**DCC Answer Bank Unit Test – 1**

**Unit – 1**

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| **1.** | **List and describe the process of data communication in various modes** |
| **A** | There are three modes of data communication:   1. Simplex: In simplex mode, communication happens in only one direction. One device is the sender and the other is the receiver. Only one device can send data, and the other device can only receive it. Examples of simplex mode include radios and television broadcasts. 2. Half-duplex: In half-duplex mode, communication can happen in two directions, but not at the same time. Each device can both send and receive data, but not simultaneously. Examples of half-duplex mode include walkie-talkies and some computer networks. 3. Full-duplex: In full-duplex mode, communication can happen in two directions simultaneously. Each device can both send and receive data at the same time. Examples of full-duplex mode include telephone conversations and most computer networks.   In each mode, the process of data communication involves the following steps:   1. Data generation: The data is created by a user or device. 2. Encoding: The data is converted into a digital format so that it can be transmitted over a communication channel. 3. Transmission: The encoded data is transmitted over the communication channel. 4. Decoding: The transmitted data is converted back into its original form. 5. Reception: The decoded data is received by the intended recipient. 6. Interpretation: The recipient interprets the data and takes appropriate action based on the information received. |
| **2.** | **Define Protocol in computer network. State the need of Protocol. Give the name of any two Protocols.** |
| **A** | A protocol in computer networking refers to a set of rules that govern the exchange of data between devices in a network. It defines the format, timing, sequencing, and error control of data transmission over a communication channel.  The need for protocols in computer networking is to ensure that devices from different manufacturers and platforms can communicate with each other in a standard way. Protocols provide a common language that devices can use to communicate, allowing for interoperability between different systems.  Two examples of protocols used in computer networking are:   1. Transmission Control Protocol (TCP): A reliable, connection-oriented protocol that provides error checking and correction, flow control, and congestion control. 2. Internet Protocol (IP): A connectionless, packet-switched protocol that provides routing and addressing for data packets sent over a network. |
| **3.** | **Compare Analog and Digital signals.** |
| **A** | |  |  |  | | --- | --- | --- | | **Feature** | **Analog Signal** | **Digital Signal** | | Definition | A continuous signal that varies in amplitude and frequency | A discrete signal that represents binary data | | Representation | Represented by sine waves | Represented by binary digits (0's and 1's) | | Accuracy | Less accurate | More accurate | | Noise | Suffers from noise interference | Resistant to noise interference | | Bandwidth | More bandwidth required for transmission | Less bandwidth required for transmission | | Storage | Cannot be stored without losing quality | Can be stored and reproduced without losing quality | | Examples | Sound waves, analog phone lines, old TV transmissions | Digital phone lines, CDs, DVDs, digital TV transmissions | |
| **4.** | **Define Computer Network and state its types. State the need of computer network** |
| **A** | A computer network refers to a group of interconnected devices that can communicate and share resources with each other. These devices can include computers, servers, printers, routers, switches, and other networked devices.  There are different types of computer networks, including:   1. Personal Area Network (PAN) 2. Local Area Network (LAN) 3. Wide Area Network (WAN) 4. Metropolitan Area Network (MAN) 5. Wireless Local Metropolitan Area Network (WLAN)   The need for computer networks is to facilitate communication and resource sharing between devices, improve efficiency and productivity, and provide access to remote resources and services. Networks also enable collaboration, data sharing, and real-time communication, which are essential in many business and social contexts. |
| **5.** | **List any four benefits of computer network** |
| **A** | Four benefits of computer networks are:   1. Resource Sharing 2. Communication 3. Centralized Management 4. Increased Flexibility 5. Cost Savings 6. Scalability 7. Improved Security 8. Remote Access |
| **6.** | **Compare LAN vs WAN vs MAN on basis of Speed, Congestion, Maintenance, and Area Coverage.** |
| **A** | |  |  |  |  | | --- | --- | --- | --- | | **Feature** | **LAN** | **MAN** | **WAN** | | Speed | Very high | High | Low to high | | Congestion | Low | Moderate to high | Moderate to high | | Maintenance | Easy | Moderate to difficult | Difficult | | Area Coverage | Small | Medium | Large | |
| **7.** | **Classify the network based on geographical area and transmission technology.** |
