

**Computer Networking**  
**Type A: Very Short Answer Questions**

<b>1.</b>	<b>Define a network. What is its need?</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ A computer network is a system in which computers are connected to share information and resources.</li> <li>✓ Computer networks help users on the network to share the resources and in communication.</li> </ul>
<b>2</b>	<b>Write two advantages and disadvantages of networks.</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ <b>Advantages:</b> <ol style="list-style-type: none"> <li>1. Data or information can be shared among the user.</li> <li>2. Fast communication can be achieved</li> </ol> </li> <li>✓ <b>Disadvantages:</b> <ol style="list-style-type: none"> <li>1. Expensive to install network.</li> <li>2. Sophisticated Hardware and Software technology is required.</li> </ol> </li> </ul>
<b>3</b>	<b>What is communication channel? Name the basic type of communication channels available.</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ Communication channels mean the connecting cables that link various workstations.</li> <li>✓ There are 3 basic types of cables:           <ol style="list-style-type: none"> <li>1. Twisted Pair cables</li> <li>2. Coaxial cables</li> <li>3. Fiber-optic cables</li> </ol> </li> </ul>
<b>4</b>	<b>What is MAC address?</b>
<b>Ans:</b>	A Media Access Control address (MAC address) is a unique identifier assigned to most network adapters or network interface cards (NICs) by the manufacturer for identification, and used in the Media Access Control protocol sub-layer.
<b>5</b>	<b>What is IP address?</b>
<b>Ans:</b>	A unique number consisting of 4 parts separated by dots, e.g. 165.113.245.2 Every machine that is on the internet has a unique IP number- if a machine does not have an IP number; it is not really on the internet.
<b>6</b>	<b>What is a domain name? How is it alternatively known?</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ The unique name that identifies an internet site.</li> <li>✓ Domain names always have 2 or more parts, separated by dots. The part on the left is the most specific, and the part on the right is the most general. E.g.:matisse.net</li> </ul>
<b>7</b>	<b>What are the various types of networks?</b>
<b>Ans:</b>	Network can be classified on the basis of their size, complexity and geographical spread. On the basis of geographical spread it can be classified as Local Area Network, Metropolitan Area Network and Wide Area Network.
<b>8</b>	<b>What is the difference between MAN and WAN?</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ A metropolitan area network (MAN) is a large computer network that usually spans a city or large campus.</li> <li>✓ WAN is a network that covers an area larger than a single building or campus such as across the cities or countries.</li> </ul>
<b>9</b>	<b>What is meant by topology? Name some popular topologies.</b>
<b>Ans:</b>	<p>Network Topology is defined as the interconnection of the various elements (link, nodes, etc.) of a computer network. In computer networking, topology refers to the layout of connected devices.</p> <ul style="list-style-type: none"> <li>✓ Bus topology</li> <li>✓ Star topology</li> <li>✓ Ring topology</li> <li>✓ Tree topology</li> <li>✓ Mesh topology</li> </ul>
<b>10</b>	<b>What are the factors that must be considered before making a choice for the topology?</b>
<b>Ans:</b>	Cost of Expenses required for implementation of network, Reliability of a particular topology and flexibility of system for future adjustment; are the various factors that must be considered before making a choice for the topology.
<b>11</b>	<b>What are the similarities and difference between bus and tree topologies?</b>
<b>Ans:</b>	In bus topology each machine is connected to a single cable. Each computer or server is connected to the single bus

	<p>cable through some kind of connector.</p> <p>Tree topology is a network with the shape of an inverted tree in which a single link between two nodes.</p>
<b>12</b>	<b>What are the limitations of star topology?</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ <b>Central node dependency:</b> In this topology central node is a controller of the network. If the central node fails, the entire network will be failed.</li> <li>✓ <b>Difficult to expand:</b> The addition of a new node to a network involves a connection all the way to the central node.</li> </ul>
<b>13</b>	<b>When do you think, ring topology becomes the best choice for a network?</b>
<b>Ans:</b>	In case if we need less connection of wires, very fast communication speed; a ring topology becomes the best choice for a network. This is because optical fiber offers the possibility of very high speed transmission in one direction.
<b>14</b>	<b>Write two advantages and two disadvantages of bus Topology in network.</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ <b>Advantages :</b> <ol style="list-style-type: none"> <li>1. Easy to connect a computer or peripheral to a linear bus.</li> <li>2. Requires less cable length than a star topology.</li> </ol> </li> <li>✓ <b>Disadvantages:</b> <ol style="list-style-type: none"> <li>1. Entire network shuts down if there is a break in the main cable.</li> <li>2. Terminators are required at both ends of the backbone cable.</li> </ol> </li> </ul>
<b>15</b>	<b>Briefly mention two advantages and two disadvantages of star topology in network.</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ <b>Advantages :</b> <ol style="list-style-type: none"> <li>1. Easy to install and wire.</li> <li>2. Easy to detect faults and to remove parts.</li> </ol> </li> <li>✓ <b>Disadvantages :</b> <ol style="list-style-type: none"> <li>1. Requires more cable length than a linear topology.</li> <li>2. If the hub, switch, or concentrator fails, nodes attached are disabled.</li> </ol> </li> </ul>
<b>16</b>	<b>Give two advantages and two disadvantages of following network topologies:</b>
	<p>(i) Star</p> <p>(ii) Tree</p>
<b>Ans:</b>	<p>(i) Star:</p> <ul style="list-style-type: none"> <li>✓ <b>Advantages :</b> <ol style="list-style-type: none"> <li>1. Easy to install and wire.</li> <li>2. Easy to detect faults and to remove parts.</li> </ol> </li> <li>✓ <b>Disadvantages :</b> <ol style="list-style-type: none"> <li>1. Requires more cable length than a linear topology.</li> <li>2. If the hub, switch, or concentrator fails, nodes attached are disabled.</li> </ol> </li> </ul> <p>(ii) Tree</p> <ul style="list-style-type: none"> <li>✓ <b>Advantages :</b> <ol style="list-style-type: none"> <li>1. Point-to-point wiring for individual segments.</li> <li>2. Supported by several hardware and software vendors.</li> </ol> </li> <li>✓ <b>Disadvantages :</b> <ol style="list-style-type: none"> <li>1. Overall length of each segment is limited by the type of cabling used.</li> <li>2. If the backbone line breaks, the entire segment goes down.</li> </ol> </li> </ul>
<b>17</b>	<b>Give two advantages and two disadvantages of following network topologies:</b>
	<p>(i) Bus</p> <p>(ii) Tree</p>
<b>Ans:</b>	<p>(i) Bus:</p> <ul style="list-style-type: none"> <li>✓ <b>Advantages :</b> <ol style="list-style-type: none"> <li>1. Easy to connect a computer or peripheral to a linear bus.</li> <li>2. Requires less cable length than a star topology.</li> </ol> </li> <li>✓ <b>Disadvantages:</b> <ol style="list-style-type: none"> <li>1. Entire network shuts down if there is a break in the main cable.</li> </ol> </li> </ul>

