

VI-SEM –CSE(MODEL QUESTION PAPER-3)
CST-602-INTERNET & WEB TECHNOLOGY

FULL MARK : 80

Time: 3hrs

Answer any Five including Q.no.1 &2
 Figures in the right hand margin indicates marks

1.	Answer ALL questions.	(2X10)
(a)	Define Markup language ?	
(b)	What is a channel ?.	
(c)	What do you mean by web.	
(d)	Define ARPANET?	
(e)	Define client.	
(f)	What do you mean by datagram.	
(g)	Define segment?	
(h)	What is a network.	
(i)	Define router.	
(j)	What do you mean by congestion.	
2.	Answer any SIX questions	(5X6)
(a)	Explain listing in HTML?	
(b)	Write the properties of reliable delivery service.	
(c)	Give the differences between java and javascript.	
(d)	Explain the concepts of client server technology..	
(e)	Explain UDP segment format.	
(f)	Describe different types of internet connectivity .	
(g)	Explain the mechanism of E-mail.	
(h)	Explain various types of search engines used nowadays.	
3.	What is an IP header file? Write the purposes of internet protocol.	(10)
4.	Explain TCP segment format with its diagram?	(10)
5.	What is a domain name ? Explain mapping and domain name resolution.	(10)
6.	Discuss the structure of HTML document overview.	(10)
7.	Write shot notes on any TWO	(5X2)
	a) Datagram (c) UDP	
	b)HTTP (d) Server	

VI-SEM –CSE(MODEL ANSWER PAPER-3)
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1.
 - a. A language that uses tags to define elements within a document. It is human-readable, meaning markup files contain standard words, rather than typical programming syntax.
 - b. A message may be sent over a channel, and another process or thread is able to receive messages sent over a channel it has a reference to, as a stream.
 - c. The Web is basically a system of Internet servers that support specially formatted documents.
 - d. It stands for Advanced Research Projects Agency Network (ARPANET) was the first wide-area packet-switching network with distributed control and the first network to implement the TCP/IP protocol suite.
 - e. A client is a piece of computer hardware or software that accesses a service made available by a server.
 - f. A datagram is a basic transfer unit associated with a packet-switched network. Datagrams provide a connectionless communication service across a packet-switched network.
 - g. segment refers to the parts into which any object is or may be divided. For example, a text, string, or other data could be broken up into different segments that may or may not be related.
 - h. A network is a collection of computers, servers, mainframes, network devices, peripherals, or other devices connected to one another to allow the sharing of data.
 - i. A router is a switching device for networks, which is able to route network packets, based on their addresses, to other networks or devices.
 - j. It refers to a network state where a node or link carries so much data that it may deteriorate network service quality, resulting in queuing delay, frame or data packet loss and the blocking of new connections.

2.a.

HTML lists are used to present list of information in well formed and semantic way. There are three different types of list in HTML and each one has a specific purpose and meaning.

Unordered list — Used to create a list of related items, in no particular order.

Ordered list — Used to create a list of related items, in a specific order.

An unordered list created using the `` element, and each list item starts with the `` element. The list items in unordered lists are marked with bullets. An ordered list created using the `` element, and each list item starts with the `` element. Ordered lists are used when the order of the list's items is important. The list items in an ordered list are marked with numbers.

b. Properties of Reliable Delivery Service

1. Stream Orientation: Stream delivery service on destination passes to the receiver exact same sequence of bytes that the sender passes it to the source.
2. Virtual Circuit Connection: Protocol software on both the ends communicate by verifying that the transfer is authorized and both sides are ready. Once all details have been settled, the protocol modules inform the application programs that the connection has been established and that transfer can begin.
3. Buffered transfer : When transferring data, each application uses whatever size pieces it finds convenient, which can be as small as a single octet.
4. Unstructured stream : Application programs using the stream service must understand stream content and agree on stream format before they initiate a connection.
5. Full duplex connection : A full duplex connection consists of two independent streams flowing in opposite directions, with no apparent interaction. The advantage of a full duplex connection is that the underlying protocol software can send control information for one stream back to the source in datagrams carrying data in the opposite direction. Such piggybacking reduces network traffic.

c.