| **A** | Networks can be classified based on geographical area and transmission technology as follows:  Based on Geographical Area:   * LAN (Local Area Network): Covers a small geographical area, such as a single building or campus. * MAN (Metropolitan Area Network): Covers a larger geographical area, such as a city or metropolitan region. * WAN (Wide Area Network): Covers a very large geographical area, such as a country or the entire world.   Based on Transmission Technology:   * Broadcast networks: Broadcast networks have a single communication channel that is shared or used by all the machines on the network. Short messages called packets sent by any machine is received by all the others. Broadcast systems generally use a special code in the address field for addressing a packet to all the concerned computers. This mode of operation is called broadcasting. * Point-to-point networks: Point to point networks consists of many connections between individual pairs of machines. To go from the source to the destination a packet on these types of networks may have to go through intermediate computers before they reach the desired computer |
| **8.** | **State any four advantages of peer-to-peer network over client-server network.** |
| **A** | Four advantages of peer-to-peer network over client-server network:   1. Use less expensive computer hardware 2. Easy to install and configure 3. No dedicated server required 4. Easy to administer -No dedicated administrator to run the network required. 5. No Network OS(NOS)/ specialized software required 6. Users control their own resources 7. More built-in redundancy |
| **9.** | **With neat diagram explain client-server network with its advantages and disadvantages.** |
| **A** | * A server-based network offers centralized control and is designed for secure operations. * In a server-based network, a dedicated server controls the network. * Nodes are either clients or servers * Clients use services * Servers provide services i.e. Access to shared data, Printing, E-mail, etc. * Client software on client node cooperates with server software on server node * WWW is largest client server application * A dedicated server is one that services the network by storing data, applications, resources, and also provides access to resources required by the client. * These servers can also control the network’s security from one centralized location or share it with other specially configured servers   CitizenChoice  Advantages of client-server network include:   1. Centralized control: The server acts as a central point of control, allowing network administrators to manage and monitor the network easily. 2. Scalability: Client-server networks can be easily scaled up or down to accommodate changes in network traffic or the number of users. 3. Resource sharing: Resources such as printers, storage devices, and applications can be shared among multiple clients, reducing costs and increasing efficiency.   Disadvantages of client-server network include:   1. High cost: Setting up a client-server network can be expensive, especially for small businesses or organizations. 2. Single point of failure: If the server fails, the entire network can become inaccessible, causing significant downtime and loss of productivity. 3. Complexity: Client-server networks can be complex and require specialized IT knowledge to manage effectively. |
| **10.** | **Describe pros and cons of peer-to-peer network and client-server network** |
| **A** | 1. Peer to Peer Network   Pros of Peer-to-Peer Networks:   1. Decentralized: In a P2P network, there is no central server or authority, and each computer can act as both a client and a server. This allows for more flexibility and resilience, as there is no single point of failure. 2. Cost-effective: P2P networks are often more cost-effective than client-server networks, as they require less specialized hardware and software. 3. Easy to set up: P2P networks can be easy to set up and configure, especially for small networks. 4. More privacy: P2P networks can offer more privacy, as there is no central authority to monitor or control network activity.   Cons of Peer-to-Peer Networks:   1. Security: P2P networks can be more vulnerable to security threats, such as hacking and malware, as each computer is responsible for its own security. 2. Less control: P2P networks can be more difficult to manage and control, as there is no central authority to enforce policies or access controls. 3. Performance: P2P networks can suffer from performance issues, especially when handling large amounts of data or complex processing tasks. 4. Client Server Network   Pros of Client-Server Networks:   1. Centralized control: In a client-server network, the server acts as a central point of control, allowing for easier management of resources and security policies. 2. Scalability: Client-server networks can be easily scaled by adding more servers or upgrading existing ones to handle increased demand. 3. Security: Client-server networks are generally more secure than P2P networks, as the server can implement security policies and access controls to protect resources from unauthorized access. 4. Performance: Client-server networks can often provide better performance than P2P networks, especially when handling large amounts of data or complex processing tasks.   Cons of Client-Server Networks:   1. Cost: Client-server networks can be more expensive than P2P networks, as they require more specialized hardware and software. 2. Single point of failure: In a client-server network, the server is a central point of control, and if the server fails, the entire network may become unusable. 3. Complexity: Client-server networks can be complex and difficult to manage, especially as the number of clients and servers increases. This can make it challenging to troubleshoot issues and maintain the network. 4. Dependence on the server: In a client-server network, clients rely on the server to access resources, and if the server is unavailable or slow, clients may not be able to access the resources they need. |
