

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

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- **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, tracert, 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

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## 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). <sup>12</sup>
- **Q2(b) TCP vs UDP:** **TCP:** Connection-oriented, reliable, acknowledged, slower (Email, Web). **UDP:** Connectionless, unreliable, no ack, faster (Streaming, VoIP). <sup>13</sup>
- **Q3(a) Hierarchical Design: Access Layer:** User connection (switches). **Distribution Layer:** Policy/Routing between access and core. **Core Layer:** High-speed backbone transport. <sup>14</sup>
- **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. <sup>15</sup>
- **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).