Chapter 12
DNS (Domain Name System)

PART – I
I. Choose The Correct Answer

Question 1.
Which of the following is used to maintain all the directory of domain names?
(a) Domain name system
(b) Domain name space
(c) Name space
(d) IP address
Answer:
(a) Domain name system

Question 2.
Which of the following notation is used to denote IPv4 addresses?
(a) Binary
(b) Dotted-decimal
(c) Hexadecimal
(d) a and b
Answer:
(d) a and b

Question 3.
How many bits are used in the IPv6 addresses?
(a) 32
(b) 64
(c) 128
(d) 16
Answer:
(c) 128

Question 4.
Expression ion of URL is
(a) Uniform Resource Location
(b) Universal Resource Location
(c) Uniform Resource Locator
(d) Universal Resource Locator
Answer:
(c) Uniform Resource Locator

Question 5.
How many types are available in Relative URL?
(a) 2
(b) 3
(c) 4
(d) 5
Answer:
(b) 3

Question 6.
Maximum characters used in the label of a node?
(a) 255
(b) 128
(c) 63
(d) 32
Answer:
(c) 63

Question 7.
In domain name, sequence of labels are separated by
(a) ;
(b) .(dot)
(c) :
(d) NULL
Answer:
(b) .(dot)

Question 8.
Pick the odd one out from the following.
(a) node
(b) label
(c) domain
(d) server
Answer:
(d) server

Question 9.
Which of the following initiates the mapping of domain name to IP address?
(a) Zone
(b) Domain
(c) Resolver
(d) Name servers
Answer:
(c) Resolver

Question 10.
Which is the contiguous area up to which the server has access?
(a) Zone
(b) Domain
(c) Resolver
(d) Name servers
Answer:
(a) Zone

Question 11.
ISP stands for
(a) International Service provider
(b) Internet Service Provider
(c) Internet service Protocol
(d) Index service provider
Answer:
(b) Internet Service Provider

Question 12.
TLD stands for
(a) Top Level Data
(b) Top Logical Domain
(c) Term Level Data
(d) Top Level Domain
Answer:
(d) Top Level Domain

Question 13.
Which of the following statements are true?
(i) Domains name is a part of URL.
(ii) URL made up of four parts
(iii) The relative URL is a part of Absolute URL
(iv) URL doesn't contain any protocol
(a) (i) & (ii)
(b) (ii)
(c) (i), (ii) & (iii)
(d) i, (ii) & (iv)
Answer:
(c) (i), (ii) & (iii)

Question 14.
Assertion(A) :The number of addresses used in IPv6 addressing method is 128.
Reason (R): IPv6 address is a 128 bit unique address.
(a) A is true and R is false.

(b) A is false and R is true.
(c) Both A and R are correct and R is the correct explanation of A.
(d) Both A and R are correct and R is not the correct explanation of A.
Answer:
(b) A is false and R is true.

Question 15.
Match the following
(i) domian – 1. progress that initiates trAnswer:lation
(ii) Zone – 2. contains database of domain names
(iii) name server – 3. single node
(iv) resolver – 4. contiguous nodes
(a) (i)-1 (ii)-4 (iii)-3 (iv)-2
(b) (i)-3 (ii)-4 (iii)-2 (iv)-1
(c) (i)-3 (ii)-2 (iii)-1 (iv)-4
(d) (i)-3 (ii)-4 (iii)-1 (iv)-2
Answer:
(b) (i)-3 (ii)-4 (iii)-2 (iv)-1

PART – II
II. Short Answer

Question 1.
List any four domain names?
Answer:
Domain Name:

1. com
2. edu
3. gov
4. mil

Meaning:

1. Commercial Organisation
2. Educational Institution
3. Government (US)
4. Military groups

Question 2.
What is an IP address?
Answer:
Internet Protocol (IP) address is simply the logical address in the network layer. Like how

the door number/flat number is used to differentiate individual house from others in the same apartment IP address is also used to find the host system in the whole network.

Question 3.
What are the types of IP address?
Answer:

1. IPv4 Address and
2. IPv6 Address

Question 4.
What is an URL?
Answer:

1. URL (Uniform Resource Locator) is the address of a document on the Internet.
2. URL is made up four parts-protocols, hostname, folder name and file name.
3. Each part has its own specific functions.