| **11.** | **Define bit rate and baud rate.** |
| **A** | **Bit rate** refers to the number of bits transmitted per second in a communication system. It is measured in bits per second (bps). For example, if a system transmits 1000 bits in one second, then the bit rate of the system is 1000 bps.  **Baud rate**, on the other hand, refers to the number of signal units transmitted per second in a communication system. It is measured in bauds or symbols per second (sps). A signal unit can represent one or more bits, depending on the modulation technique used. For example, if a system transmits 1000 symbols per second, then the baud rate of the system is 1000 sps. |

**UNIT 2**

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|  | **State factors to be considered for selecting transmission media** |
| **Ans.** | **Bandwidth: All other factors remaining constant, the greater**  **the band-width of a signal, the higher the data rate that can be**  **achieved**  **• Transmission Impairments: Limit the distance a signal can**  **travel.**  **• Interference: Competing signals in overlapping frequency**  **bands can distort or wipe out a signal.**  **• Number of Receivers / Nodes: Each attachment introduces**  **some attenuation and distortion, limiting distance and/or data**  **rate.** |
| **2.**  **Ans.** | **Compare Guided and Unguided transmission media, Write applications for guided and unguided transmission media**   |  |  |  | | --- | --- | --- | | **Parameters** | **Unguided Transmission** | **Guided Transmission** | | **Physical medium** | **Not Required** | **Required** | | **Signal attenuation** | **Not an issue** | **Experiences It** | | **Interference** | **Less** | **More** | | **Distance** | **Longer** | **Shorter** | | **Security** | **Less** | **More** |   **Applications:**  **Guided Transmission**     1. **LAN** 2. **Cable TV** 3. **Telephone System** 4. **Data Center** 5. **Industrial control System**   **Unguided Transmission**   1. **WLAN** 2. **Mobile Communications** 3. **Satellite communications** 4. **Bluetooth Devices** 5. **Infrared Devices** |
| **3.** | **Why the network cable is twisted?** |
| **Ans.** | * **Network cables are twisted to help reduce interference between wires. When the wires are twisted together, any electromagnetic signals that are emitted from one wire are canceled out by the opposite signal in the other wire, making the signal transmission more reliable.** * **Additionally, the twisting pattern helps to reduce crosstalk, which is when a signal on one wire interferes with a signal on an adjacent wire.** * **This ensures that each signal is transmitted with minimal interference, resulting in a better quality and speed of data transmission.** |
| **4.** | **Compare UTP with STP on basis of Noise, Ease of Handling, Cost, and Speed, Attenuation.**  **OR**  **Differentiate / compare UTP and STP cable.** |
| **Ans.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Parameters** | **UTP** | | **STP** | | | **Noise** | **Comparatively weaker at reducing noise** | | **STP cables are better at reducing noise** | | | **Ease of Handling** | **UTP cables are generally easier to handle and install** | | **STP cables are**  **Difficult to install** | | | **Cost:** | **UTP cables are generally less expensive than STP** | | **STP cables are generally more expensive than UTP** | | | **Speed and Attenuation:** | **Lower Attenuation and Higher Transmission Speed** | **Higher Attenuation and lower Transmission speed** | | |
| **5.** | **What is cross over cable and straight through cable? Give color code (pin configuration) for both and write the steps to create cross over cable.** |
| **Ans.** | **A crossover cable and a straight-through cable are two types of Ethernet cables that are used to connect networking devices to each other.**  **1.Crossover Cable**  **A crossover cable is used to connect similar devices together, like a computer to another computer or a switch to another switch.**  **2.Straight-through Cable**  **A straight-through cable is used to connect different types of networking devices together, like a computer to a switch or a router to a modem.**  **Color Code**   * 1. **Crossover Cable**   **Green/White**  **Green**  **Orange/White**  **Blue**  **Blue/White**  **Orange (2)**  **Brown/White**  **Brown**   * 1. **Straight – through cable**   **Orange/White**  **Orange**  **Green/White**  **Blue**  **Blue/White**  **Green**  **Brown/White**  **Brown**  **Steps to create crossover cable**   1. **Gather the required tools and materials, including a length of Ethernet cable, RJ-45 connectors, a crimping tool, and a wire stripper.** 2. **Strip about an inch of the outer jacket off the Ethernet cable, exposing the inner wires.** 3. **Untwist the pairs of wires and separate them into the appropriate color codes for the wiring standard being used.** 4. **Cross over the wires at one end of the cable, following the appropriate color code for a crossover cable.** 5. **Insert the wires into the RJ-45 connector and use the crimping tool to secure the connector onto the cable.** 6. **Repeat the same process for the other end of the cable, making sure to use the same wiring pattern.** 7. **Test the cable to make sure it is functioning properly by connecting two similar devices together.** |
