MODULE 1:

* What is a computer network and what are its primary components?
* Compose a brief summary of the network design, information significance, and management.
* What are the most essential criteria for establishing a productive and effective network?
* Comment on the characteristics that determine the efficiency of a data communications system.
* List the various communication modes utilized by computer networks.
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* distinguish between Point-to-Point and Broadcast communications.
* Provide examples of network design scenarios in which a network switch would be preferable to a network router.
* Analyze the performance and security implications of the distinctions between a hub and a switch.
* Provide examples of network hardware configurations suitable for various network topologies, including star, bus, and mesh.
* Utilize your knowledge of network hardware to troubleshoot a network connectivity issue and determine the potential hardware component causing the issue.
* What are some examples of commonly used network software in computer networks?
* Assess the influence of network software on network efficacy, scalability, and security.
* Contrast PAN, LAN, MAN, and WAN.
* What role do network protocols play in facilitating data communication and transmission between computer network devices?
* Analyze the benefits and drawbacks of a layered approach to network design, as illustrated by the ISO OSI model.
* Utilize your knowledge of the ISO OSI model to troubleshoot a network problem and determine the prospective layer where the issue may exist.
* Compare and contrast the capabilities and characteristics of the Network and Data Link layers of the ISO OSI model.
* Design a network solution that employs specific protocols at each stratum of the ISO OSI model to support network services including routing, error detection, and data framing.
* Evaluate the scalability and adaptability of the TCP/IP model to support diverse network configurations and capacities.
* Design a network solution that employs specific protocols at each layer of the TCP/IP paradigm to support network services including web browsing, email, and file transfer.
* Recommend the appropriate layer for implementing network security measures such as firewalling and intrusion detection based on your knowledge of the TCP/IP model.
* Can you describe the fundamental characteristics and design principles of ARPANET, which laid the groundwork for the modern Internet?
* What is ARPANET and what role did it play in the evolution of the Internet?
* Recommend the appropriate transmission media for a network requiring high bandwidth and long-distance connectivity, using your knowledge of fiber optics.
* Construct a network solution that employs the optimal combination of guided transmission media to attain high-speed data transfer, long-distance connectivity, and electromagnetic interference resistance.
* Provide examples of data transmission technologies that utilize unguided media, such as Wi-Fi, Bluetooth, and satellite communication.
* How does wireless transmission differ from guided transmission with regard to medium and signal propagation?
* Give scenarios in which Wi-Fi, Bluetooth, cellular networks, or satellite communication would be the most appropriate wireless technology.
* Contrast the benefits and drawbacks of guided and unguided media.

MODULE 2:

* Enumerate the design considerations for the data link layer.
* What is the purpose of parity testing in error detection and correction?
* Explain the VRC (Vertical Redundancy Check) concept and its role in error detection.
* How does an error detection checksum algorithm function? Provide an example.
* Contrast and compare the error detection and correction capabilities of CRC (Cyclic Redundancy Check) and Hamming Code.
* Using even parity, the binary data sequence 1101101 is transmitted. Determine the parity bit that must be appended to the data to detect errors.
* What purpose does framing serve in DLL protocols?
* Define the function of flow control protocols in DLL for data transmission.
* Describe the Stop and Wait Protocol utilized by DLL and provide an illustration.
* What is the sliding window protocol concept in DLL? How does it enhance the efficiency of data transmission?
* Compare and contrast the DLL protocols Automatic Repeat Request (ARQ) and Selective Repeat Flow Control.
* In networking, what are MAC (Media Access Control) and LLC (Logical Link Control)?
* What is the problem with channel allocation in MAC protocols?
* Define ALOHA, Pure Aloha, and Slotted Aloha in the context of multiple access protocols.
* Define CSMA (Carrier Sense Multiple Access) Collision Detection within MAC protocols.
* Analyze CSMA Collision Avoidance and Collision-Free Protocols in MAC.
* Each device transmits with a probability of 0.50 in a network of 15 Pure Aloha-enabled devices. Calculate the network's efficacy.
* What message format is used in Ethernet and wireless local area networks?
* What are the advantages and disadvantages of Ethernet and wireless LANs?
* Describe the concealed and exposed station issues in wireless LANs.
* Compare and contrast the message formats employed by Ethernet and wireless LANs, emphasizing their similarities and differences.