SHRI GNANAMBICA DEGREE COLLEGE, MADANAPALLE
(AUTONOMOUS)
PROGRAMME: B. Sc (Computer Science)
II YEAR-IV-SEM
COURSE: DATA COMMUNICATIONS AND COMPUTER NETWORKS
QUESTION BANK

UNIT – I: Introduction & Physical Layer

Short Answer Questions

1. Explain the various hardware components of a computer network.
2. What is a protocol? Explain the concept of protocol hierarchies.
3. List and briefly explain any four key design issues that must be considered when designing network layers.
4. Differentiate between connection-oriented services and connectionless services.
5. What are the primary responsibilities of the Physical Layer?
6. What is the theoretical basis for data communication? Explain the concepts of bandwidth and data rate.
7. Discuss the role and components of the Public Switched Telephone Network (PSTN) in data communication.

Long Answer Questions

1. Explain the various types of computer networks and their applications, with suitable examples.
2. Describe the OSI reference model in detail, explaining the functions of each of its seven layers.
3. Describe the TCP/IP reference model in detail, explaining the functions of each of its layers.
4. Describe in detail the different types of guided transmission media, including twisted pair cable, coaxial cable, and optical fiber.
5. Explain the different types of wireless transmission media, including radio waves, microwaves, and infrared.

UNIT – II: Data Link Layer & Medium Access Sublayer

Short Answer Questions

1. List and briefly explain the key design issues of the Data Link Layer.
2. What is Cyclic Redundancy Check (CRC)? Briefly explain the concept of polynomial division used in CRC.
3. Explain any two elementary Data Link Layer protocols.
4. What is HDLC? Name its frame types.

5. Explain the various collision-free protocols.
6. What is the channel allocation problem? Why is it important in the Medium Access Sublayer?
7. What is Ethernet? Explain the frame structure of Ethernet.

Long Answer Questions

1. Explain the various error detection and correction techniques used at the Data Link Layer.
2. Describe the Sliding Window Protocol. Explain the working of both Go-Back-N ARQ and Selective Repeat ARQ with suitable examples.
3. Explain the HDLC (High-Level Data Link Control) protocol in detail. Discuss its frame structure, types, and operation.
4. What is the channel allocation problem? Explain the various channel allocation techniques.
5. Explain the concept of Data Link Layer switching in detail.

UNIT – III: Network Layer

Short Answer Questions

1. List and briefly explain the key design issues of the Network Layer.
2. State the Optimality Principle and explain its significance in routing.
3. What is flooding? List its advantages and disadvantages.
4. Explain the working of Distance Vector Routing.
5. Describe the Count-to-Infinity problem.
6. What is Quality of Service (QoS) in the Network Layer?
7. What is internetworking? Explain its key components.
8. What is BGP? What is its main function in the Internet?

Long Answer Questions

1. Explain the Shortest Path Routing algorithm (Dijkstra's algorithm).
2. Explain Link State Routing in detail.
3. What is congestion? Explain congestion control mechanisms in detail.
4. What is internetworking? Explain fragmentation and tunneling.
5. Describe the Network Layer in the Internet. Compare and contrast the IPv4 and IPv6 header formats.

UNIT – IV: Transport Layer

Short Answer Questions

1. What services does the Transport Layer provide?
2. What is Remote Procedure Call (RPC)? Briefly explain its basic operation.

3. What is the Real-Time Transport Protocol (RTP)? What is it typically used for?
4. Describe the various TCP timer management techniques.
5. Explain the User Datagram Protocol (UDP). Discuss its segment header.
6. Explain the TCP congestion control algorithms.
7. Explain the future of TCP.

Long Answer Questions

1. Explain the transport services and the Quality of Service (QoS) parameters provided by the Transport Layer to the upper layers.
2. Explain the elements of a Transport Layer protocol in detail.
3. Describe the Real-Time Transport Protocol (RTP). How does it provide end-to-end delivery services for real-time data?
4. Explain the Transmission Control Protocol (TCP) in detail.
5. Explain the User Datagram Protocol (UDP) and Remote Procedure Call (RPC).

UNIT – V: Application Layer

Short Answer Questions

1. What is the role and what are the key functions of the Application Layer?
2. What is the Domain Name System (DNS)? Why is it essential for the Internet?
3. Explain the hierarchical structure of the domain name space.
4. What are DNS resource records? Name any three types and explain their purposes.
5. List the main components of the Electronic Mail system.
6. How does a DNS resolver work?
7. What is TELNET? Explain its features, advantages, and disadvantages.

Long Answer Questions

1. Explain the Domain Name System (DNS) and its role in the Internet.
2. Describe the Electronic Mail (E-Mail). And working of E-mail System.
3. Explain the Simple Mail Transfer Protocol (SMTP) in detail.
4. Describe the File Transfer Protocol (FTP) in detail. And list out Common Application Layer Protocols.
5. Describe the Simple Network Management Protocol (SNMP).