| **6.** | **Draw a neat sketch and describe the construction of co-axial cable. State any two advantages and disadvantages of coaxial cable.** |
| **Ans.** | **Coaxial cables consist of two concentric conductors separated by an insulating layer, with the outer conductor usually shielded by a metallic braid or foil. Here's a simple way to construct a coaxial cable:**  **Inner Conductor: The inner conductor is a single solid or stranded copper wire that carries the signal. It is usually coated with a thin layer of insulation to prevent it from touching the outer conductor and causing interference.**  **Dielectric Insulation: The inner conductor is surrounded by a layer of dielectric insulation, which is a non-conductive material that separates the inner and outer conductors. The dielectric material used can vary depending on the specific application and desired performance characteristics, but common materials include polyethylene (PE), polytetrafluoroethylene (PTFE), and foam.**  **Outer Conductor: The outer conductor is a metallic layer that surrounds the dielectric insulation and provides shielding from external electromagnetic interference.**  **Jacket: The outermost layer of the coaxial cable is a protective jacket that provides mechanical protection and resistance to environmental factors such as moisture and abrasion. The jacket is typically made of a tough, flexible material such as PVC or polyurethane.**      **Advantages**   1. **Inexpensive** 2. **Easy to wire and install** 3. **Easy to expand** 4. **Good resistance to EMI** 5. **Durable**   **Disadvantages**   1. **High attenuation rate makes it expensive over long distance** 2. **Bulky** |
| **7.** | **Draw a neat structural diagram of Fiber optic cable & state its types.** |
| **Ans.** | **OR** |
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| **8.** | **Describe any four physical characteristics of Fiber Optic Cable.** |
| **Ans.** | 1. **Core: The core is the center of the fiber optic cable, and it is where the light travels. It is typically made of silica glass or plastic, and its diameter can range from 5 to 200 microns.** 2. **Cladding: The cladding surrounds the core and is made of a material with a lower refractive index than the core. This causes the light to be reflected back into the core, which helps to keep it contained within the cable.** 3. **Coating: The coating surrounds the cladding and provides protection for the fiber. It is typically made of a polymer material and helps to prevent damage from bending or crushing.** 4. **Jacket: The jacket is the outermost layer of the fiber optic cable, and it provides additional protection against physical damage and environmental factors such as moisture or UV radiation.** 5. **Mode: The mode of an optical fiber refers to the way in which the light travels through the fiber. Single mode fibers have a very small core diameter and allow for the transmission of a single mode of light, while multimode fibers have a larger core diameter and allow for the transmission of multiple modes of light.** 6. **Attenuation: Attenuation is the loss of signal strength as the light travels through the fiber. Fiber optic cables have low attenuation, which allows for the transmission of signals over longer distances without requiring signal amplification.** 7. **Dispersion: Dispersion refers to the spreading out of light as it travels through the fiber. There are two types of dispersion: chromatic dispersion, which occurs when different colors of light travel at different speeds, and modal dispersion, which occurs when different modes of light travel at different speeds. Dispersion can cause signal distortion and limit the distance over which signals can be transmitted.** 8. **Bandwidth: Bandwidth refers to the amount of data that can be transmitted over the fiber optic cable in a given amount of time. Fiber optic cables have a very high bandwidth capacity, which allows for the transmission of large amounts of data over long distances.** |
| **9.** | **Draw and explain different modes of fiber optic cable.** |
| **Ans.** | **Multimode step index fiber**  **– Both core and cladding have different but uniform refractive index.**  **– Relies on total internal reflection; Wide pulse width.**  **– the reflective walls of the fiber move the light pulses to the receiver**  **Multimode graded index fiber**  **– Core has variable refractive index (light bends as it moves away from core).**  **– Narrow pulse width resulting in higher bit rate.**  **– acts to refract the light toward the center of the fiber by variations in the**  **density.**  **Single mode fiber (> 100 Mbs)**  **– the light is guided down the center of an extremely narrow core**  **– Width of core diameter equal to a single wavelength.** |
| **10.** | **Compare fiber optic cable with copper cable.** |