	<p>2. Terminators are required at both ends of the backbone cable.</p> <p><b>(ii) Tree</b></p> <p>✓ <b>Advantages :</b></p> <ol style="list-style-type: none"> <li>1. Point-to-point wiring for individual segments.</li> <li>2. Supported by several hardware and software vendors.</li> </ol> <p>✓ <b>Disadvantages :</b></p> <ol style="list-style-type: none"> <li>1. Overall length of each segment is limited by the type of cabling used.</li> <li>2. If the backbone line breaks, the entire segment goes down.</li> </ol>
<b>18</b>	<p><b>Write two advantages and disadvantages of the following:</b></p> <p><b>(i) Optical fibers</b></p> <p><b>(ii) Satellites</b></p> <p><b>(iii) Microwaves.</b></p>
<b>Ans:</b>	<p><b>(i) Optical fiber:</b></p> <p>✓ <b>Advantages :</b></p> <ol style="list-style-type: none"> <li>1. Secure transmission.</li> <li>2. Very high transmission capacity.</li> </ol> <p>✓ <b>Disadvantages :</b></p> <ol style="list-style-type: none"> <li>1. Expensive.</li> <li>2. Difficult to connect to fibers.</li> </ol> <p><b>(ii) Satellite:</b></p> <p>✓ <b>Advantage :</b></p> <ol style="list-style-type: none"> <li>1. Large area coverage of earth.</li> <li>2. Useful for sparsely populated areas.</li> </ol> <p>✓ <b>Disadvantage :</b></p> <ol style="list-style-type: none"> <li>1. Cannot deploy large, high gain antennas.</li> <li>2. Require high investment in case off failure.</li> </ol> <p><b>(iii) Microwaves</b></p> <p>✓ <b>Advantage :</b></p> <ol style="list-style-type: none"> <li>1. Free from land acquisition rights.</li> <li>2. Provides ease of communication over difficult terrain.</li> </ol> <p>✓ <b>Disadvantage:</b></p> <ol style="list-style-type: none"> <li>1. Insecure Communication.</li> <li>2. High cost for implementation and maintenance.</li> </ol>
<b>19</b>	<p><b>Write two disadvantages of twisted pair cables.</b></p>
<b>Ans:</b>	<p><b>Disadvantage :</b></p> <ol style="list-style-type: none"> <li>1. Incapable for long distance.</li> <li>2. Unsuitable for long distance.</li> <li>3. Supports maximum data rates 1 mbps without conditioning and 10 mbps with conditioning.</li> </ol>
<b>20</b>	<p><b>Define the following:</b></p> <p><b>(i) Hub</b></p> <p><b>(ii) Switch</b></p>
<b>Ans:</b>	<p><b>(i) Hub</b></p> <p>The central connecting device in a computer network is known as a hub. When data packets arrives at hub, it broadcast them to all the LAN cards in a network and the destined recipient picks them and all other computers discard the data packet.</p> <p><b>(ii) Switch</b></p> <p>A switch is a device that is used to segment networks into different sub networks called subnets or LAN segments. Segmenting the network into smaller subnets prevents traffic overloading in a network.</p>
<b>21</b>	<p><b>What is eavesdropping?</b></p>
<b>Ans:</b>	<p>Eavesdropping is the act of secretly listening/intercepting someone else's private communication/data/information.</p>