Question 5.
List out four URLs you know?
Answer:
URL:

1. http: //www. example.com/index, html
2. http://www.computer.com
3. http://www.ibm.com
4. https://www.hellotravel.com

Question 6.
What are the types of URL?
Answer:

1. URL (Uniform Resource Locator) is the address of a document on the Internet.
2. URL is divided into two types: Absolute URL and Relative URL

Question 7.
What is a domain?
Answer:

1. A domain is a single node of the Domain Namespace.

2. In the domain name space (DNS) tree structure domain is a sub structure tree. The domain can be further divided into sub domains.

Question 8.
What is a zone?
Answer:

1. It is the area up to which the server has access.
2. Zone is defined as a group of contiguous domains and sub domains. If the zone has a single domain, then zone and domain are the same.

Question 9.
What is a resolver?
Answer:

1. The resolver is a program which is responsible for initiating the trAnswer:lation of a domain name into an IP address.
2. Since a resolver is stored in the host, there is no need of any protocol to form a connection between the resolver and the user program.

Question 10.
What are the categories available in domain name space?
Answer:
There are 3 important components in the Domain Name System. They are Namespace, Name server and Zone.

Question 11.
Write any four generic Top Level Domain?
Answer:
Domain Name:

1. com
2. edu
3. gov
4. mil

Meaning:

1. Commercial Organisation
2. Educational Institution
3. Government (US)
4. Military groups

PART – III
III. Explain in Brief Answer

Question 1.
Write a note on DNS?
Answer:
Domain Name System (DNS) maintains all the directory of domain names/host names and help us to access the websites using the domain/host names. To enable the use of domain names in a network, the Domain Name System (DNS) is used.

Question 2.
Differentiate IPv4 and IPv6?
Answer:
IPv4:

1. IPv4 address is a 32 bit unique address given to a computer system
2. The number of address that can be formed is 232
3. It is represented by Binary notation Dotted-decimal notation

IPv6:

1. IPv6 address is a 128 bit unique address given to a computer system
2. The number of addresses formed in IPv6 is 2128
3. It is represented by 4 digit Hexadecimal numbers.

Question 3.
Differentiate Domain name and URL?
Answer:
Domain name:

1. Domain name is the tr:lated and simpler form of IP address 2. Part of URL
3. It is subdivided into subdomains eg, .in, .uk

URL:

1. URL is the full web address used to locate a webpage
2. Complete web address including domain names.
3. It is divided into method domain name, port, path www.ibm.com

Question 4.
What are the differences between Absolute URL and Relative URL?
Answer:
Absolute URL:

1. Absolute URL is the complete address of a document on the Internet.
2. Absolute URL contains all the information that are required to find the files on the . Internet.
3. If any of the four parts is missing then the browser would not able to link to the specific file. So, all the four parts is very important in absolute URL.

Relative URL:

1. Relative URL is the partial address of a document on the Internet.
2. Relative URL contains only file name or file name with folder name.
3. We can use this type of URL when the file is on the same server related to original document.

Question 5.
Write a note on domain name?
Answer:

1. Domain name is the sequence of labels. In domain name the sequence of labels are separated ‘ by dot (.).
2. The domain name is always read from the lower level to higher level i.e., from the leaf node to root node.
3. Since the root node always represent NULL string, all the domain name ending with dot.

Question 6.
Differentiate web address and URL?
Answer:
Web Address:

1. A Web Address more commonly defines a unique name that helps people remember a URL
2. It is usually in simpler form such as Amazon.com
3. Generally your browser will recognize the proper URL when you type in a web address

URL:

1. URL stands for Uniform Resource Locator. A is the address of a particular website, audio stream or document available on the web
2. URL’s consist of the Internet protocol needed to access the item you wish to locate on the host computer.

PART – IV
IV. Explain in detail

Question 1.
Explain briefly the components of DNS?
Answer:
DNS Components:
There are three important components in the Domain Name System. They are:

1. Namespace
2. Name server
3. Zone

1. Name Space:

- The domain names must be very unique and appropriate. The names should be selected from a namespace.
- The name space can be organized in two ways
- Flat name space
- Hierarchical name space
- Flat name space is where the name is assigned to the IP address. They do not have any specific structure.
- Hierarchical name space is where the name is made up of several parts. The first part may represent the nature of organization, the second part may represent the name of organization, and third part may represent the department of the organization.
- Domain name space was designed to achieve hierarchical name space.