| **Ans.** |  |
| **11.** | **List any four unguided transmission media. Enlist any four communication bands for unguided media with their frequency range.** |
| **Ans.** | 1. **Radio Waves** 2. **Microwaves** 3. **Infrared Waves** 4. **Laser Beams** 5. **Ultraviolet Waves** 6. **X-rays**   **Communication Bands**   1. **Radio frequency (RF) band** 2. **Microwave band:** 3. **Infrared band** 4. **Visible light band** |
| **12.** | **Explain microwave communication with diagram. Give any two applications of microwave communication.** |
| **Ans.** | **In microwave communication, the transmitter sends a signal in the form of a microwave wave, which is picked up by a receiver at the other end. The signal can be modulated to carry various types of information, such as voice, video, or data. The transmission can occur in a point-to-point or point-to-multipoint configuration, depending on the network setup.**  Microwave Link Networks - Engineering and Technology History Wiki  **Applications**   1. **Cellular Communication** 2. **Satellite Communication** 3. **Wireless Local Area Network (WLAN)** 4. **Point – to – point links** 5. **Radar Systems** |
| **13.** | **Explain satellite communication with neat diagram.** |
| **Ans.** | **Satellite communication is a method of transmitting information from one point on the Earth's surface to another point via a satellite that orbits the Earth. The process involves a ground-based transmitter sending a signal to the satellite, which then relays the signal back down to a ground-based receiver.**  **Satellites used for communication are typically placed in geostationary orbit, meaning they orbit the Earth at the same rate as the Earth rotates, allowing them to remain in a fixed position relative to the ground. This allows for continuous communication between two or more points on the Earth's surface.**  Satellite Basics | Intelsat |
| **14.** | **Define Multiplexing. State its types.** |
| **Ans.** | **• Multiplexing to refer to the combination of information**  **streams from multiple sources for transmission over a shared**  **medium**  **• Multiplexing is a technique used to combine and send the**  **multiple data streams(signals) over a single medium (data link).**  **—The process of combining the data streams is known as Multiplexing and**  **hardware used for multiplexing is known as a Multiplexer.**  **—Multiplexing is achieved by using a device called Multiplexer (MUX) that**  **combines n input lines to generate a single output line. Multiplexing**  **follows many-to-one, i.e., n input lines and one output line.**  **Types** |
| **15** | **State advantages and disadvantages of FDM.** |
| **Ans.** | **Advantages**  **• FDM is used for analog signals.**  **• FDM process is very simple and easy modulation.**  **• A Large number of signals can be sent through an FDM**  **simultaneously.**  **• It does not require any synchronization between sender and**  **receiver.**  **Disadvantages**  **• FDM technique is used only when low-speed channels are**  **required.**  **• It suffers the problem of crosstalk.**  **• A Large number of modulators are required.**  **• It requires a high bandwidth channel.** |

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| **16.** | **What advantages does TDM have over FDM in a circuit switched network?** |
| **Ans.** | **In TDM, each signal uses all of the bandwidth some of the time, while for FDM,**  **each signal uses a small portion of the bandwidth all of the time.**  **TDM uses the entire frequency range but dynamically allocates time, certain jobs might require less or more time, which TDM can offer but FDM is unable to as it cannot change the width of the allocated frequency.**  **TDM provides much better flexibility compared to FDM.**  **TDM offers efficient utilization of bandwidth**  **Low interference of signal and minimizes cross talk** |
| **17.** | **Describe the working principle of Packet switching and Circuit switching techniques with neat diagram** |
| **Ans.** | **Circuit Switching: When two nodes communicate with each other over a dedicated communication path, it is called circuit switching. There 'is a need of pre-specified route from which data will travels and no other data is permitted. In circuit switching, to transfer the data, circuit must be established so that the data transfer can take place.**  **Circuits can be permanent or temporary. Applications which use circuit switching may have to go through three phases:**  ** Establish a circuit**  ** Transfer the data**  ** Disconnect the circuit**    **Circuit switching was designed for voice applications. Telephone is the best**  **suitable example of circuit switching. Before a user can make a call, a virtual**  **path between callers and called is established over the network**  **Packet Switching: The entire message is broken down into smaller chunks called packets. The switching information is added in the header of each packet and transmitted independently.**  **Packet switching enhances line efficiency as packets from multiple applications can be multiplexed over the carrier. The internet uses packet switching technique. Packet switching enables the user to differentiate data streams based on priorities. Packets are stored and forwarded according to their priority to provide quality of service.** |