**Type B: Short Answer Questions**

<b>1</b>	<b>What is network? What are its goals and applications?</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ A computer network is a system in which computers are connected to share information and resources.</li> <li>✓ <b>Goals of network:</b> <ol style="list-style-type: none"> <li>1. <b>Resource sharing:</b> The aim to make all programs, data and peripherals available to anyone on the network irrespective of the physical location of the resources and the users.</li> <li>2. <b>Reliability:</b> A file can have copies on two or more machines, so if one of them is unavailable due to hardware or software crash, the other copies could be used. E.G.: Railway reservation, Airways reservation etc.</li> <li>3. <b>Cost Factor:</b> Personal computers have better price/performance ratio as the important data are stored on file server machine available for sharing.</li> </ol> </li> <li>✓ <b>Application of network:</b> <ol style="list-style-type: none"> <li>1. <b>Access the remote database:</b> User can access to remote database sitting at his home to make reservation for airplanes, trains hotels and so on anywhere in the world with instant confirmation.</li> <li>2. <b>Communication facilities:</b> Using Network, user can share text, images, digitized voice or movie to any users anywhere in the world.</li> <li>3. <b>Cost deduction:</b> Using computer network communication system, amount required for travelling of user or data from one location to another can be reduced to very less and also saves energy for the same.</li> </ol> </li> </ul>
<b>2</b>	<b>What do you understand by Domain Name Resolution?</b>
<b>Ans:</b>	<p>Domain Name Resolution is the task of converting domain names to their corresponding IP address. This is all done behind the scenes and is rarely noticed by the user. When you enter a domain name in an application that uses the internet, the application will issue a command to have the operating system convert the domain name into its IP address, and then connect to that IP address, and then connect to that IP address to perform whatever operation it is trying to do.</p>
<b>3</b>	<b>What are communication channels? Discuss various communication channels available for networks.</b>
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ Communication channel mean the connecting cables that link various workstations.</li> <li>✓ There are 3 basic types of cables: <ol style="list-style-type: none"> <li>1. <b>Twisted Pair cables:</b> A cable composed of two small insulated conductors twisted together without a common covering. Also known as copper pair. Twisted pairs have less bandwidth than coaxial cable or optical fiber.</li> <li>2. <b>Coaxial cables:</b> A cable consisting of two concentric conductors (an inner conductor and an outer conductor) insulated from each other by a dielectric; commonly used for the transmission of high-speed electronic data/or video signals.</li> <li>3. <b>Fiber Optic cables:</b> It is flexible optically transparent fiber, usually made of glass or plastic through which light can be transmitted by successive internal reflections.</li> </ol> </li> </ul>
<b>4</b>	<p><b>Write some advantages and disadvantages of the following:</b></p> <ol style="list-style-type: none"> <li>(i) <b>Optical fibers</b></li> <li>(ii) <b>Coaxial cable</b></li> <li>(iii) <b>Twisted pair cables</b></li> <li>(iv) <b>Radio waves</b></li> <li>(v) <b>Micro waves</b></li> <li>(vi) <b>Satellites.</b></li> </ol>
<b>Ans:</b>	<ol style="list-style-type: none"> <li>(i) <b>Optical fibers</b> <ul style="list-style-type: none"> <li>✓ <b>Advantages:</b> <ol style="list-style-type: none"> <li>1. Secure transmission.</li> <li>2. Very high transmission capacity.</li> </ol> </li> <li>✓ <b>Disadvantages:</b> <ol style="list-style-type: none"> <li>1. Expensive.</li> <li>2. Difficult to connect to fibers.</li> </ol> </li> </ul> </li> </ol>

- (ii) **Coaxial cable**
- ✓ **Advantages:**
    1. Better data transmission than twisted-pair cables.
    2. Used as source for shared cable network.
  - ✓ **Disadvantages :**
    1. Single cable failure can take down an entire network.
    2. Expensive
- (iii) **Twisted pair cables**
- ✓ **Advantages:**
    1. Simple.
    2. Flexible.
    3. Inexpensive.
    4. Connected easily.
  - ✓ **Disadvantages:**
    1. Unsuitable for long distance.
    2. Supports maximum data rates 1 mbps without conditioning and 10 mbps with conditioning.
- (iv) **Radio waves**
- ✓ **Advantages:**
    1. Free from land acquisition rights.
    2. Provides ease of communication over difficult terrain.
    3. Provide mobility.
  - ✓ **Disadvantages:**
    1. Insecure communication.
    2. Susceptible to weather effects.
- (v) **Micro waves**
- ✓ **Advantages:**
    1. Free from land acquisition rights.
    2. Provides ease of communication over difficult terrain.
  - ✓ **Disadvantages:**
    1. Insecure Communication.
    2. High cost for implementation and maintenance.
- (vi) **Satellites**
- ✓ **Advantages:**
    1. Large area coverage of earth.
    2. Useful for sparsely populated areas.
  - ✓ **Disadvantages:**
    1. Cannot deploy large, high gain antennas.
    2. Require high investment in case off failure.

**5 Discuss and compare various types of networks.**

**Ans:** ✓ A computer network is a system in which computers are connected to share information and resources. There are four types of networks :

**a) LAN (Local Area Network)** – A group of computers that shares a common connection and is usually in a small area or even in the same building. For example, it can be an office or a home network. It is usually connected by Ethernet cables and has high speed connections. If it was a wireless setup, it would be called a WLAN, which would have a lower connection speed.

**b) MAN (Metropolitan Area Network)** –This is a larger network that connects computer users in a particular geographic area or region. For example, a large university may have a network so large that it may be classified as a MAN. The MAN network usually exists to provide connectivity to local ISPs, cable TV, or large corporations. It is far larger than a LAN and smaller than a WAN. Also, large cities like London and Sydney, Australia, have metropolitan area networks.