2. Name Servers:

- The information which needs to be stored in Domain name space is quite large. Single system would be inefficient to store such a huge amount as responding to requests from all over the world. It also becomes unreliable because in case of any failure the data becomes inaccessible.
- Name Server is a main part in the Domain Name System (DNS). It tr**Answer**:late the domain names to IP addresses.
- Name server contains the DNS database which consists of domain names and their corresponding IP addresses.
- There is a need to store large number of domain names for the world wide usage, so plenty of servers are used in the hierarchical manner.
- Name servers do the important task of searching the domain names. While you searching a website, Local Name server (provided by ISP) ask the

different name servers until one of them find out your Answer:wer. At last it returns IP address for that domain name.

3. Zone:

- The entire name space is divided into many different zones. It is the area up to which the server has access.
- Zone is defined as a group of contiguous domains and sub domains. If the zone has a single domain, then zone and domain are the same.
- Every zone has the server which contains a database called zone file. Using the zone file, the DNS server replies the queries about hosts in its zone. There are two copies of zone files available, Master file and slave file.

Question 2.
Classify and Explain the IP address?
Answer:
IP Address:
Internet Protocol (IP) address is simply the logical address in the network layer. Like how the door number/flat number is used to differentiate individual house from others in the same apartment IP address is also used to find the host system in the whole network. Due to increase in the number of system in a network there is a need of more addresses which lead to two addressing methods i.e., IPv4 and IPv6.

IPv4 Address:
1. IPv4 address is a 32-bit unique address given to a computer system. No two systems can have same IP address.

2. If the network has p connections then ' p' addresses should be there.

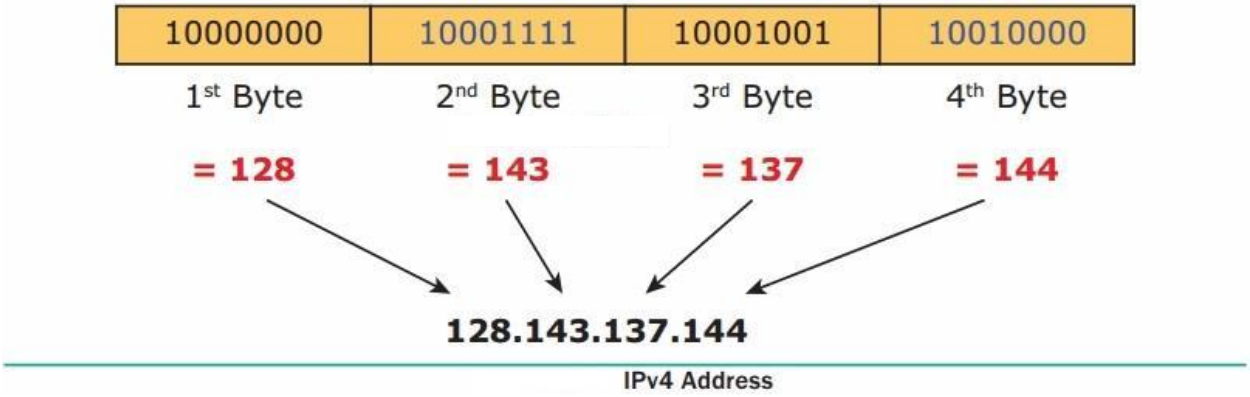
3. An address space is the total number of addresses that can be made by that protocol. It is determined by the number of bits that the protocol use.

4. If the protocol uses 'n' bits then the address space of that protocol would be '2n' addresses can be formed. So, the number of addresses that can be formed in IPv4 is 232.

5. There are two ways to represent the IP address – Binary notation

Dotted-decimal notation:
In binary notation the address is expressed as 32-bit binary values.
For E.g. 00111001 10001001 00111000 00000111
In dotted-decimal notation the address is written in decimal format separated by dots(.).

