### **5.1 HTTP and WWW**

#### **HTTP (Hypertext Transfer Protocol):**

* **Definition:** A protocol used for transferring hypertext documents (like HTML files) on the World Wide Web.
* **Key Features:**
  + Stateless: Each request is independent of others.
  + Connection Types: Supports persistent and non-persistent connections.
  + Methods:
    - **GET**: Retrieve data.
    - **POST**: Submit data.
    - **PUT**: Update resources.
    - **DELETE**: Delete resources.
    - **HEAD**: Retrieve headers only.
* **HTTP Versions:**
  + **HTTP/1.0**: Non-persistent connections.
  + **HTTP/1.1**: Persistent connections and pipelining.
  + **HTTP/2**: Faster, binary framing, and multiplexing.
  + **HTTP/3**: Based on QUIC for low latency.
* **Port Used:** Default is **Port 80** (HTTP) and **Port 443** (HTTPS).

#### **WWW (World Wide Web):**

* **Definition:** An information system on the internet enabling users to access and share hypertext documents linked via hyperlinks.
* **Components:**
  + **Web Browser:** Client software (e.g., Chrome, Firefox) to access web content.
  + **Web Server:** Hosts web pages (e.g., Apache, Nginx).
  + **URLs:** Unique addresses for resources on the web.
  + **HTML:** Standard language for creating web pages.
* **Working:**
  + User sends a request (via HTTP/HTTPS) to the server.
  + Server responds with the requested document or an error message.

### **5.2 DNS (Domain Name System)**

#### **Definition:**

A hierarchical and decentralized naming system that translates human-readable domain names (e.g., [www.example.com](http://www.example.com)) into IP addresses (e.g., 192.168.1.1).

#### **Functions:**

1. **Name Resolution:** Maps domain names to IP addresses.
2. **Mail Server Identification:** Finds mail servers via MX records.
3. **Load Distribution:** Distributes traffic using multiple IP addresses for one domain.

#### **Structure:**

* **Root DNS Servers:** The top of the DNS hierarchy (represented by ".").
* **TLD (Top-Level Domain) Servers:** Handle domains like .com, .org, .edu.
* **Authoritative DNS Servers:** Contain specific domain details.
* **Resolvers:** Act as intermediaries for client queries.

#### **DNS Records:**

* **A Record:** Maps a domain to an IPv4 address.
* **AAAA Record:** Maps a domain to an IPv6 address.
* **CNAME Record:** Alias for another domain.
* **MX Record:** Specifies mail servers for the domain.

#### **Port Used: Port 53 for queries.**

### **5.3 FTP and Telnet**

#### **FTP (File Transfer Protocol):**

* **Definition:** A protocol used for transferring files between a client and a server over a network.
* **Modes:**
  + Active Mode: Client sends a request; server connects back.
  + Passive Mode: Client initiates both control and data connections.
* **Working:**
  + Establish a connection (control channel) on **Port 21**.
  + Transfer data on a separate data channel (Port 20).
* **Commands:**
  + **LIST:** Lists files.
  + **RETR:** Downloads files.
  + **STOR:** Uploads files.
* **Secure Versions:** FTPS (FTP Secure) and SFTP (uses SSH).

#### **Telnet:**

* **Definition:** A protocol used to remotely log into systems over a network.
* **Features:**
  + Provides a command-line interface.
  + Sends data as plaintext (not secure).
* **Port Used:** **Port 23**.
* **Modern Alternative:** SSH (Secure Shell) due to better security.

### **5.4 SMTP (Simple Mail Transfer Protocol)**

#### **Definition:**

A protocol used to send emails from a client to a server or between mail servers.

#### **Working:**

1. Sender's client establishes a connection with the SMTP server.
2. Emails are sent using commands like:
   * **HELO/EHLO:** Identifies the client.
   * **MAIL FROM:** Specifies the sender.
   * **RCPT TO:** Specifies the recipient.
   * **DATA:** Sends the email body.
3. If the recipient is not local, the message is forwarded to the recipient’s SMTP server.
4. SMTP relies on DNS to find mail servers using **MX records**.

#### **Port Used:**

* **Port 25:** Standard SMTP.
* **Port 587:** Secure SMTP.
* **Port 465:** For encrypted connections.

#### **Limitations:**

* SMTP cannot retrieve emails; protocols like **IMAP** or **POP3** are needed for this purpose.

### **Exam Tips:**

1. Use diagrams for HTTP, DNS hierarchy, FTP modes, and SMTP workflow.
2. Highlight ports and key commands in short notes.
3. Compare similar protocols (e.g., Telnet vs. SSH, FTP vs. SFTP).

Let me know if you’d like more detailed examples or a sample question set!

4o

##### **You said:**

give subjective questions and answers of 5 and 10 marks

###### **ChatGPT said:**

ChatGPT

Here are **subjective questions** with detailed answers for each section, tailored for college exams. These are designed for both **5-mark** and **10-mark** questions.