**Unit 3**

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| **2.** | **Describe Forward Error Correction** |
| A | Forward Error Correction (FEC) is a technique used to detect and correct errors in data transmission. In FEC, extra redundant bits are added to the transmitted data to enable the receiver to detect and correct any errors that occur during transmission.  FEC is used in various applications, such as digital communication systems, wireless networks, and satellite communication systems, where the transmission channel is prone to errors and the quality of the channel is unpredictable. By adding redundancy to the transmitted data, FEC can improve the reliability and robustness of the data transmission. |
| **1.** | **Define Redundancy** |
| A | Redundancy in data communication and computer networks refers to the use of additional bits or information that are added to the transmitted data to provide error detection and correction capabilities. These extra bits are used to ensure that the transmitted data is accurate and error-free, even in the presence of noise, interference, or other technical issues. |
| **3.** | **Describe working of CRC with suitable example** |
| A | Cyclic Redundancy Check (CRC) is a popular error detection technique used in data communication and computer networks. It is a type of checksum that is computed by dividing the data bits by a predetermined polynomial to generate a remainder. This remainder is appended to the original data bits to create the transmitted message.  The receiver performs the same polynomial division operation on the received message and compares the resulting remainder with the remainder that was transmitted. If they match, it is assumed that the message was transmitted without errors, otherwise, an error is detected.  Suppose the original data to be sent - 11100  Divisor/Key - 1001 [ Or generator polynomial x3+ 1]  CRC Generator  • A CRC generator uses a modulo-2 division. Firstly, three zeroes are appended  at the end of the data as the length of the divisor is 4 and we know that the  length of the string 0s to be appended is always one less than the length of the  divisor.  • Now, the string becomes 11100000, and the resultant string is divided by the  divisor 1001.  • The remainder generated from the binary division is known as CRC remainder.  The generated value of the CRC remainder is 111.  • CRC remainder replaces the appended string of 0s at the end of the data unit,  and the final string would be 11100111 which is sent across the network.  CRC Checker  • The functionality of the CRC checker is similar to the CRC  generator.  • When the string 11100111 is received at the receiving end,  then CRC checker performs the modulo-2 division.  • A string is divided by the same divisor, i.e., 1001.  • In this case, CRC checker generates the remainder of zero.  Therefore, the data is accepted. |
| **4.** | **Describe various IEEE standards for network topologies** |
| A | A set of network standards developed by the IEEE. They include:   IEEE 802.1: Standards related to network management.   IEEE 802.2: General standard for the data link layer in the OSI Reference Model. The IEEE divides this layer into two sublayers -- the logical link control (LLC) layer and the media access control (MAC) layer. The MAC layer varies for different network types and is defined by standards IEEE 802.3 through IEEE 802.5.   IEEE 802.3: Defines the MAC layer for bus networks that use CSMA/CD. This is the basis of the Ethernet standard.   EEE 802.4: Defines the MAC layer for bus networks that use a token passing mechanism (token bus networks).   IEEE 802.5: Defines the MAC layer for token-ring networks.   IEEE 802.6: Standard for Metropolitan Area Networks (MANs).   IEEE 802.11 :the collection of standards setup for wireless networking. |
| **5.** | **Compare Token passing with CSMA/CD.** |
| A | |  |  | | --- | --- | | **Token Passing** | **CSMA/CD** | | Nodes Grant permission for transmitting the data | Each node listens to network before transmitting data in order to avoid collisions | | In Token Passing, the nodes are organized in a logical ring topology, and the token circulates around the ring. | In CSMA/CD, the nodes are connected to a shared communication medium, such as a coaxial cable or a hub. | | A node can only transmit data when it holds the token. | In CSMA/CD, a node listens to the network before transmitting data. | | Token Passing is a deterministic protocol | CSMA/CD is a probabilistic protocol | | Token Passing is more suitable for networks with a low to moderate number of nodes | CSMA/CD is more suitable for networks with a higher number of nodes | | Token Passing has a high overhead, | CSMA/CD has a lower overhead | | Token Passing is more secure than CSMA/CD, | CSMA/CD is less secure than Token Passing, | |
| 11. | With neat diagram explain the ESS architecture of IEEE 802.11 |
| A | **ESS stands for Extended Service Set in the context of IEEE 802.11 wireless local area networks (WLANs). It is a network architecture that allows multiple access points (APs) to be interconnected to form a single logical WLAN.**  **an ESS architecture of IEEE 802.11 allows multiple APs to be interconnected to form a single WLAN with seamless connectivity and coverage over a larger area, providing users with mobility and a stable connection.** |