



DECCAN EDUCATION SOCIETY'S  
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## ASSIGNMENT

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Q1 Demonstrate the HTTP protocol steps to describe what happens when a user visits a website using a web browser.

→ When a user enters a website URL in a browser, the following steps occur:

1. DNS Resolution: The domain name (eg, `www.example.com`) is translated into its IP address by a DNS server.
2. TCP Connection: A connection is established with the server using the TCP-3-way handshake (SYN, SYN-ACK, ACK).
3. (If HTTPS) TLS Handshake: Encryption is set up using SSL/TLS before data transfer.
4. HTTP Request: The browser sends an HTTP request (eg: `GET /index.html HTTP/1.1`) along with headers to the server.
5. Server Processing: The web server processes the request and prepares the response (HTML, CSS, image, etc).
6. HTTP Response: The server sends back a response (status code + headers + content). Example: 200 OK with the webpage data.
7. Rendering: The browser interprets the HTML and loads additional resources (CSS, JS, images).
8. Display: The final webpage is displayed to the user.



Q2 Differentiate between TCP and UDP

→ Feature	TCP (Transmission Control Protocol)	UDP (User Datagram Protocol)
Type	Connection-oriented	Connectionless
Reliability	Reliable, ensures delivery ACK's, retransmission	Unreliable, no guarantee of delivery
Data Ordering	Maintains sequence of packets	No ordering, packets may arrive out of order.
Error Handling	Yes (error checking + correction)	Only error checking no correction
Speed	Slower due to overhead	Faster, lightweight
Typical Uses	Web browsing (HTTP/ HTTPS), Emails, File transfer (FTP)	Streaming, Online gaming, VoIP, DNS



Q.3 Examine the roles of various network devices (routers, switches, hubs) in managing data flow. How does each device affect network performance?

→ Hub:

- Works at the Physical Layer (Layer 1).
- Forwards data to all connected devices (broadcasts).
- Creates collisions, reduces performance.
- Impact: Low efficiency, not used in modern networks.

Switch:

- Work at the Data Link Layer (Layer 2).
- Forwards data based on MAC addresses (unicast).
- Reduces collisions, increases throughput.
- Impact: Improves performance, supports Full duplex, VLANs QoS.

Router:

- Works at the Network Layer (Layer 3).
- Forwards packets between different networks using IP addresses.
- Separates broadcast domains, provides routing, NAT, firewalling.
- Impact: Enables internetworking, controls traffic, but adds slight delay due to processing.

Summary:

- Hub = Simple, inefficient.
- Switch = efficient, LAN traffic management.
- Router = connects multiple networks.



Q4 Assuming even parity, find the parity bit for each of the following data units: 1) 1001011 2) 0001100 3) 1000000 4) 11101

→ Rule: In even parity, the total number of 1's (including parity bit) must be even.

1. 1001011

- Number of 1's = 4 (even)
- parity bit = 0

2. 0001100

- Number of 1's = 2 (even)
- parity bit = 0

3. 1000000

- Number of 1's = 1 (odd)
- parity bit = 1

4. 1110111

- Number of 1's = 6 (even)
- parity bit = 0



Q5 For the following IP Addresses: Identify the class, Network IP and Broadcast address:

a) 1.2.3.4    b) 10.15.20.60    c) 130.1.2.3    d) 300.1.2.3

→ Rules (classful addressing):

- Class A: 1-126 - Default mask /8 → Net ID = 1st octet.
- Class B: 128-191 - Default mask /16 → Net ID = 1st two octets.
- Class C: 192-223 → Default mask /24 → Net ID = 1st three octets.
- Note: Any octet must be in range 0-255; otherwise invalid.

a) 1.2.3.4

- class: A
- Network IP: 1.0.0.0
- Broadcast: 1.255.255.255

b) 10.15.20.60

- class: A
- Network IP: 10.0.0.0
- Broadcast: 10.255.255.255

c) 130.1.2.3

- Class: B
- Network IP: 130.1.0.0
- Broadcast: 130.1.255.255

d) 300.1.2.3

- Invalid IP address (octet "300" > 255, not allowed)