**c) WAN (Wide Area Network)** – This is the largest network and can inter-connect networks throughout the world because it is not restricted to a geographical location. The Internet is an example of a worldwide public WAN. Most

	<p>WANs exist to connect LANs that are not in the same geographical area. This technology is high speed and very expensive to setup.</p> <p><b>d) PAN (Personal Area Network)</b> – PAN is a computer network organized around an individual person. Personal area networks typically involve a mobile computer, a cell phone and/or a handheld computing device such as a PDA. You can use these networks to transfer files including email and calendar appointments, digital photos and music.</p>														
<b>6</b>	<b>Explain various mostly used topologies.</b>														
<b>Ans:</b>	<ol style="list-style-type: none"> <li>1. <b>Bus or Linear Topology</b> – It is characterized by common transmission medium shared by all the connected hosts, managed by dedicated nodes. It offers simultaneous flow of data and control.</li> <li>2. <b>Ring Topology</b> – A ring topology connects one host to the next and the last host to the first. This creates a physical ring of cable.</li> <li>3. <b>Star Topology</b> – It is characterized by central switching mode (communication controller) unique path (point-to-point link) for each host. It is easy to add and remove additional host by upgrading the centralized node.</li> <li>4. <b>Tree Topology</b> – A tree topology may be defined as a group of bus topologies put together and controlled by one node.</li> </ol>														
<b>7</b>	<b>Discuss the factors that govern the selection of a topology for a network.</b>														
<b>Ans:</b>	<p>There are number of factors that govern the selection of topology for a network, the most important of which are as following :</p> <ol style="list-style-type: none"> <li>a) <b>Cost</b> – For a network to be cost effective, one would try to minimize installation cost. This may be achieved by using well understood media and also, to a lesser extent, by minimizing the distances involved.</li> <li>b) <b>Flexibility</b> – Because the arrangement of furniture, internal walls etc. in offices are often subject to change, the topology should allow for easy reconfiguration of the network. This involves moving existing nodes and adding new ones.</li> <li>c) <b>Reliability</b> – Failure in a network can take two forms. Firstly, an individual node can malfunction. This is not nearly as serious as the second type of fault where the network itself fails to operate. The topology chosen for the network can help by allowing the location of the fault to be detected and to provide some means of isolating it.</li> </ol>														
<b>8</b>	<b>Compare and contrast</b>														
	<ol style="list-style-type: none"> <li>(i) <b>Star and Bus topologies</b></li> <li>(ii) <b>Star and Tree topologies</b></li> <li>(iii) <b>Bus and Ring topologies.</b></li> </ol>														
<b>Ans:</b>	<table border="1" style="width: 100%;"> <tr> <td colspan="2"><b>(i) Star and Bus topologies</b></td> </tr> <tr> <td style="width: 50%;"><b>Comparison :</b></td> <td style="width: 50%;"><b>Contrast :</b></td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>✓ As compared to the bus topology, a star network requires more devices and cables to complete a network.</li> <li>✓ The failure of each node or cable in a star network won't take down the entire network as happens in the Bus topology.</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>✓ Bus topology is slower in contrast to star topologies of network</li> <li>✓ Star topology is expensive in contrast to Bus Topology</li> </ul> </td> </tr> <tr> <td colspan="2"><b>(ii) Star and Tree topologies</b></td> </tr> <tr> <td><b>Comparison :</b></td> <td><b>Contrast :</b></td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>✓ Both required more wiring.</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>✓ Tree topology is slower in contrast to star topologies of network.</li> <li>✓ More difficult to configure in contrast to star topologies.</li> </ul> </td> </tr> <tr> <td colspan="2"><b>(iii) Bus and Ring topologies</b></td> </tr> </table>	<b>(i) Star and Bus topologies</b>		<b>Comparison :</b>	<b>Contrast :</b>	<ul style="list-style-type: none"> <li>✓ As compared to the bus topology, a star network requires more devices and cables to complete a network.</li> <li>✓ The failure of each node or cable in a star network won't take down the entire network as happens in the Bus topology.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Bus topology is slower in contrast to star topologies of network</li> <li>✓ Star topology is expensive in contrast to Bus Topology</li> </ul>	<b>(ii) Star and Tree topologies</b>		<b>Comparison :</b>	<b>Contrast :</b>	<ul style="list-style-type: none"> <li>✓ Both required more wiring.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Tree topology is slower in contrast to star topologies of network.</li> <li>✓ More difficult to configure in contrast to star topologies.</li> </ul>	<b>(iii) Bus and Ring topologies</b>	
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	<p><b>Comparison :</b></p> <ul style="list-style-type: none"> <li>✓ Difficult to identify the problem if the entire network shuts down.</li> <li>✓ If one node fails to pass the data, entire network has failed.</li> </ul>	<p><b>Contrast :</b></p> <ul style="list-style-type: none"> <li>✓ Ring topology faster communication in contrast to Bus topology.</li> <li>✓ In contrast to Bus topology Ring topology has independent line of connection which allows freedom of removing or adding nodes from the network.</li> </ul>
<b>9</b>	<b>What is the role of modem in electronic communications?</b>	
<b>Ans:</b>	A modem (modulator-demodulator) is a device that modulates an analog carrier signal to encode digital information, and also demodulates such a carrier signal to decode the transmitted information. The role is to produce a signal that can be transmitted easily and decoded to reproduce the original digital data. Modems can be used over any means of transmitting analog signals, from light emitting diodes to radio.	
<b>10</b>	<b>What are hubs? What are its types?</b>	
<b>Ans:</b>	<p>A hub is hardware device used to connect several computers together. It is of two types Active or Passive HUBs.</p> <ul style="list-style-type: none"> <li>✓ <b>Active hub</b> is one which amplifies the signal as it moves from one connected device to another.</li> <li>✓ <b>Passive hub</b> allows the signal to pass from one computer to another computer without any change.</li> </ul>	
<b>11</b>	<b>What is the role of a switch in a network?</b>	
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ A switch is a device that is used to segment networks into different sub networks called subnets or LAN segments. Segmenting the network into smaller subnets prevents traffic overloading in a network.</li> <li>✓ A switch is responsible for filtering i.e. transforming data in a specific way and for forwarding packets (a piece of message) between LAN segments.</li> <li>✓ Switch support any packet protocol. LANs that are segmented through switches are called switched LANs.</li> </ul>	
<b>12</b>	<b>Briefly discuss the role of following devices in the context of networking.</b>	
	<p>(i) <b>Repeater</b>  (ii) <b>Gateway.</b></p>	
<b>Ans:</b>	<ul style="list-style-type: none"> <li>✓ <b>Repeater</b> – A repeater amplifies the input signal to an appropriate level and works at the physical level of the OSI model. Sometimes the signal on the Internet becomes weak before reaching the destination node. Thus, repeater is used to regenerate the incoming packet and amplify it and then transmit it to another segment of the network.</li> <li>✓ <b>Gateway</b> – A network gateway is an internetworking system capable of joining together two networks that use different base protocols. A network gateway can be implemented completely in software, completely in hardware, or as a combination of both. Depending on the types of protocols they support.</li> </ul>	
<b>13</b>	<b>What are common threats to network security?</b>	
<b>Ans:</b>	<p>The various threats to network security are as follows:</p> <ol style="list-style-type: none"> <li><b>1. Intrusion Problems/Access Attacks:</b> This occurs when an unauthorized user attempts to protected sensitive/confidential information. It may be following types: <ul style="list-style-type: none"> <li>✓ <b>Snooping:</b> It refers to unauthorized access to someone else’s data, email or computer activity.</li> <li>✓ <b>Eavesdropping:</b> It refers to unauthorized listening/ intercepting someone else’s private communication/data/information.</li> </ul> </li> <li><b>2. Denial-of-services attacks:</b> DoS are those attacks that prevent the legal user of system from accessing or using the resources, information or capabilities of the system. It may be of following types: <ul style="list-style-type: none"> <li>✓ <b>Denial of access to information:</b> Such attacks cause deletion or changing of important information to non readable format.</li> <li>✓ <b>Denial of Access to Applications:</b> Such attacks make the applications unusable or unavailable for legal user of the system.</li> <li>✓ <b>Denial of Access to Communications:</b> Such attacks includes cutting of communication wire,</li> </ul> </li> </ol>	