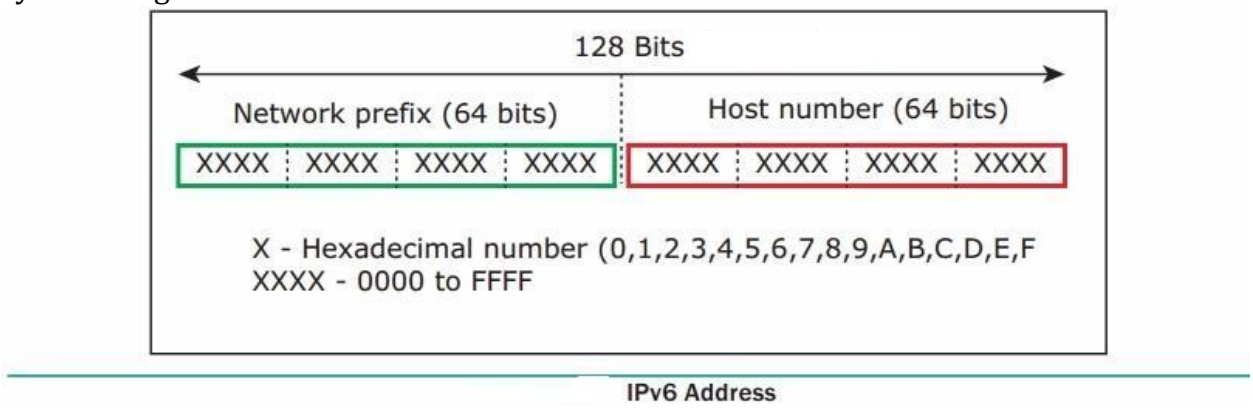
For e.g. 128.143.137.144



IPv6 Address:
1. IPv6 address is a 128-bit unique address given to a computer system. The number of addresses that can be formed in IPv6 is 2128.

2. In IPv6 address, the 128 bits are divided into eight 16-bits blocks.

3. Each block is then changed into 4-digit Hexadecimal numbers separated by colon symbols. E.g. 2001:0000:32313:DFE1:0063:0000:0000:FEFB.



Question 3.
Explain about the name server?
Answer:
Name Servers:
1. The information which needs to be stored in Domain name space is quite large. Single system would be inefficient and insufficient to store such a huge amount as responding to requests from all over the world. It also becomes unreliable because in case of any failure the data becomes inaccessible.

2. The solution to this problem is to distribute the information among many computers. The best way to do that is to divide the entire space into many domains and sub domains

3. DNS also allows domains to be further divided into sub domains. By this, the solution to the problem is obtained and hierarchy of servers is also maintained.

4. Name servers store the data and provide it to clients when queried by them. Name Servers are programs that run on a physical system and store all the zone data.

5. Name Server is a main part in the Domain Name System (DNS). It translate the domain names to IP addresses.

6. Name server contains the DNS database which consists of domain names and their corresponding IP addresses.

7. There is a need to store large number of domain names for the world wide usage, so plenty of servers are used in the hierarchical manner.

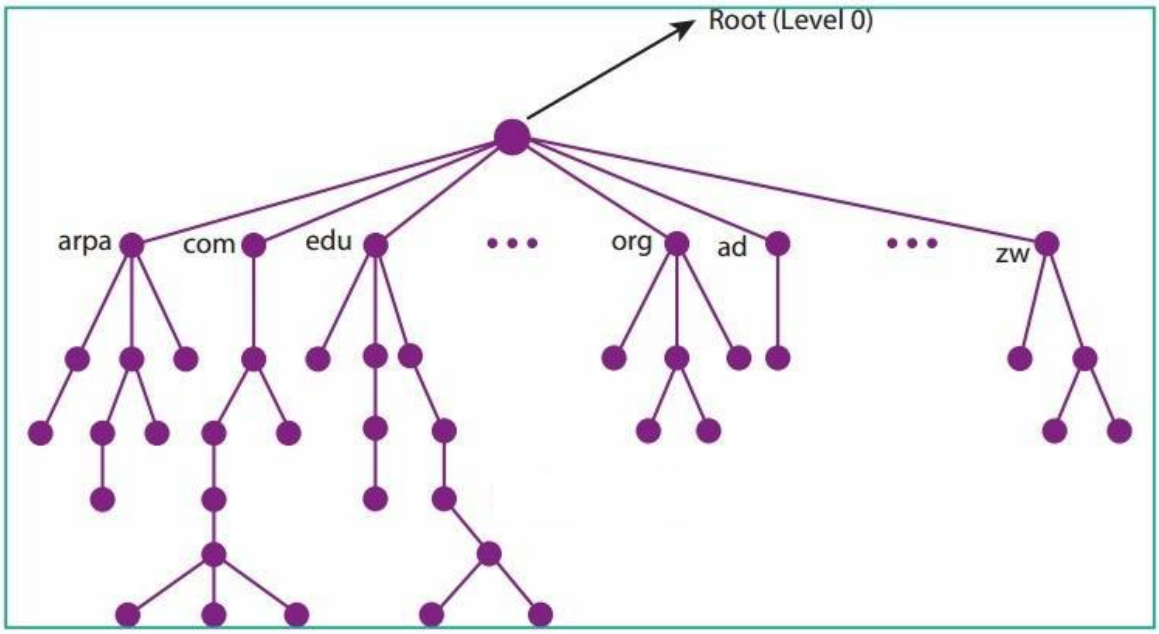
8. Name servers do the important task of searching the domain names. While you searching a website, Local Name server (provided by ISP) ask the different name servers until one of them find out your Answer:wer. At last it returns IP address for that domain name.

