

Dr. Babasaheb Ambedkar Open University

Term End Examination January – 2026

Course	: BSCCS	Date	: 24/02/2026
Subject Code	: BSCCS-303	Time	: 11:30pm to 01:45pm
Subject Name	: Data Communications and Networks	Duration	: 2.15 Hour
		Max. Marks	: 70

Section A

Answer the following (Attempt any three)

(30)

1. Define Data Communication. Explain the five components of a data communication system (Message, Sender, Receiver, Medium, Protocol) in detail.
2. What is a Network Topology? Explain Mesh, Star, and Bus topologies along with their respective advantages and disadvantages.
3. Describe the OSI Reference Model in detail. Explain the primary functions and responsibilities of each of the seven layers.
4. Explain the different types of Guided Transmission Media (Twisted-pair, Coaxial, and Fiber-optic cable) and compare their performance and shielding.
5. What is Switching? Explain the three phases of Circuit Switching and compare it with Packet Switching in terms of efficiency.

Section B

Answer the following (Attempt any four)

(20)

1. Differentiate between LAN, MAN, and WAN based on geographical area, ownership, and data transfer rates.
2. Explain the characteristics of an electromagnetic signal: Amplitude, Frequency, and Phase.
3. Describe the various types of transmission modes: Simplex, Half-Duplex, and Full-Duplex with real-world examples.
4. Compare the TCP/IP Protocol Suite with the OSI Reference Model. List the layers of TCP/IP.
5. Explain the concept of Routing. Differentiate between Static Routing and Dynamic Routing.
6. Write a short note on the functions of the Data Link Layer, specifically focusing on framing and error control.

Section C

Part – A (Multiple Choice Questions)

(10)

1. Which topology requires a multipoint connection?
A. Mesh B. Star
C. Bus D. Ring
2. The _____ layer is responsible for moving frames from one hop (node) to the next.
A. Physical B. Data Link
C. Transport D. Network
3. Which transmission media is immune to electromagnetic interference (EMI)?
A. Twisted-pair B. Coaxial cable
C. Fiber-optic cable D. Radio waves

- 4 IP address operates at which layer of the OSI model?
A. Data Link Layer B. Network Layer
C. Transport Layer D. Physical Layer
- 5 In _____ switching, there is no need for resource reservation.
A. Circuit B. Packet
C. Message D. None of these
- 6 Which device is used to connect different network segments and operates at the Network layer?
A. Hub B. Bridge
C. Router D. Switch
- 7 Communication between a computer and a keyboard involves _____ transmission.
A. Simplex B. Half-duplex
C. Full-duplex D. Automatic
- 8 How many layers are in the standard TCP/IP protocol suite?
A. 7 B. 5
C. 4 D. 6
- 9 What is the unit of data at the Transport layer?
A. Bits B. Frames
C. Packets D. Segments
- 10 The process of adding control information to data at each layer is called:
A. Decapsulation B. Encapsulation
C. Fragmentation D. Routing

Part – B (Do as Directed)

(10)

State whether the following statements are true or false

- 1 In a star topology, if the central hub fails, the entire network goes down.
- 2 The Physical layer is concerned with the transmission of raw bits over a communication channel.
- 3 UDP (User Datagram Protocol) is a connection-oriented protocol.
- 4 Fiber-optic cables use light pulses to transmit data instead of electrical signals.
- 5 A MAC address is also known as a logical address.
- 6 Attenuation refers to the loss of signal energy as it travels over a distance.
- 7 Packet switching is generally more efficient than circuit switching for bursty data traffic.
- 8 An Intranet is a public network accessible to everyone via the World Wide Web.
- 9 The Presentation layer of the OSI model handles data compression and encryption.
- 10 Half-duplex mode allows data to flow in both directions simultaneously.