### **5.1 HTTP and WWW**

#### **5-Mark Question:**

**Q1. Explain the key features of HTTP and its request methods.** **Answer:**

* **HTTP Features:**
  + **Stateless:** Each request is treated independently.
  + **Connection Types:** Supports persistent and non-persistent connections.
  + **Media Independence:** Can transfer text, images, videos, etc.
  + **Simple Protocol:** Uses plain text commands.
* **HTTP Request Methods:**
  + **GET:** Retrieves data from a server.
  + **POST:** Submits data to a server.
  + **PUT:** Updates existing resources.
  + **DELETE:** Deletes a resource.
  + **HEAD:** Retrieves only the headers of a response.

#### **10-Mark Question:**

**Q2. Describe the working of HTTP with a suitable diagram.** **Answer:**

1. **Client Request:**
   * A user enters a URL in the browser, and the browser sends an HTTP request to the server.
   * The URL contains the server address, resource path, and parameters.
2. **Server Response:**
   * The server processes the request and sends back an HTTP response, including the requested resource or an error code.
3. **Browser Display:**
   * The browser renders the received resource (e.g., HTML, images).

**Diagram:** Include a simple diagram showing:

* Client (browser) → HTTP Request → Web Server
* Web Server → HTTP Response → Client (browser)
* **Ports:** HTTP uses **Port 80**, HTTPS uses **Port 443**.

### **5.2 DNS**

#### **5-Mark Question:**

**Q3. What is DNS, and explain its main purpose?** **Answer:**

* **Definition:** The Domain Name System (DNS) translates human-readable domain names (e.g., www.example.com) into machine-readable IP addresses (e.g., 192.168.1.1).
* **Purpose:**
  1. Simplifies accessing websites by using names instead of numeric IPs.
  2. Helps locate mail servers for sending emails.
  3. Distributes traffic to multiple servers for load balancing.
* **Ports:** Uses **Port 53** for queries.

#### **10-Mark Question:**

**Q4. Explain the structure of DNS with a diagram.** **Answer:**

1. **Root Servers:** At the top of the hierarchy, represented by “.”. They direct queries to TLD servers.
2. **TLD (Top-Level Domain) Servers:** Handle domains like .com, .org, .net.
3. **Authoritative Servers:** Contain the actual mapping of domain names to IPs.
4. **Resolvers:** Intermediaries between clients and DNS servers.

**Diagram:** Include:

* Client (Resolver) → Root DNS Server → TLD Server → Authoritative DNS Server → IP Address.

### **5.3 FTP and Telnet**

#### **5-Mark Question:**

**Q5. Differentiate between FTP and SFTP.** **Answer:**

| **Feature** | **FTP** | **SFTP** |
| --- | --- | --- |
| **Security** | Sends data in plaintext, insecure. | Encrypts data using SSH. |
| **Ports** | Uses Ports 21 (control) and 20 (data). | Uses Port 22. |
| **Data Transfer** | Faster due to no encryption. | Slower due to encryption. |
| **Use Case** | Suitable for non-sensitive files. | Used for secure file transfers. |

#### **10-Mark Question:**

**Q6. Explain the working of FTP with its modes and commands.** **Answer:**

1. **Modes:**
   * **Active Mode:** The server connects to the client’s specified port for data transfer.
   * **Passive Mode:** The client initiates both control and data connections, useful when firewalls block incoming connections.
2. **Commands:**
   * **LIST:** Lists files in a directory.
   * **RETR:** Downloads a file.
   * **STOR:** Uploads a file.
   * **USER & PASS:** Authenticate the user.
3. **Working:**
   * FTP establishes a control connection on **Port 21** for commands.
   * A separate data connection on **Port 20** handles file transfers.

**Diagram:** Include:

* Client ↔ Server (show control and data connections).

### **5.4 SMTP**

#### **5-Mark Question:**

**Q7. Explain the key features of SMTP.** **Answer:**

* **SMTP Features:**
  1. **Mail Transfer Protocol:** Handles email sending between mail servers.
  2. **Relies on DNS:** Uses MX records to locate recipient servers.
  3. **Commands:** Uses commands like HELO, MAIL FROM, RCPT TO, and DATA.
  4. **Ports:** Uses **Port 25** (standard), **Port 587** (secure), or **Port 465** (SSL).

#### **10-Mark Question:**

**Q8. Describe the working of SMTP with a flow diagram.** **Answer:**

1. **Steps:**
   * The sender’s email client establishes a connection to the SMTP server.
   * Commands (HELO, MAIL FROM, RCPT TO) are sent to define the sender and recipient.
   * The email body is transmitted after the **DATA** command.
   * The server forwards the email to the recipient’s SMTP server if the recipient is on a different domain.
2. **Diagram:**
   * Sender → SMTP Server → Intermediate Servers → Recipient’s SMTP Server → Recipient’s Inbox.
3. **Limitations:** SMTP is not used for receiving emails; protocols like IMAP or POP3 are required for retrieval.

### **General Exam Writing Tips:**

* Use diagrams for 10-mark answers.
* Highlight key terms (e.g., protocols, ports).
* Include comparisons in tabular form where applicable.
* Ensure your answers are structured: **Introduction, Main Content, and Conclusion**.