**ASSIGNMENT 1 (TO BE PRESENTED PYHSICALLY ON 31ST MARCH 2025)**

**Group A (10 Marks)**

1. Differentiate between **broadband and baseband signaling** in terms of data transmission. *(2 Marks)*
2. Compare **half-duplex and full-duplex transmission** with examples. *(2 Marks)*
3. Explain three **benefits of the OSI model** in networking. *(3 Marks)*
4. Why is Ethernet considered a **scalable** networking technology? *(3 Marks)*

**Group B (10 Marks)**

1. Identify and explain **six benefits of the OSI Model** in networking. *(6 Marks)*
2. Discuss two **advantages of digital transmission** in modern telecommunication systems. *(2 Marks)*
3. Explain how **error detection and correction techniques** improve digital communication. *(2 Marks)*
4. Describe the importance of **packet switching** in digital communication. *(2 Marks)*

**Group C (10 Marks)**

1. With the aid of a diagram, differentiate between **single-mode and multimode fiber optic cables**. *(4 Marks)*
2. How does **parallel transmission** differ from serial transmission? *(3 Marks)*
3. Define a **Stub network** and describe its function in a network topology. *(1 Mark)*
4. What is **DHCP**, and how does it simplify network management? *(2 Marks)*

**Group D (10 Marks)**

1. Define the following networking terms:
   * **CPE (Customer Premises Equipment)** *(1 Mark)*
   * **DCE (Data Circuit-Terminating Equipment)** *(1 Mark)*
   * **DTE (Data Terminal Equipment)** *(1 Mark)*
2. Why is **TCP/IP well-suited for intranets and extranets**? State four reasons. *(4 Marks)*
3. What are two **advantages of fiber optic cables** over copper cables in data transmission? *(3 Marks)*

**Group E (10 Marks)**

1. Describe the **four attributes** of the **physical layer interfaces**: electrical, functional, mechanical, and procedural. *(4 Marks)*
2. Why is the **physical layer important** in network communication? *(2 Marks)*
3. Explain the **difference between analog and digital signals** in networking. *(2 Marks)*
4. What is the significance of **bit synchronization** in data transmission? *(2 Marks)*

**Group F (10 Marks)**

1. List and explain **five major network maintenance activities** performed by administrators. *(5 Marks)*
2. What is **network uptime**, and why is it crucial for businesses? *(2 Marks)*
3. Describe the role of **network monitoring tools** in maintaining network performance. *(2 Marks)*
4. Explain how **firmware and software updates** enhance network security. *(1 Mark)*

**Group G (10 Marks)**

1. What are **private IP addresses**, and why are they used in internal networks? *(3 Marks)*
2. Explain one **advantage and one disadvantage** of using private IP addresses. *(2 Marks)*
3. Which three **IP address ranges** are reserved for private addressing as per RFC 1918? *(3 Marks)*
4. How do **Network Address Translation (NAT) techniques** facilitate internet access for private IPs? *(2 Marks)*

**Group H (10 Marks)**

1. Differentiate between **static and dynamic IP addressing**. *(3 Marks)*
2. What is the significance of **subnetting** in IP addressing? *(3 Marks)*
3. Describe the process of **IP address allocation in a DHCP-enabled network**. *(2 Marks)*
4. Why is **IPv6 preferred over IPv4**, and what advantages does it offer? *(2 Marks)*