	jamming radio communications, flooding a system with junk mail.
<b>14</b>	<b>What are Denial of service attacks?</b>
<b>Ans:</b>	<p><b>Denial-of-services attacks:</b> DoS are those attacks that prevent the legal user of system from accessing or using the resources, information or capabilities of the system. It may be of following types:</p> <ul style="list-style-type: none"> <li>✓ <b>Denial of access to information:</b> Such attacks cause deletion or changing of important information to non readable format.</li> <li>✓ <b>Denial of Access to Applications:</b> Such attacks make the applications unusable or unavailable for legal user of the system.</li> <li>✓ <b>Denial of Access to Communications:</b> Such attacks includes cutting of communication wire, jamming radio communications, flooding a system with junk mail.</li> </ul>
<b>15</b>	<b>How can you prevent/counter threats to network security?</b>
<b>Ans:</b>	<p>Threats of network security can be prevented by using various techniques:</p> <ol style="list-style-type: none"> <li>1. <b>Authorization:</b> in this case user is asked to enter an authorized login-id. If user is able to provide legal login-id then he/she is considered as authorized user.</li> <li>2. <b>Authentication:</b> in this case user is asked to enter a legal password. If user is able to provide legal password then he/she is considered as authenticate user.</li> <li>3. <b>Firewall:</b> Firewall is a mechanism to prevent unauthorized internet user to access private network connected to internet.</li> <li>4. <b>Intrusion Detection:</b> This is a monitoring system which detects unauthorized access of data or resources of the network.</li> </ol>

**Unsolved problems**

1 “Bias Methodologies” is planning to expand their network in India, starting with three cities in India to build infrastructure for research and development of their chemical products. The company has planned to setup their main office in Pondicherry –at three different locations and have named their office as “Back Office”, “Research Lab” and “Development Unit”. The company has one more Research office namely “Corporate Office” in “Mumbai”. A rough layout of the same is as follows:

**INDIA**

Corporate Unit  
Mumbai

**Pondicherry**

Research

Back

Development

From	To	Distance
Research Lab	Back Office	110 Mtr
Research Lab	Development Unit	16 KM
Research Lab	Corporate Unit	1800 KM
Back Office	Development Unit	13 KM