Types of Name Servers
There are three types of Name Servers which control the entire Domain Name System:
(i) Root Name Server – top level server which contains entire DNS tree, maintained by ICANN.
There are 13 servers.

(ii) Primary/Master Name Server – contains a zone resource records. These records are updatable by domain name holders such as organizations.

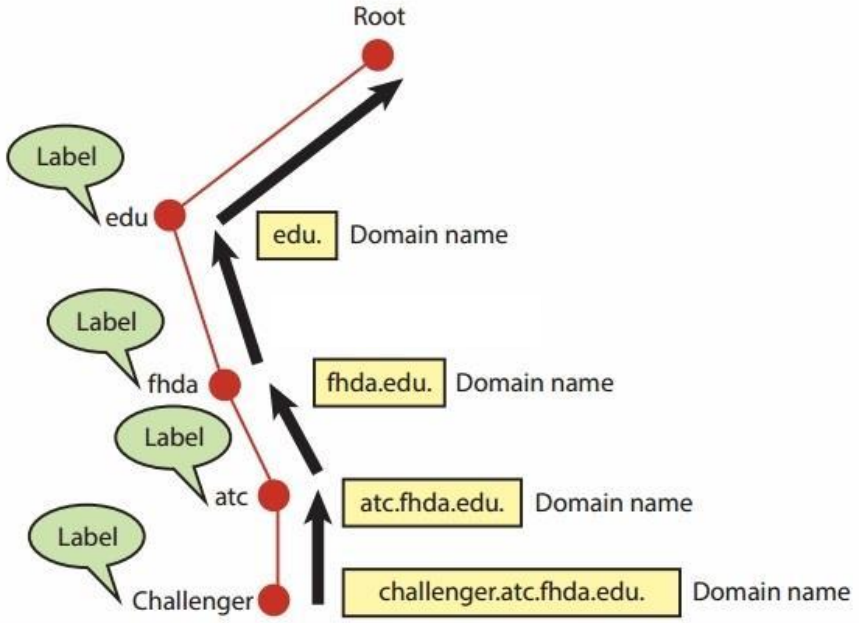
(iii) Secondary/Slave Name Server – contains a copy of primary server files. This server has no authority to update, but reduce the workload of master server by sharing the queries.

Question 4.
What is domain name space? Explain?
Answer:
Domain Name Space:
Domain name space was designed to achieve hierarchical name space. In this, the names are represented as a tree like structure with root element on the top and this tree can have a maximum of 128 levels starting from root element taking the level 0 to level 127.



Domain Name Space

This diagram represent the domain name space where the root element is present at the top most level i.e., level 0. The root element always represents the NULL string (empty, string). The next level to the root element is node (children of root element). Each node in the tree has a label and a domain name.



Domain Name and Label

Label:

1. It is a string which can have maximum of 63 characters.
2. Each node in that level should have different labels thereby assuring the individuality of the domain name.
3. In other words, Labels are the names given to domains.
4. Domain is a sub tree in domain name space tree structure. The domain can be further divided into sub domains.

