two Cisco routers directly together over a serial link. A back-to-back serial link will have one router act as the DCE device with the clock rate set and the other router act as the DTE device.
- **Straight-through Cable:** A straight-through cable is used to connect dissimilar devices together. Scenarios that use straight-through cables are computer-to-switch and switch-to-router.
- **Crossover Cable:** A crossover cable has wires 1 and 2 switch positions with wires 3 and 6 on one end and is used to connect similar devices together. Scenarios that use crossover cables are computer-to-computer, switch-to-switch, and computer-to-router (they are both hosts).
- **Coaxial Cable:** A network cable type used in old Ethernet environments such as 10Base2 and 10Base5. Coaxial cable is seen in high speed Internet connections with cable companies today.
- **Fiber Optic Cable:** A unique cable type that has a glass core which carries pulses of light as opposed to copper cable carrying electrical signals (coax and twisted pair cabling).

## ICND1 Certification Exam: Network Devices and Services

You can be sure to get a few questions on the Cisco ICND1 certification exam that tests your knowledge of types of devices and different network services. The following are some key points to remember about devices and services:

### Network devices

- **Hub:** A hub is a layer 1 device that is used to connect systems together. When a hub receives data in the form of an electrical signal it sends the data to all other ports in hopes the destination system is at one of those ports. All ports on the hub create a single collision domain and a single broadcast domain.
- **Repeater:** A repeater is a layer 1 device that is used to re-amplify the signal. As the signal travels along the network it gets weaker due to interference so the purpose of the repeater is to regenerate that signal so it can travel more distance.

- **Bridge:** A bridge is a layer-2 device that creates multiple network segments. The bridge maintains a table in memory of what systems reside on what segments by their MAC addresses. When data reaches the bridge, the bridge filters the traffic by only sending the data to the network segment that the destination system resides on.

The purpose of the bridge is that it filters traffic by only sending the data to the segment where the destination system resides. Each segment on the bridge creates a separate collision domain, but it is all one broadcast domain.

- **Switch:** The switch, another layer-2 device, is an improvement on a bridge in the sense that each port on the switch acts as a network segment. The switch filters traffic by only sending the data to the port on the switch where the destination MAC address resides. The switch stores each MAC address and the port the MAC address resides on in an area of memory known as the MAC address table. Each port on the switch creates a separate collision domains but all ports are part of the same broadcast domain.
- **Router:** A router is a layer-3 device that handles routing of data from one network to another network. The router stores a listing of destination network in the routing table which is found in memory on the router.

## Network services

- **DHCP:** The DHCP service is responsible for assigning IP addresses to hosts on the network. When a client boots up it sends a DHCP discover message, which is a broadcast message designed to locate a DHCP server. The DHCP server responds with a DHCP Offer — offering the client an IP address. The client then responds with a DHCP request message asking for the address before the server responds with a DHCP ACK to acknowledge that the address has been allocated to that client.
- **DNS:** The DNS service is responsible for converting the Fully Qualified Domain Name (FQDN) such as [www.gleneclarke.com](http://www.gleneclarke.com) to an IP address.
- **NAT:** Network Address Translation is responsible for converting the internal address to a public address that is used to access the Internet. NAT offers the benefit of being able to only purchase one public IP addresses and have a number of clients on the network use that one IP address for Internet access.

NAT also offers the security benefit that the internal addresses are not used on the Internet – helping to keep the internal addresses unknown to the outside world. There are two types of NAT to know for the CCENT certification exam:

- **Static NAT:** Static NAT is the mapping of one internal address to one public address. With static NAT you will need multiple public addresses to allow internal clients to access the Internet.
- **NAT Overloading:** A more popular form of NAT, NAT overloading is the concept that all internal addresses get translated to the one public address on the NAT device.
- **Web Services:** There are a number of web services you should be familiar with for the CCENT certification exam.

Consider the following:

- **POP3/IMAP4:** POP3 and IMAP4 are the Internet protocols for receiving email over the Internet.
- **SMTP:** SMTP is the Internet protocol for sending email over the Internet. SMTP servers are also known as email servers.
- **HTTP:** HTTP servers are also known as web servers, and are used to host websites. HTTP is a protocol that is used to send the web page from the web server to the web client.
- **FTP:** FTP is an Internet protocol used to transfer files over the Internet. The files are hosted on FTP servers which are then downloaded to any clients on the Internet.