Both Java and JavaScript are written, assembled and executed differently, and each has dramatic differences when it comes to what it is capable of doing. There are some other key differences:

- Java code must be compiled, and JavaScript code is all-text.
- Each language requires different plug-ins.
- JavaScript code is run on a browser only, while Java creates applications that run in a virtual machine or browser.
- Java is an OOP (object-oriented programming) language, and JavaScript is specifically an OOP scripting language.

d.

Client-server is a relationship in which one program (the client) requests a service or resource from another program (the server). At the turn of the last century, the label client-server was used to distinguish distributed computing by personal computers (PCs) from the monolithic, centralized computing model used by mainframes.

computer transactions in which the server fulfills a request made by a client are very common and the client-server model has become one of the central ideas of network computing. In this context, the client establishes a connection to the server over a local area network (LAN) or wide-area network (WAN), such as the Internet. Once the server has fulfilled the client's request, the connection is terminated. Because multiple client programs share the services of the same server program, a special server called a daemon may be activated just to await client requests.

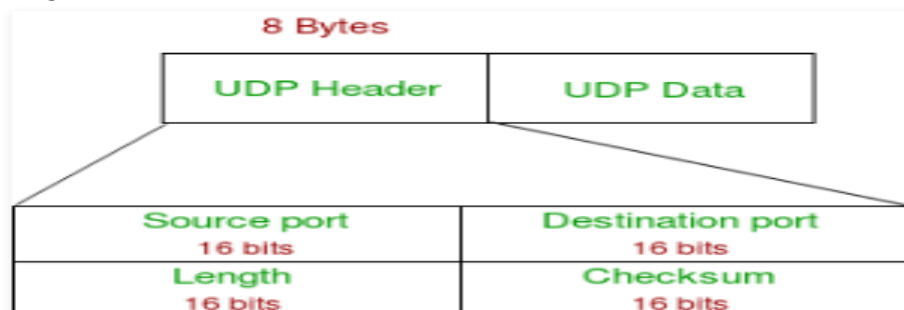
Advantages and disadvantages of the client-server model:

An important advantage of the client-server model is that its centralized architecture helps make it easier to protect data with access controls that are enforced by security policies. Also, it doesn't matter if the clients and the server are built on the same operating system because data is transferred through client-server protocols. An important disadvantage of the client-server model is that if too many clients simultaneously request data from the server, it may get overloaded

e.

User Datagram Protocol (UDP) is a Transport Layer protocol. UDP is a part of Internet Protocol suite, referred as UDP/IP suite. Unlike TCP, it is unreliable and connectionless protocol. So, there is no need to establish connection prior to data transfer. Though Transmission Control Protocol (TCP) is the dominant transport layer protocol used with most of Internet services; provides assured delivery, reliability and much more but all these services cost us with additional overhead and latency. Here, UDP comes into picture. For the realtime services like computer gaming, voice or video communication, live conferences; we need UDP. Since high performance is needed, UDP permits packets to be dropped instead of processing delayed packets. There is no error checking in UDP, so it also save bandwidth. User Datagram Protocol (UDP) is more efficient in terms of both latency and bandwidth.

DIAGRAM:



1. Source Port : Source Port is 2 Byte long field used to identify port number of source.
2. Destination Port : It is 2 Byte long field, used to identify the port of destined packet.
3. Length : Length is the length of UDP including header and the data. It is 16-bits field.
4. Checksum : Checksum is 2 Bytes long field. It is the 16-bit one's complement of the one's complement sum of the UDP header, pseudo header of information from the IP header and the data, padded with zero octets at the end (if necessary) to make a multiple of two octets.

f.