Domain name:
It is the sequence of labels. In domain name the sequence of labels are separated by dot (.).

Question 5.
Explain how the DNS is working?
Answer:
1. When the user enters the URL (consists of protocol, domain name, folder name, file name) in the browser, the system fist checks its DNS cache for the corresponding IP address.

2. If the IP address is found in the cache then the information is retrieved from cache.

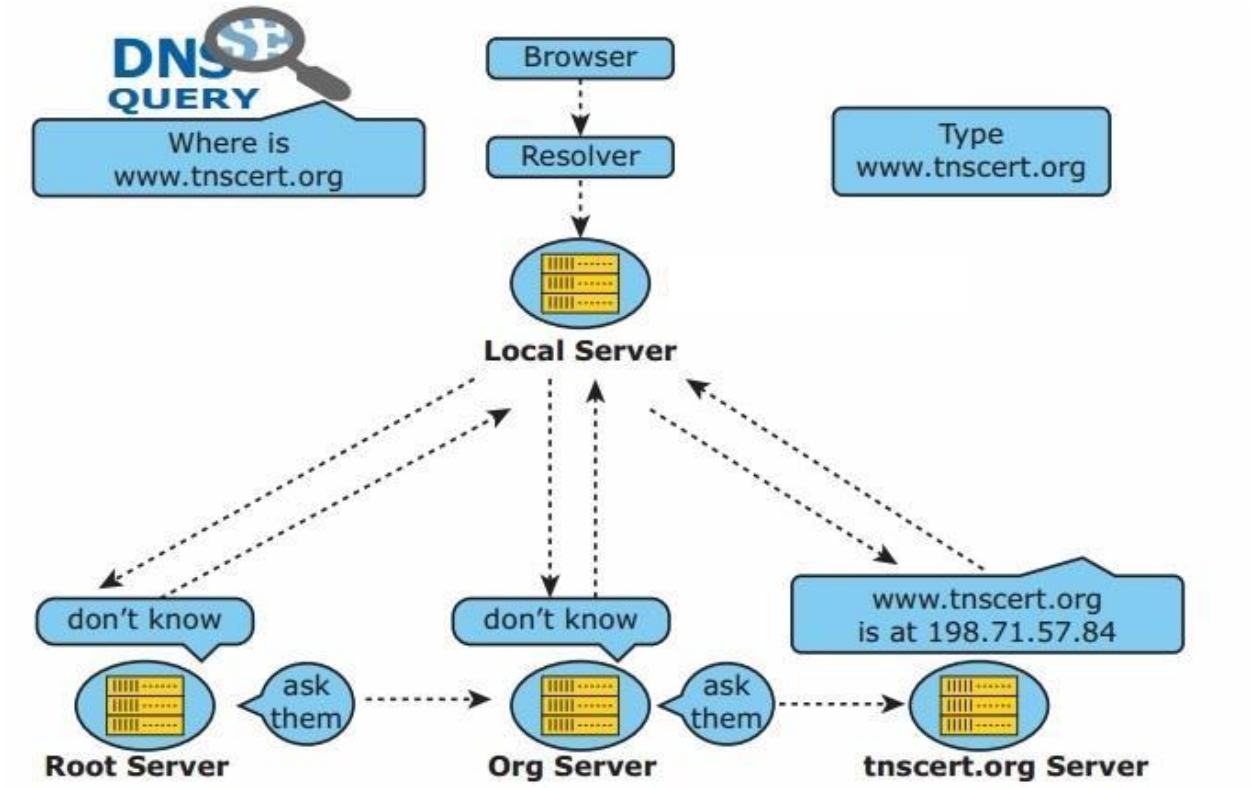
3. If not, then the system needs to perform DNS query i.e., the system needs to query the resolver about the IP address from Internet Service Provider (ISP).

4. Each resolver has its own cache and if it is found in that then that information is retrieved.

5. If not, then the query is passed to next domain server i.e., TLD (Top Level Domain) which reviews the request and direct the query to name servers associated with that specific domain.

6. Until the query is solved it is passed to next level domains. At last the mapping and the record are returned to the resolver who checks whether the returned value is a record or an error.

7. Then the resolver returns the record back to the computer browser which is then viewed by the user.



workflow of basic DNS