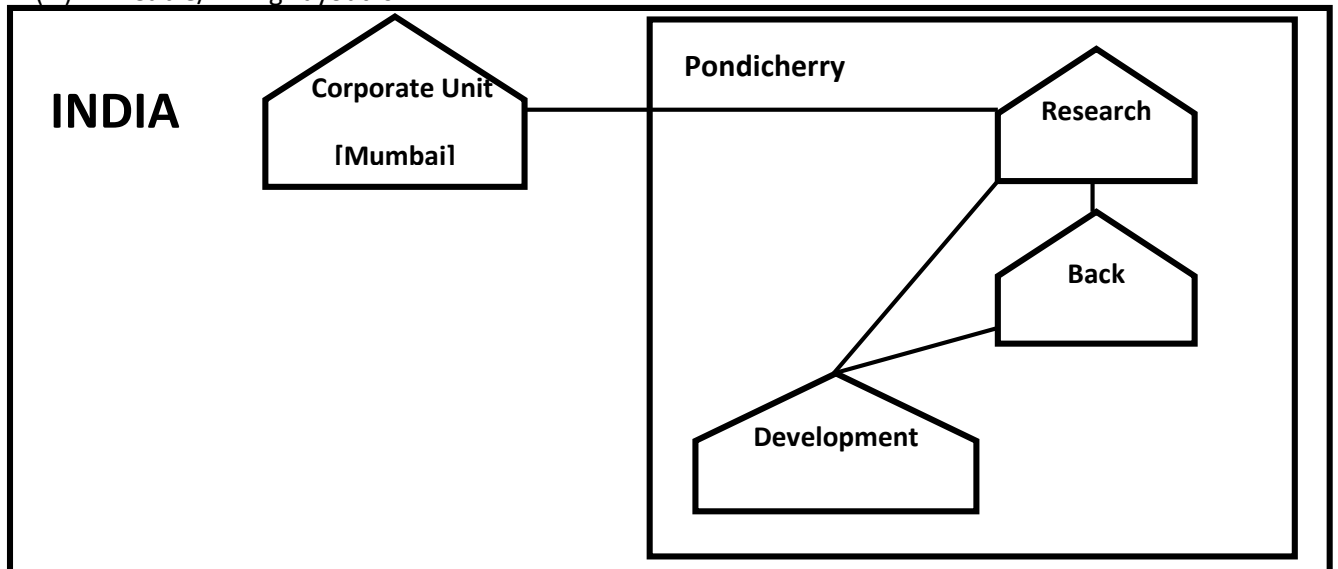


In continuation of the above , the company experts have planned to install the following number computers in each of their offices:

Research Lab	158
Back Office	79
Development Unit	90
Corporate Unit	51

- (i) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting each of the following office units:
- ☞ Research Lab and Back Office
  - ☞ Research Lab and Development Unit
- (i) Which one of the following device will you suggest for connecting all the computers with in each of their units?
- ☞ Switch/Hub
  - ☞ Modem
  - ☞ Telephone
- (ii) Which of the following communication media, you will suggest to be procured by the company for connecting their local office units in Pondicherry for very effective (High Speed) communication?
- ☞ Telephone Cable
  - ☞ Optical Fiber
  - ☞ Ethernet Cable
- (iii) Suggest a cable/wiring layout for connecting the company's local office units located in Pondicherry. Also, suggest an effective method/technology for connecting the company's office unit located in Mumbai.

- Ans:
- (i) Research Lab and Back office - LAN  
 Research Lab and Development Unit -WAN
- (ii) Switch/Hub
- (iii) Optical Fiber
- (iv) Cable/wiring Layout is:



2 INDIAN PUBLIC SCHOOL in Darjeeling is setting up the network between its different wings. There are 4 wings named as SENIOR(S), JUNIOR (J), ADMIN (A) and HOSTEL (H).

