



NATIONAL UNIVERSITY OF MODERN LANGUAGES

Computer Networks Assignment No - 1

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Q1: Working with the OSI Model

Task 1: Clicking a link in browser (IP already known)

- User clicks link
- Browser sends request
- Request passes through OSI layers
- Server responds
- Response travels back.

Layer	Name	Protocol / Example	Up/Dn	What happens (simple English)
7	Application	Browser	Dn	Browser makes request for a web page.
6	Presentation	HTTP	Dn	Data is formatted into HTTP request format.
5	Session	Port 80 (Session)	Dn	A session is started with the server.
4	Transport	TCP	Dn	Request is split into TCP segments.
3	Network	IP	Dn	Destination IP is added and routing begins.
2	Data Link	Ethernet / MAC	Dn	Packets are framed, error check added.
1	Physical	Cable / Wi-Fi	Dn	Bits are sent as signals over medium.

Task 2: Sending an Email

- User writes email
- Email client prepares
- SMTP sends to mail server
- Data goes through network
- Delivered to recipient's server.

Layer	Name	Protocol / Example	Up/Dn	What happens (simple English)
7	Application	Gmail / Outlook client	Dn	User writes and sends an email.

Layer	Name	Protocol / Example	Up/Dn	What happens (simple English)
6	Presentation	MIME / Encryption	Dn	Email is encoded, attachments handled.
5	Session	SMTP Session (Port 25/587)	Dn	Connection made with mail server.
4	Transport	TCP	Dn	Email is split into ordered TCP segments.
3	Network	IP	Dn	Destination IP of mail server added.
2	Data Link	Wi-Fi / Ethernet	Dn	Data is framed and error-checked.
1	Physical	Wireless signals / Cable	Dn	Data travels as signals over wire or air.

Task 3: Downloading a File (HTTP/FTP)

- Client requests file
- Server sends
- Packets travel through OSI layers
- File is reassembled on client
- User saves file.

Layer	Name	Protocol /	Up/Dn	What happens
7	Application	Browser / FTP	Dn	User clicks download.
6	Presentation	HTTP / FTP	Dn	File is converted into transferable format.
5	Session	FTP / TCP Session	Dn	Session is created between client and server.
4	Transport	TCP	Dn	File is broken into smaller packets.
3	Network	IP	Dn	Destination IP and route are added.
2	Data Link	Ethernet / Wi-Fi	Dn	Packets are framed and sent to network device.
1	Physical	Cable / Wireless	Dn	Bits are transmitted physically.

Q2: Scenario Questions

i. Which OSI layers to check for delay and packet loss? Why?

- **Transport Layer (Layer 4):** Ensures reliability, retransmits lost packets, checks sequencing.
- **Network Layer (Layer 3):** Handles routing; delays may happen due to wrong or congested routes.
- **Data Link Layer (Layer 2):** Responsible for error detection, collisions, retransmission on LAN.

ii. How will troubleshooting differ with TCP/IP model?

- **TCP/IP has only 4 layers:** Application, Transport, Internet, Network Access.
- Delay/loss would be checked at Transport (TCP reliability), Internet (IP routing), and Network Access (error handling + physical medium).
- Compared to OSI, troubleshooting is more practical but less detailed because layers are combined.

iii. Key differences between OSI and TCP/IP models?

- **OSI: 7 layers**, theoretical, clear separation of functions (Presentation, Session exist).
- **TCP/IP: 4 layers**, practical, directly used on internet. Combines OSI's Session + Presentation + Application into one.
- **OSI is good for learning;** TCP/IP is used for real implementation.

iv. If TCP is used, how is packet loss and retransmission handled? Which OSI layer?

- TCP uses acknowledgements (ACKs).
- If packet not acknowledged in time, TCP resends it (timeout).

- If duplicate ACKs are received, fast retransmit is triggered.
- TCP also uses congestion control to avoid overload.
- This happens in the Transport Layer (Layer 4) of the OSI model.

GeeksforGeeks *OSI and TCP/IP Models* – <https://www.geeksforgeeks.org>