Different types of internet connectivity are as follows:

Dial up: Dial-up access is cheap but slow. A modem (internal or external) connects to the Internet after the computer dials a phone number. This analog signal is converted to digital via the modem and sent over a land-line serviced by a public telephone network. Telephone lines are variable in quality and the connection can be poor at times. The lines regularly experience interference and this affects the speed, anywhere from 28K to 56K. Since a computer or other device shares the same line as the telephone, they can't be active at the same time.

DSL: DSL stands for Digital Subscriber Line. It is an internet connection that is always "on". This uses 2 lines so your phone is not tied up when your computer is connected. There is also no need to dial a phone number to connect. DSL uses a router to transport data and the range of connection speed, depending on the service offered, is between 128K to 8 Mbps.

Cable: Cable provides an internet connection through a cable modem and operates over cable TV lines. There are different speeds depending on if you are uploading data transmissions or downloading. Since the coax cable provides a much greater bandwidth over dial-up or DSL telephone lines, you can get faster access. Cable speeds range from 512K to 20 Mbps.

Wireless: Wireless, or Wi-Fi, as the name suggests, does not use telephone lines or cables to connect to the internet. Instead, it uses radio frequency. Wireless is also an always on connection and it can be accessed from just about anywhere. Wireless networks are growing in coverage areas by the minute so when I mean access from just about anywhere, I really mean it. Speeds will vary, and the range is between 5 Mbps to 20 Mbps.

g. . E-mail or email is information stored on a computer that is exchanged between two users over telecommunications. More plainly, e-mail is a message that may contain text, files, images, or other attachments sent through a network to a specified individual or group of individuals. Email routing will help you keep track of important emails and make sure the right people are kept in the loop.

There's a lot of ways you can use email routing:

- Send sales inquiries to the right person or department
- Instantly sort large amounts of email
- Automatically copy emails to managers for oversight and accountability
- Selectively archive important emails

Email routing is performed based entirely on the destination address of the email message. An email address has the following format: *username @ domain*.

h.

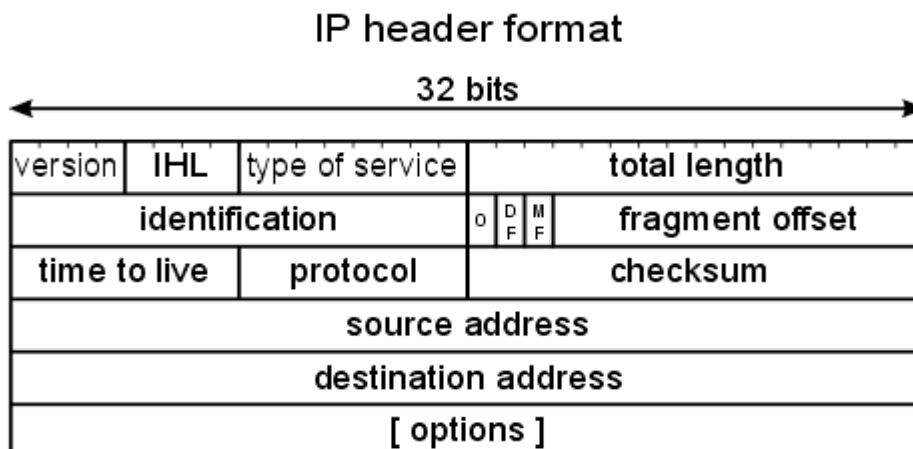
Search Engines are now part of our daily life, whether it be carrying out research . People are now becoming more and more dependent on search engines to get the answer for their everyday queries. At Inspire we monitor our search traffic using a variety of analytics. Most of our queries returned are related to what we do and some are simply bizarre. Those we're interested in relate to the services of what we do e.g improving search ranking, web design, web development, and many more.

