

SAMPLE PAPERS
DIPLOMA THIRD SEMESTER EXAMINATION 2025 (JUT)
COMPUTER NETWORKS
DIPLOMA WALLAH

- **Time:** 3 Hours
 - **Full Marks:** 70
 - **Instructions:** Answer any **FIVE** questions. **Question No. 1 is Compulsory.**
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1. Choose the correct alternative of the following: ($2 * 7 = 14$)

(i) Which layer handles the logical addressing (IP address) of packets?

- (a) Data Link Layer
- (b) Network Layer
- (c) Transport Layer
- (d) Physical Layer

(ii) A set of rules that governs data communication is called:

- (a) Protocols
- (b) Standards
- (c) RFCs
- (d) Servers

(iii) Which of the following is NOT a valid IPv4 class?

- (a) Class A
- (b) Class B
- (c) Class D
- (d) Class F

(iv) ICMP stands for:

- (a) Internet Connection Management Protocol
- (b) Internet Control Message Protocol
- (c) Internal Control Message Protocol
- (d) Internet Configuration Management Protocol

(v) The physical address of a network interface card (NIC) is known as:

- (a) IP Address
- (b) Port Address
- (c) MAC Address

(d) URL

(vi) Frequency is measured in:

(a) Seconds

(b) Hertz

(c) Bits

(d) Bytes

(vii) Which device operates at the Data Link Layer?

(a) Hub

(b) Repeater

(c) Switch

(d) Passive Hub

2.

(a) Why do we need IPv6? Explain its features and address representation. Compare IPv4 and IPv6. (7)

(b) Explain the working and features of TCP and UDP. Provide a detailed comparison between TCP and UDP. (7)

3.

(a) Explain the three layers of Hierarchical Network Design (Access, Distribution, Core) and their functions. (7)

(b) Differentiate between Static Routing and Dynamic Routing. Define Default Gateway. (7)

4.

(a) Write short notes on DNS. Explain the complete DNS Resolution process. (7)

(b) Define Bandwidth, Throughput, Latency, and Jitter. Differentiate between them. (7)

5.

(a) Explain the OSI Reference Model with a neat diagram. (7)

(b) Differentiate between Parallel and Serial Transmission. (7)

6.

(a) What is VLAN (Virtual LAN)? Explain its need and benefits in a network. (7)

(b) Explain the purpose and output of the commands: ping, traceroute, and nslookup. (7)

7. Write short notes on any four: (3.5 * 4 = 14)

(a) Default Gateway

(b) IMAP4

(c) Crossover UTP Cable

(d) Jitter

(e) SOHO Network

SOLUTIONS

Q1. MCQ Answers:

- (i) (b) Network Layer
- (ii) (a) Protocols
- (iii) (d) Class F (Classes are A, B, C, D, E)
- (iv) (b) Internet Control Message Protocol
- (v) (c) MAC Address
- (vi) (b) Hertz
- (vii) (c) Switch

Q2-Q6 Model Answers (Summary):

- **Q2(a) IPv6:** Needed due to IPv4 exhaustion. **Features:** 128-bit address, hexadecimal (e.g., 2001:0db8::), built-in security (IPsec), no broadcasting. **Compare:** IPv4 (32-bit, numeric) vs IPv6 (128-bit, hex). ¹²
- **Q2(b) TCP vs UDP:** **TCP:** Connection-oriented, reliable, acknowledged, slower (Email, Web). **UDP:** Connectionless, unreliable, no ack, faster (Streaming, VoIP). ¹³
- **Q3(a) Hierarchical Design:** **Access Layer:** User connection (switches). **Distribution Layer:** Policy/Routing between access and core. **Core Layer:** High-speed backbone transport. ¹⁴
- **Q3(b) Routing:** **Static:** Manually configured paths, secure but hard to maintain. **Dynamic:** Auto-updates using protocols (RIP, OSPF). **Default Gateway:** The router interface that connects the local network to the internet. ¹⁵
- **Q4(a) DNS:** Resolves Hostnames to IPs. **Process:** Client -> Local DNS -> Root Server -> TLD Server (.com) -> Authoritative Server -> IP returned.
- **Q4(b) Metrics:** **Bandwidth:** Max capacity. **Throughput:** Actual speed. **Latency:** Delay time. **Jitter:** Variation in delay.
- **Q5(a) OSI Model:** (Same as Paper 1).
- **Q5(b) Parallel vs Serial:** **Parallel:** Multiple bits sent simultaneously (faster, short distance). **Serial:** One bit at a time (slower, long distance, reliable).
- **Q6(a) VLAN:** See Paper 1 Q7. Benefits: Security, Broadcast control, flexible grouping.
- **Q6(b) Commands:** **Ping:** Checks connectivity/latency. **Tracert:** Shows path/hops to destination. **Nslookup:** Queries DNS server for IP.

Q7 Short Notes:

- **Default Gateway:** Router IP for exit traffic.
- **IMAP4:** Protocol to retrieve email, keeps mail on server (sync).
- **Crossover Cable:** Used to connect same-device types (PC to PC, Switch to Switch).
- **Jitter:** Variation in packet arrival time.
- **SOHO:** Small Office Home Office network (Simple, often single router/AP).