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 address is used to identify a process on a host by the transport layer?

(a) Physical address

(b) Logical address

(c) Port address

(d) Specific address

(ii) In IP addressing, Class C is reserved for:

(a) Large networks

(b) Multicasting

(c) Small networks

(d) Research

(iii) The acronym 'WLAN' stands for:

(a) Wide Local Area Network

(b) Wireless Local Area Network

(c) Wireless Land Access Network

(d) Wide Land Area Network

(iv) Which layer is responsible for encryption and decryption?

(a) Application

(b) Presentation

(c) Session

(d) Transport

(v) What is the size of an Ethernet MAC address?

(a) 32 bits

(b) 48 bits

(c) 64 bits

(d) 128 bits

(vi) "Data" in the Transport layer is called:

(a) Frame

(b) Packet

(c) Segment

(d) Bit

(vii) The protocol used for secure remote login is:

(a) Telnet

(b) SSH

(c) HTTP

(d) FTP

2.

(a) Differentiate between POP3 and IMAP4. Explain the role of SMTP in email delivery. (7)

(b) What is NAT (Network Address Translation)? Explain its operation and purpose. (7)

3.

(a) Explain the Structured Troubleshooting Methods: Bottom-Up and Top-Down approaches. (7)

(b) Differentiate between Straight-Through and Crossover UTP Cable Pinouts. State when each type is used. (7)

4.

(a) Compare Telnet and SSH. Why is SSH preferred for secure remote access? (7)

(b) Draw and label the basic structure of an Ethernet Frame. (7)

5.

(a) What is a SOHO (Small Office/Home Office) Network? Discuss its design, components, and common challenges. (7)

(b) Define a MAC Address. Explain the working process of the ARP (Address Resolution Protocol). (7)

6.

(a) Explain the various TCP/IP Messages and the TCP/IP Reference model. (7)

(b) Explain IPv4 Addressing and rules for grouping IP addresses. (7)

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

(a) DHCP Server

(b) Firewall

(c) Bandwidth

(d) Static Routing

(e) Subnet Mask

✅ SOLUTIONS — PAPER 3

Q1. MCQ Answers:

(i) (c) Port address

(ii) (c) Small networks

(iii) (b) Wireless Local Area Network

(iv) (b) Presentation

(v) (b) 48 bits

(vi) (c) Segment

(vii) (b) SSH

Q2-Q6 Model Answers (Summary):

- **Q2(a) Email Protocols: POP3:** Downloads & deletes from server (local storage). **IMAP4:** Syncs with server (multiple device access). **SMTP:** Pushes email from sender to server and server to server. [23]
- **Q2(b) NAT:** Translates private local IPs (192.168.x.x) to a public IP on the router. **Purpose:** Security + Saves IPv4 addresses. [24]
- **Q3(a) Troubleshooting: Bottom-Up:** Start from Physical layer (cables, power) -> up to App. **Top-Down:** Start from App (software error) -> down to physical. [25]
- **Q3(b) Cables: Straight-Through:** Connect different devices (PC to Switch). **Crossover:** Connect same devices (Switch to Switch). [26]
- **Q4(a) Telnet vs SSH: Telnet:** Plain text, insecure. **SSH:** Encrypted, secure remote access. [27]
- **Q4(b) Ethernet Frame:** Fields: Preamble, SFD, Dest MAC, Source MAC, Type/Length, Data, FCS (CRC). [28]
- **Q5(a) SOHO:** Design: Simple star topology. **Components:** Router/Modem combo, Switch, PCs, Printers. **Challenges:** Security, consumer-grade hardware reliability. [29]
- **Q5(b) MAC/ARP: MAC:** 48-bit unique hardware ID (burnt-in). **ARP:** Broadcasts "Who has IP X?" -> Owner replies "I have IP X, here is my MAC Y". [30]
- **Q6(a) TCP/IP:** Refer to Paper 1 Q5.
- **Q6(b) IPv4:** Refer to Paper 1 Q4.

Q7 Short Notes:

- **DHCP Server:** Assigns dynamic IPs automatically.
- **Firewall:** Filters traffic based on rules (allows/blocks ports).
- **Bandwidth:** Maximum rate of data transfer.
- **Static Routing:** Manual entry of routes in router table.
- **Subnet Mask:** Differentiates Network ID from Host ID (e.g., 255.255.255.0). [31]