List of Top 6 Best Search Engines in The World:

1. Google: Google Search Engine is the best search engine in the world and it is also one of most popular products from Google. Almost 70 percent of the Search Engine market has been acquired by Google.
2. Bing: It is Microsoft's answer to Google and it was launched in 2009. Bing is the default search engine in Microsoft's web browser. At Bing, they are always striving to make it a better search engine but it's got a long way to go to give Google competition.
3. Yahoo: Yahoo & Bing compete more with each other than with Google. A recent report on netmarketshare.com tells us that Yahoo have a market share of 7.68 percent. Although a leader as a free email provider, this is declining significantly though with their recent acknowledgement that User Details & Passwords were hacked last year.
4. Baidu: It is the most used search engine in China & this web search is made to deliver results for website, audio files and images. It provides some other services including maps, news, cloud storage and much more.
5. AOL: Aol.com is also among the top search engines. These are the guys that used to send out CD's which you'd load onto your PC to install their browser and modem software.

3. The unit of transfer in an IP network is called an IP datagram. It consists of an IP header and data relevant to higher level protocols. The IP - datagram traveling across a network is encapsulated within the physical network's frame. We briefly discussed ethernet - and PPP - encapsulation earlier.

Header Format



Version

The field contains the IP protocol version. The current version is 4, sometimes called IPv4.

Internet Header Length - IHL

The header length is the number of 32-bit words in the header, including any options. This does not include the data field.

Since this is a 4-bit field, it limits the header to 60 bytes ($=15 \times 4$).

Total Length

The total length of the datagram, header and data.

Identification

A unique number assigned by the sender to aid in reassembling a fragmented datagram. Each fragment of a datagram has the same identification number.

Checksum

The header checksum is calculated over the IP header only. It does not cover any data that follows the header. ICMP, IGMP, UDP, and TCP all have a checksum in their own headers to cover their header and data.

To compute the IP checksum for an outgoing datagram, the value of the checksum field is first set to 0. Then the 16-bit one's complement sum of the header is calculated (i.e., the entire header is considered a sequence of 16-bit words). The 16-bit one's complement of this sum is stored in the checksum field. When an IP datagram is received, the 16-bit one's complement sum of the header is calculated. Since the receiver's calculated checksum contains the checksum stored by the sender, the receiver's checksum is all one bits if nothing in the header was modified. If the result is not all one bits (a checksum error), IP discards the received datagram. No error message is generated. It is up to the higher layers to somehow detect the missing datagram and retransmit.

Source Address

The 32-bit IP address of the host sending this datagram. We will come to the concept of IP addresses in the next section.

Destination Address

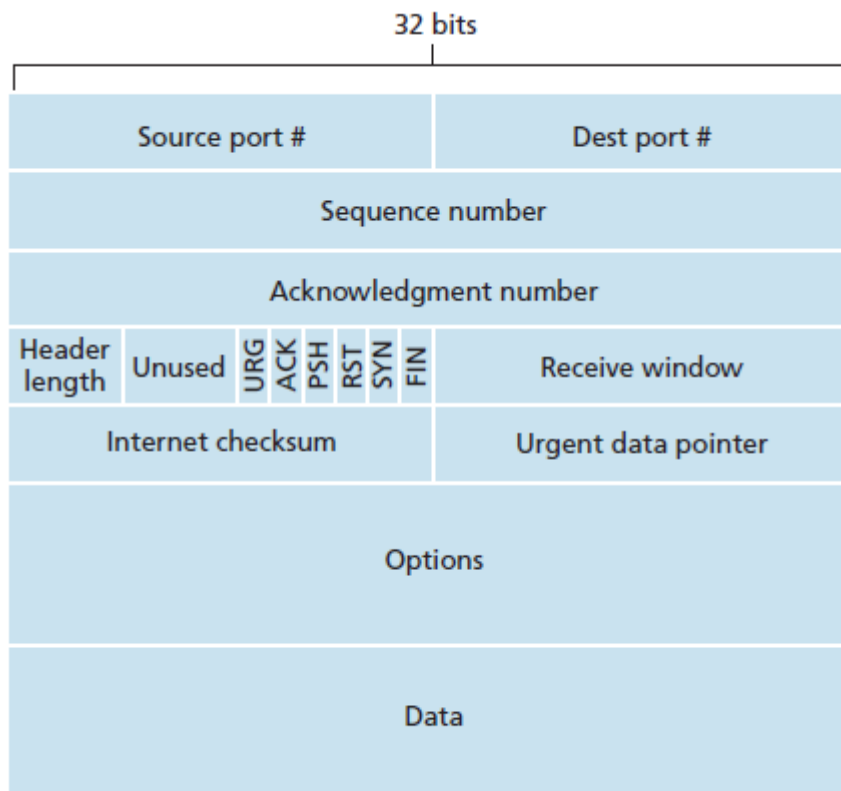
The 32-bit IP address of the destination host for this datagram.

Options

The final field, the options, is a variable-length list of **optional** information for the datagram. Options are rarely used and not all hosts and routers support all defined options.

4. TCP segment consists of data bytes to be sent and a header that is added to the data by TCP as shown: The header of a TCP segment can range from 20-60 bytes. 40 bytes are for options. If there are no options, header is of 20 bytes else it can be of upmost 60 bytes. The TCP segment consists of header fields and a data field. The data field contains a chunk of application data. The figure above shows the structure of the TCP segment. As with UDP, the header includes source and destination port numbers, which are used for multiplexing/demultiplexing data from/to upper-layer applications.

FORMAT OF TCP SEGMENT:



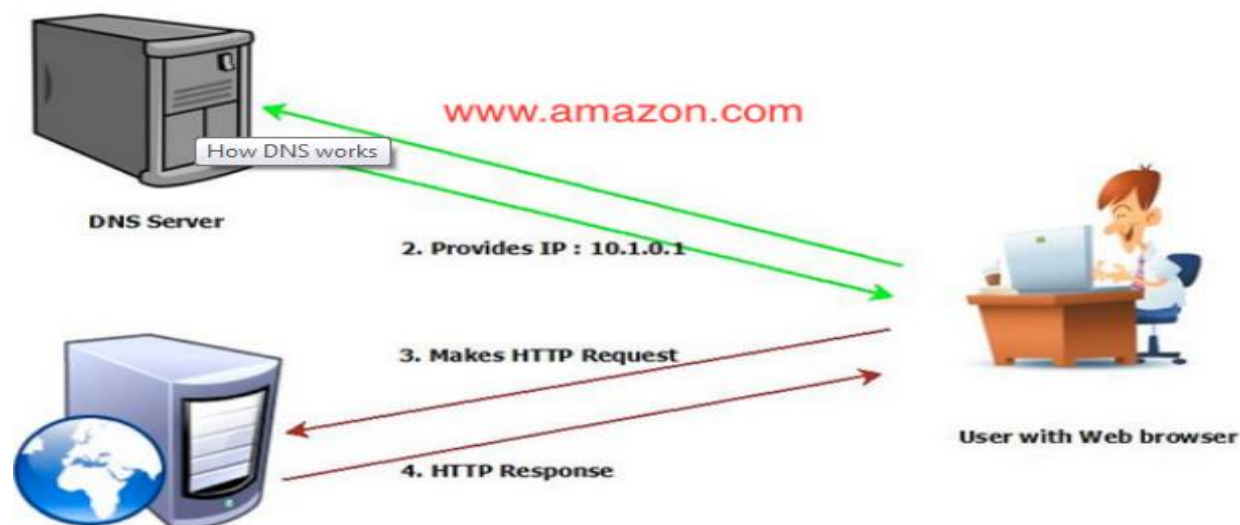
- The 32-bit sequence number field and the 32-bit acknowledgement number field are used by the TCP sender and receiver in implementing a reliable data transfer service.
- The 16-bit receive window field is used for flow control. It is used to indicate the number of bytes that a receiver is willing to accept.
- The 4-bit header length field specifies the length of the TCP header in 32-bit words. The TCP header can be of variable length due to the TCP options field. (Typically, the options field is empty, so that the length of the typical TCP header is 20 bytes).
- The optional and variable-length options field is used when a sender and receiver negotiate the maximum segment size (MSS) or as a window scaling factor for use in high-speed networks.
- The flag field contains 6 bits. The ACK bit is used to indicate that the value carried in the acknowledgement for a segment that has been successfully received. The RST, SYN, and FIN bits are used for connection setup and teardown. Setting the PSH bit indicates that the receiver should pass the data to the upper layer immediately. Finally, the URG bit is used to indicate that there is data in this segment that the sending-side upper-layer entity has marked as "urgent".