Distance between various Wings

Wing A to Wing S	100 m
Wing A to Wing J	200 m

Number of Computers

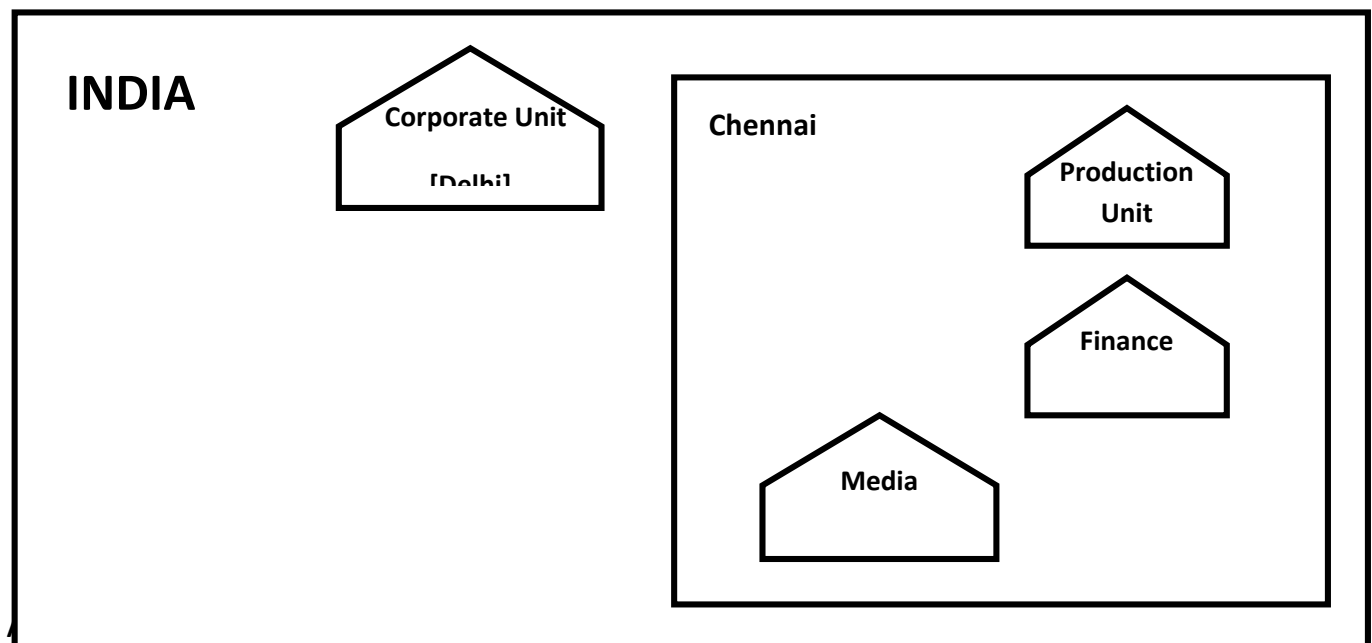
Wing A to Wing H	400 m
Wing S to Wing J	300 m
Wing S to Wing H	100 m
Wing J to Wing H	450 m

Wing A	10
Wing S	200
Wing J	100
Wing H	50

- (i) Suggest a suitable Topology for networking the computer of all wings.
- (ii) Suggest the placement of Hub/Switch in the network.
- (iii) Mention the economic technology to provide internet accessibility to all wings.

**Ans:** (i) Star or Bus or any other valid topology or diagram.  
(ii) Hub/Switch in all the wings.  
(iii) Coaxial cable/Modem/LAN/TCP-IP/Dialup/DSL/Leased Lines or any other valid technology.

**3** “China Middleton Fashion” is planning to expand their network in India, starting with two cities in India to provide infrastructure for distribution of their product. The company has planned to setup their main office in Chennai at three different locations and have named their office as “Production Unit”, “Finance Unit” and “Media Unit”. The company has its corporate unit in Delhi. A rough layout of the same is as follows:



From	To	Distance
Production Unit	Finance Unit	70 Mtr
Production Unit	Media Unit	15 KM
Production Unit	Corporate Unit	2112 KM
Finance Unit	Media Unit	15 KM

In continuation of the above , the company experts have planned to install the following number computers in each of their offices:

Production Unit	150
Finance Unit	35
Media Unit	10
Corporate Unit	30

- (i) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting each of the following office units:

☞ Production Unit and Media Unit

☞ Production Unit and Finance Unit

(ii) Which one of the following device will you suggest for connecting all the computers with in each of their units?

☞ Switch/Hub

☞ Modem

☞ Telephone

(iii) Which of the following communication media, you will suggest to be procured by the company for connecting their local office units in Chennai for very effective (High Speed) communication?

☞ Telephone Cable

☞ Optical Fiber

☞ Ethernet Cable

(iv) Suggest a cable/wiring layout for connecting the company's local office units located in Chennai. Also, suggest an effective method/technology for connecting the company's office unit located in Delhi.

Ans:

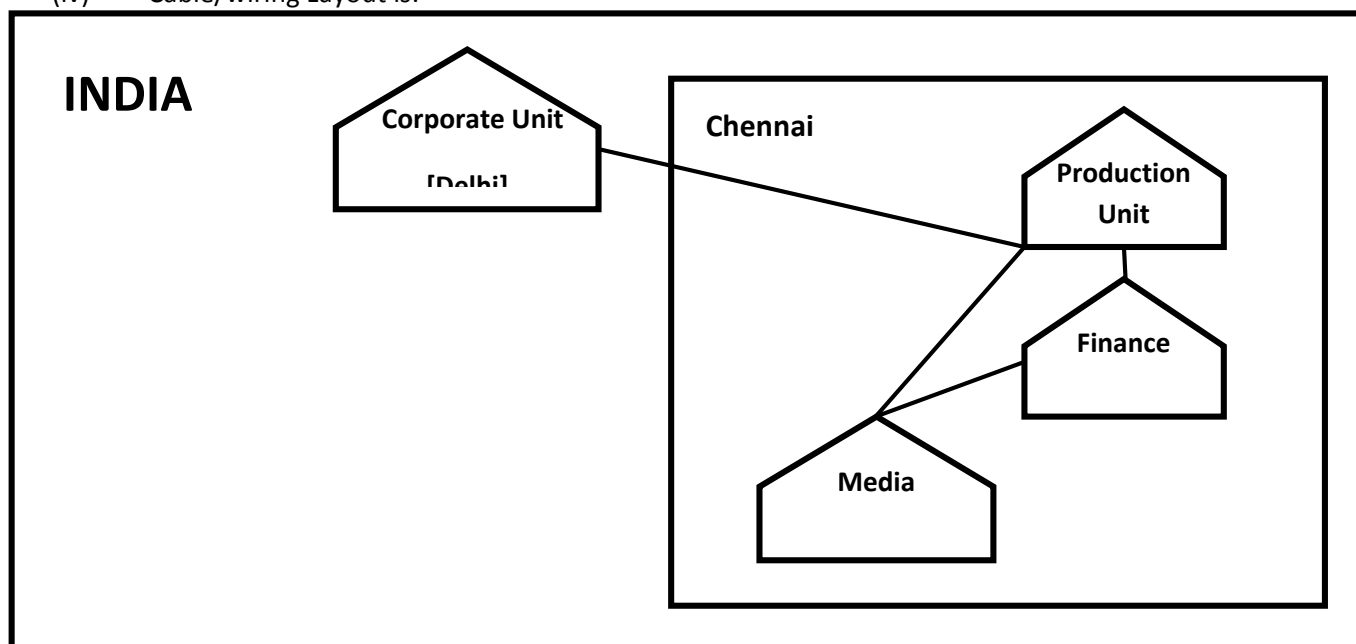
(i) Production Unit and Media Unit- WAN

Production Unit and Finance Unit- LAN

(ii) Switch/Hub

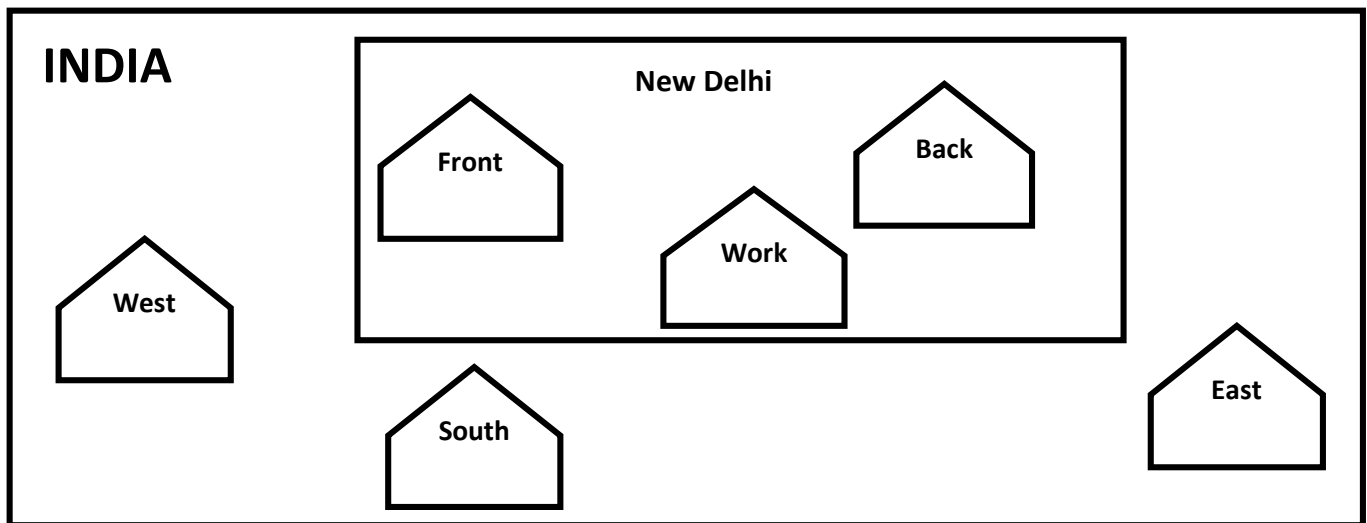
(iii) Optical Fiber

(iv) Cable/wiring Layout is:



4

“Bhartiya Connectivity Association” is planning to spread their office in four major cities in India to provide regional IT infrastructure support in the field of Education & Culture. The company has planned to setup their head office in New Delhi in three location and have named their New Delhi office has “Front Office”, “Back Office” and “Work Office”. The company has three more regional offices as “South Office”, “East Office” and “West Office” located in other major cities of India. A rough layout of the same is as follows:



Approximate distance between these office as per network survey team is as follows:

Place From	Place To	Distance
Back Office	Front Office	10 KM
Back Office	Work Office	70 Meter
Back Office	East Office	1291 KM
Back Office	West Office	790 KM
Back Office	South Office	1952 KM

In continuation of the above , the company experts have planned to install the following number of computers in each of their offices:

Back Office	100
Front Office	20
Work Office	50
East Office	50
West Office	50
South Office	50

- (i) Suggest network type (out of LAN, MAN, WAN) for connecting each of the following set of their offices:
  - ☞ Back Office and Work Office
  - ☞ Back Office and South Office
- (ii) Which device you will suggest to be produced by the company for connecting all the computers with in each of their offices out of the following devices?
  - ☞ Switch/Hub
  - ☞ Modem
  - ☞ Telephone
- (iii) Which of the following communication medium, you will suggest to be procured by the company for connecting their local office units in New Delhi for very effective and fast communication?
  - ☞ Telephone Cable
  - ☞ Optical Fiber
  - ☞ Ethernet Cable
- (iv) Suggest a cable/wiring layout for connecting the company's local office located in New Delhi. Also, suggest an effective method/technology for connecting the company's regional office –“East Office”, “West Office” and “South Office” with offices located in New Delhi.

- Ans:**
- (i) Back Office and Work Office-MAN  
Back Office and South Office-WAN
  - (ii) Switch/Hub
  - (iii) Optical Fiber
  - (iv) Cable/wiring Layout is:

