| **Register**  **Number** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**SRM Institute of Science and Technology** 

**College of Engineering and Technology**

**School of Computing**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu

**Academic Year: 2021-22 (Even)**

Test: CLA-T1 Date: 06-04-2022 Course Code & Title: 18CSS202J - Computer Communications Duration: 1 Hour Year & Sem: II Year / IV Sem Max. Marks: 25

**Course Articulation Matrix:**

Set - D

| **S.No.** | **Course**  **Outcome** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | CO1 | 3 | - | - | - | - | - | - | - | - | - | - | 3 |
| 2 | CO2 | 3 | 2 | 3 | - | - | - | - | - | - | - | - | 3 |
| 3 | CO3 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 |
| 4 | CO4 | 3 | 2 | - | - | - | - | - | - | - | - | - | 3 |
| 5 | CO5 | 3 | - | - | - | - | - | - | - | - | - | - | 2 |
| 6 | CO6 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 |

| Part - A  (15 x 1 = 15 Marks)  Instructions: 1) Answer ALL questions. 2) The duration for answering the part A is 20 minutes (this sheet will be collected after 20 minutes). 3) Encircle the correct answer (if more than one is right answer encircle appropriately) | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Q.  No | Question | Marks | BL | CO | PO | PI  Code |
| 1 | What is the central device in star topology?  a. STP server  b. Hub/switch  c. PDC  d. Route  **Answer: b** | 1 | L2 | 2 | 1 | 1.4.1 |
| 2 | In OSI network architecture, the dialogue control and token management are responsibility of  a. session layer  b. network layer  c. transport layer  d. data link layer  **Answer: a** | 1 | L3 | 1 | 1 | 1.4.1 |
| 3 | A cable break in which topology stops all transmission a. Mesh  b. Bus  c. Star  d. Primary  **Answer: b** | 1 | L2 | 2 | 1 | 1.4.1 |
| 4 | Data unit is called a frame in  a. Physical layer  b. Network layer  c. Presentation layer  d. Data link layer  **Answer: d** | 1 | L2 | 1 | 1 | 1.4.1 |

| 5 | Which mode of Communication occurs between a computer and a keyboard.  a. Automatic  b. Half-duplex  c. Full-duplex  d. Simplex  **Answer: d** | 1 | L3 | 1 | 1 | 1.4.1 |
| --- | --- | --- | --- | --- | --- | --- |
| 6 | HTTP is \_\_\_\_\_\_\_\_ protocol.  a. application layer  b. transport layer  c. network layer  d. data link layer  **Answer: a** | 1 | L1 | 1 | 1 | 1.4.1 |
| 7 | FTP server listens for connection on which port number? a. 20  b. 21  c. 22  d. 23  **Answer: b** | 1 | L2 | 1 | 1 | 1.4.1 |
| 8 | FDDI used which type of physical topology?  a. Bus  b. Ring  c. Star  d. Tree  **Answer: b** | 1 | L3 | 2 | 1 | 1.4.1 |
| 9 | In mesh topology, relationship between one device and another is ..............  a. Primary to peer  b. Peer to primary  c. Primary to secondary  d. Peer to Peer  **Answer: d** | 1 | L2 | 2 | 1 | 1.4.1 |
| 10 | Devices on one network can communicate with devices on another network via a .......  a. File Server  b. Utility Server  c. Printer Server  d. Gateway  **Answer: d** | 1 | L2 | 1 | 1 | 1.4.1 |
| 11 | In a................ topology, if there are n devices in a network, each device has n-1 ports for cables.  a. Mesh  b. Star  c. Bus  d. Ring  **Answer: a** | 1 | L2 | 2 | 1 | 1.4.1 |
| 12 | The ARP protocol operates on which layer of the OSI model? a. Physical Layer  b. Network Layer  c. Session Layer  a) d. Application  b) **Answer: b** | 1 | L3 | 1 | 1 | 1.4.1 |
| 13 | The PDU stands for?  a. Protocol Data Unit  b. Packet Data Unit  c. Packet Delivery Unit  d. Packet Data Uniqueness  **Answer: a** | 1 | L1 | 1 | 1 | 1.4.1 |

| 14 | How many bytes are reserved for target hardware address in ARP message format?  a. 4 bytes  b. 6 bytes  c. 8 bytes  d. 16 bytes  **Answer: b** | 1 | L1 | 1 | 1 | 1.4.1 |
| --- | --- | --- | --- | --- | --- | --- |
| 15 | During error reporting, ICMP always reports error messages to \_\_\_\_\_\_\_\_  a. Destination  b. Source  c. Next router  d. previous router  **Answer: b** | 1 | L1 | 1 | 1 | 1.4.1 |

| **Register**  **Number** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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Set - D

| Part – B  (2 x 5 = 10 Marks)  Instructions: Answer ANY two questions | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Q.  No | Question | Marks | BL | CO | PO | PI  Code |
| 16 | Explain the types of transmission modes.  ✓ Transmission mode means transferring data between two devices.  ✓ It is also known as a communication mode. Buses and networks are designed to allow communication to occur between individual devices that are interconnected. ✓ There are three types of transmission mode    ***Simplex Mode***  ✓ In Simplex mode, the communication is unidirectional, as on a one-way street. | 5 | L2 | 1 | 1 | 1.6.1 |

|  | ✓ Only one of the two devices on a link can transmit, the other can only receive.  ✓ The simplex mode can use the entire capacity of the channel to send data in one direction.  ✓ Example: Keyboard and traditional monitors. The keyboard can only introduce input, the monitor can only give the output.    ***Half-Duplex Mode***  ✓ In half-duplex mode, each station can both transmit and receive, but not at the same time. When one device is sending, the other can only receive, and vice versa.  ✓ The half-duplex mode is used in cases where there is no need for communication in both directions at the same time.  ✓ The entire capacity of the channel can be utilized for each direction.  ✓ Example: Walkie-talkie in which message is sent one at a time and messages are sent in both directions.  ✓ Channel capacity=Bandwidth \* Propagation Delay  ***Full-Duplex Mode***  ✓ In full-duplex mode, both stations can transmit and receive simultaneously.  ✓ In full\_duplex mode, signals going in one direction share the capacity of the link with signals going in another direction, this sharing can occur in two ways:  ▪ Either the link must contain two physically separate transmission paths, one for sending and the other for receiving.  ▪ Or the capacity is divided between signals traveling in both directions.  ✓ Full-duplex mode is used when communication in both directions is required all the time. The capacity of the channel, however, must be divided between the two directions.  ✓ Example: Telephone Network in which there is communication between two persons by a telephone line, through which both can talk and listen at the same time.  ✓ Channel Capacity=2\* Bandwidth\*propagation Delay |  |  |  |  |  |
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| 17 | What is network topology? Explain the different network topologies.  ✓ The arrangement of a network that comprises nodes and connecting lines via sender and receiver is referred to as network topology. The various network topologies are ***Mesh Topology***  ✓ In a mesh topology, every device is connected to another device via a particular channel.    ✓ Every device is connected with another via dedicated channels. These channels are known as links  ✓ Suppose, N number of devices are connected with each other in a mesh topology, the total number of ports that are required by each device is N-1. In the Figure, there are 5 devices connected to each other, hence the total number of ports required by each device is 4. Total number of ports required=N\*(N-1).  ✓ Suppose, N number of devices are connected with each other in a mesh topology, then the total number of dedicated links required to connect them is NC2 i.e. N(N 1)/2. In Figure 1, there are 5 devices connected to each other, hence the total number of links required is 5\*4/2 = 10.  ✓ **Advantages of this topology**  ▪ It is robust.  ▪ The fault is diagnosed easily. Data is reliable because data is transferred among the devices through dedicated channels or links.  ▪ Provides security and privacy.  ✓ **Problems with this topology**  ▪ Installation and configuration are difficult.  ▪ The cost of cables is high as bulk wiring is required, hence suitable for less number of devices.  ▪ The cost of maintenance is high.  ***Star Topology***  ✓ In star topology, all the devices are connected to a single hub through a cable.  ✓ This hub is the central node and all other nodes are connected to the central node.  ✓ The hub can be passive in nature i.e., not an intelligent hub such as broadcasting devices, at the same time the | 5 | L3 | 2 | 2 | 2.6.4 |

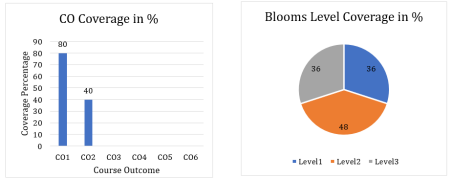
|  | hub can be intelligent known as an active hub. Active hubs have repeaters in them.    ✓ **Advantages of this topology**  ▪ If N devices are connected to each other in a star topology, then the number of cables required to connect them is N. So, it is easy to set up.  ▪ Each device requires only 1 port i.e. to connect to the hub, therefore the total number of ports required is N.  ✓ **Problems with this topology**  ▪ If the concentrator (hub) on which the whole topology relies fails, the whole system will crash down.  ▪ The cost of installation is high.  ▪ Performance is based on the single concentrator i.e. hub.  ***Bus Topology***  ✓ Bus topology is a network type in which every computer and network device is connected to a single cable. It transmits the data from one end to another in a single direction. No bi-directional feature is in bus topology.  ✓ It is a multi-point connection and a non-robust topology because if the backbone fails the topology crashes.  ✓ **Advantages of this topology**  ▪ If N devices are connected to each other in a bus topology, then the number of cables required to connect them is 1, which is known as backbone cable, and N drop lines are required.  ▪ The cost of the cable is less as compared to other topologies, but it is used to build small networks. ✓ **Problems with this topology**  ▪ If the common cable fails, then the whole system will crash down.  ▪ If the network traffic is heavy, it increases collisions in the network. To avoid this, various protocols are used in the MAC layer known as Pure Aloha, Slotted Aloha, CSMA/CD, etc.  ▪ Security is very low  ***Ring Topology***  ✓ In this topology, it forms a ring connecting devices with its exactly two neighboring devices. |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |

|  | ✓ A number of repeaters are used for Ring topology with a large number of nodes, because if someone wants to send some data to the last node in the ring topology with 100 nodes, then the data will have to pass through 99 nodes to reach the 100th node.  ✓ Hence to prevent data loss repeaters are used in the network.  ✓ The transmission is unidirectional, but it can be made bidirectional by having 2 connections between each Network Node, it is called Dual Ring Topology    ✓ The following operations take place in ring topology are ▪ One station is known as a monitor station which takes all the responsibility to perform the operations.  ▪ To transmit the data, the station has to hold the token. After the transmission is done, the token is to be released for other stations to use.  ▪ When no station is transmitting the data, then the token will circulate in the ring.  ▪ There are two types of token release techniques: Early token release releases the token just after transmitting the data and Delay token release releases the token after the acknowledgment is received from the receiver  ✓ **Advantages of this topology**  ▪ The possibility of collision is minimum in this type of topology.  ▪ Cheap to install and expand.  ✓ **Problems with this topology**  ▪ Troubleshooting is difficult in this topology. ▪ The addition of stations in between or removal of stations can disturb the whole topology.  ▪ Less secure. |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 18 | What are the different types of networks? Explain in detail. ✓ Types of area networks – LAN, MAN and WAN ✓ The Network allows computers to connect and  communicate with different computers via any medium. LAN, MAN, and WAN are the three major types of networks designed to operate over the area they cover.  ✓ There are some similarities and dissimilarities between them. One of the major differences is the geographical area they cover,  ✓ i.e. LAN covers the smallest area; MAN covers an area larger than LAN and WAN comprises the largest of all **Local Area Network** | 5 | L1 | 1 | 1 | 1.6.1 |

|  | ✓ Local Area Network (LAN) is a group of computers connected to each other in a small area such as building, office.  ✓ LAN is used for connecting two or more personal computers through a communication medium such as twisted pair, coaxial cable, etc.  ✓ It is less costly as it is built with inexpensive hardware such as hubs, network adapters, and Ethernet cables. ✓ The data is transferred at an extremely faster rate in Local Area Network.  ✓ Local Area Network provides higher security. ✓ LAN's are private networks, not subject to tariffs or other regulatory controls.  ✓ LAN's operate at relatively high speed when compared to the typical WAN.  ✓ There are different types of Media Access Control methods in a LAN, the prominent ones are Ethernet, Token ring.  ✓ It connects computers in a single building, block or campus, i.e. they work in a restricted geographical area. ***Metropolitan Area Network (MAN)***    ✓ A metropolitan area network is a network that covers a larger geographic area by interconnecting a different LAN to form a larger network.  ✓ Government agencies use MAN to connect to the citizens and private industries.  ✓ In MAN, various LANs are connected to each other through a telephone exchange line.  ✓ The most widely used protocols in MAN are RS-232, Frame Relay, ATM, ISDN, OC-3, ADSL, etc.  ✓ It has a higher range than Local Area Network(LAN). ✓ It generally covers towns and cities (50 km) ✓ Communication medium used for MAN are optical fibers, cables etc.  ✓ Data rates adequate for distributed computing applications.  ***Wide Area Networks*** |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |

|  | ✓ A network that connects two or more local-area networks over a potentially large geographic distance ✓ Network providing long-distance communication over a country, a continent, or the whole world  ✓ It is also called WAN. WAN can be private or it can be public leased network.  ✓ It is used for the network that covers large distance such as cover states of a country.  ✓ It is not easy to design and maintain.  ✓ Communication medium used by WAN are PSTN or Satellite links.  ✓ WAN operates on low data rates. |  |  |  |  |  |
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**Course Outcome (CO) and Bloom’s level (BL) Coverage in Questions**

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