5.

One of the most fundamental instruments of the internet is the Domain Name System, or DNS. (Although many people think "DNS" stands for "Domain Name Server," it really stands for "Domain Name System.") DNS is a protocol within the set of standards for how computers exchange data on the internet and on many private networks, known as the TCP/IP protocol suite. Its purpose is vital, as it helps convert easy-to-understand domain names like "howstuffworks.com" into an Internet Protocol (IP) address, such as 70.42.251.42 that computers use to identify each other on the network. It is, in short, a system of matching names with numbers. Computers and other network devices on the internet use an IP address to route your request to the site you're trying to reach. This is similar to dialing a phone number to connect to the person you're trying to call. Thanks to DNS, though, you don't have to keep your own address book of IP addresses. Instead, you just connect through a domain name server, also called a DNS server or name server, which manages a massive database that maps domain names to IP addresses. Whether you're accessing a website or sending e-mail, your computer uses a DNS server to look up the domain name you're trying to access. The proper term for this process is DNS name resolution, and you would say that the DNS server resolves the domain name to the IP address. Without DNS servers, the internet would shut down very quickly. But how does your computer know what DNS server to use? Typically, when you connect to your home network, internet service provider (ISP) or WiFi network, the modem or router that assigns your computer's network address also sends some important network configuration information to your computer or mobile device. That configuration includes one or more DNS servers that the device should use when translating DNS names to IP address.

So far, you've read about some important DNS basics. The rest of this article dives deeper into domain name servers and name resolution. It even includes an introduction to managing your own DNS server. Let's start by looking at how IP addresses are structured and how that's important to the name resolution process. When a user types a human-readable address into the browser, the operating system's DNS client will check for information in a local cache. If the requested address isn't there, it will look for a DNS server in the local area network (LAN). When the local DNS server receives the query, and the requested domain name is found, it will return the result. For example the DNS provides mapping between human-readable names (like www.amazon.com) and their associated IP addresses (like 205.251.242.103). DNS can be best compared to a phone book where you look up the phone numbers listed by easier-to-remember names. DNS comes under the application layer protocol.

DIAGRAM:



If the name is not found, the local server will forward the query to a DNS cache server, often provided by the Internet Service Provider (ISP). Since the DNS server's cache contains a temporary store of DNS records, it will quickly respond to requests. These DNS cache servers are called not authoritative DNS servers as they provide request resolution based in a cached value acquired from authoritative *DNS* servers. An Authoritative Root Name Server maintains and provides a list of authoritative name servers for each of the top-level domains (.com, .org, etc.). An Authoritative Top Level Domain Name Server maintains and provides a list of authoritative name servers for all domains. Its job is to query name servers to find and return the authoritative name server for the requested domain.

6. Structure of an HTML Document:

Tags in HTML: Tags are one of the most important part in an HTML Document. HTML uses some predefined tags which tells the browser about content display property, that is how to display a particular given content

An HTML Document is mainly divided into two parts:

- **HEAD:** This contains the information about the HTML document. For Example, Title of the page, version of HTML, Meta Data etc.
- **BODY:** This contains everything you want to display on the Web Page.

Let us now have a look on the basic structure of HTML. That is the code which is must for every webpage to have:

```
<html>
  <head>
    <title>

  </title>
  </head>

  <body>

  </body>
</html>
```

Every Webpage must contain this code. Below is the complete explanation of each of the tags used in the above piece of HTML code:

<html>: This is called HTML root element and used to wrap all the code.

<head>: Head tag contains metadata, title, page CSS etc. All the HTML elements that can be used inside the **<head>** element are:

- **<style>**
- **<title>**
- **<base>**
- **<noscript>**
- **<script>**
- **<meta>**

<body>: Body tag is used to enclosed all the data which a web page has from texts to links. All of the content that you see rendered in the browser is contained within this element. Apart from this all other tags are also used in HTML.

7.a.

A datagram is a basic transfer unit associated with a packet-switched network. Datagrams provide a connectionless communication service across a packet-switched network. The delivery, arrival time, and order of arrival of datagrams need not be guaranteed by the network. Version: Identifies the version of IP used to generate the datagram. The purpose of this field is to ensure compatibility between devices that may be running different versions of IP. In general, a device running an older version of IP will reject datagrams created by newer implementations, under the assumption that the older version may not be able to interpret the newer datagram correctly.

Internet Header Length (IHL): Specifies the length of the IP header, in 32-bit words. This includes the length of any options fields and padding. Each datagram has two components, a header and a data payload. The header contains all the information sufficient for routing from the originating equipment to the destination without relying on prior exchanges between the equipment and the network. Headers may include source and destination addresses as well as a type field. The payload is the data to be transported. This process of nesting data payloads in a tagged header is called encapsulation. The internet layer is a datagram service provided by an IP. For example, UDP is run by a datagram service on the internet layer. IP is an entirely connectionless, best effort, unreliable, message delivery service. TCP is a higher level protocol running on top of IP that provides a reliable connection-oriented service.

b. HTTP means HyperText Transfer Protocol. HTTP is the underlying protocol used by the World Wide Web and this protocol defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands. Clients (web browsers) send requests to web servers for web elements such as web pages and images. After the request is serviced by a server, the connection between client and server across the Internet is disconnected. A new connection must be made for each request. is an application-layer protocol for transmitting hypermedia documents, such as HTML. It was designed for communication between web browsers and web servers, but it can also be used for other purposes. HTTP follows a classical client-server model, with a client opening a connection to make a request, then waiting until it receives a response. HTTP is a stateless protocol, meaning that the server does not keep any data (state) between two requests.

c.

UDP is a part of Internet Protocol suite, referred as UDP/IP suite. Unlike TCP, it is unreliable and connectionless protocol. So, there is no need to establish connection prior to data transfer. The service provided by UDP is an unreliable service that provides no guarantees for delivery and no protection from duplication. UDP can offer a very efficient communication transport to some applications, but has no inherent congestion control or reliability. A second unique characteristic of UDP is that it provides no inherent On many platforms, applications can send UDP datagrams at the line rate of the link interface, which is often much greater than the available path capacity, and doing so would contribute to congestion along the path, applications. UDP does not provide any communications security. Applications that need to protect their communications against eavesdropping, tampering, or message forgery therefore need to separately provide security services using additional protocol mechanisms.

d. Servers are used to manage network resources. For example, a user may set up a server to control access to a network, send/receive e-mail, manage print jobs, or host a website. They are also proficient at performing intense calculations. A server is a computer that provides data to other computers. ... For example, a Web server may run Apache HTTP Server or Microsoft IIS, which both provide access to websites over the Internet.

Need: The purpose of a server is to share data as well as to share resources and distribute work. In the Internet world you get many types of server and every server have different use. When client computer request any information to a server then search this and then sent to client computer search result. so a server is a computer program or device that provides a service to another computer program and its user, also known as the client. In a data center, the physical

computer that a server program runs on is also frequently referred to as a server. That machine may be a dedicated server or it may be used for other purposes as well.