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| **SESSION** | **SEPT 2024** |
| **PROGRAM** | **BACHELOR OF COMPUTER APPLICATIONS (BCA)** |
| **SEMESTER** | **4** |
| **COURSE CODE & NAME** | **DCA2201 COMPUTER NETWORKING** |
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**Set – I**

**1. Explain the TCP/IP protocol suite and how it aligns with the TCP/IP model. Outline the four layers of the TCP/IP model—Network Interface, Internet, Transport, and Application layers—detailing each layer's function in data transmission across networks. Compare the TCP/IP model to the OSI model, noting both their similarities and differences.**

**Ans 1.**

**The TCP/IP Protocol Suite and Its Alignment with the TCP/IP Model**

The **TCP/IP protocol suite** is a comprehensive framework that facilitates communication between devices across networks. It is the backbone of the Internet and many private networks, as it allows for reliable data transmission. TCP/IP (Transmission Control Protocol/Internet Protocol) combines a suite of protocols that collectively govern how data is packaged, addressed, transmitted, and received. The TCP/IP model is a simplified representation of this suite, organized into four distinct layers: Network Interface, Internet, Transport, and

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**2. Describe the concept of sliding window protocols in computer networking. Compare the two primary types of sliding window protocols: Stop-and-Wait and Go-Back-N, highlighting their key similarities and differences.**

**Ans 2.**

**Sliding Window Protocols in Computer Networking**

In computer networking, **sliding window protocols** are methods used for flow control and error management during data transmission. These protocols help optimize the efficient use of available bandwidth while ensuring reliable communication. Sliding window protocols allow multiple frames of data to be sent before an acknowledgment is received, as opposed to sending one frame at a time. The "window" in these protocols refers to the range of frames that can be

**3. Describe the detailed structure of an IPv4 address, and discuss the significance and purpose of different Internet address classes. Also compare IPv4 and IPv6.**

**Ans 3.**

**Detailed Structure of an IPv4 Address**

An **IPv4 address** is a 32-bit numerical identifier used to uniquely identify devices on a network. The address is divided into four octets (8-bit segments), with each octet separated by a dot, written in decimal form (e.g., 192.168.1.1). Since each octet can represent a value between 0 and 255, the entire IPv4 address range spans from 0.0.0.0 to 255.255.255.255. The structure of an IPv4 address consists of two main components: the **network portion** and the **host portion**.

* The **network portion** identifies the specific network to which a device belongs. This

**Set – II**

**4. What is Routing? Explain the significance of routing algorithms. Explain any two routing algorithms in detail**

**4. Routing and Routing Algorithms**

**Routing**

Routing is the process of determining the optimal path for data packets to travel from the source to the destination across interconnected networks. Routers, which are network devices, play a critical role in routing as they analyze incoming packets, consult routing tables, and forward packets to their intended destination based on IP addresses.

**Significance of Routing Algorithms**

Routing algorithms are essential for ensuring efficient data transmission in computer networks.

**5. Discuss various email protocols**

**Ans 5.**

**Various Email Protocols**

Email communication is a fundamental part of the Internet, enabling the transfer of messages and files between users across the globe. Email protocols are a set of standardized rules that govern how email messages are sent, retrieved, and stored. These protocols ensure smooth communication between email clients (software like Outlook, Thunderbird) and email servers. The primary email protocols include **SMTP**, **POP3**, and **IMAP**, each serving a specific

**6. Describe the role and importance of the Domain Name System (DNS) in computer networking. Additionally, distinguish between static and dynamic web pages.**

**Ans 6.**

**Role and Importance of the Domain Name System (DNS)**

The **Domain Name System (DNS)** plays a crucial role in computer networking by translating human-readable domain names (e.g., [www.google.com](http://www.google.com)) into machine-readable IP addresses (e.g., 216.58.217.46). This translation is essential because computers and network devices communicate using IP addresses, but remembering numerical addresses is impractical for humans.

DNS functions as a distributed database that maps domain names to IP addresses. It enables