

Q. a) Ans. to the Ques No - 1(a)

Q: what are routing algorithms?

Ans: The routing algorithm are as follows:

Flooding: Flooding is simplest method packet forwarding. When a packet is received, the router send it to all the interfaces except the one on which it was received. This creates too much burden on the network and lots of duplicate packets wandering in the network.

Time to live(TTL) can be used to avoid infinite looping of packets. There exists another approach for flooding which is called selective flooding to reduce the overhead on the network.

Shortest path: Routing decisions in networks

are mostly taken on the basis of cost between source and destination. Hop count plays

major role here. Shortest path is a technique which uses various algorithms to decide a path with minimum number of hops.

Common shortest path algorithms are:

- Dijkstra algorithm.

- Bellman-Ford algorithm.

- Floyd-Warshall algorithm.

Ans to the ques No - 1 (b)

q: what does internet control message protocol mean ? Explain .

Ans: ICMP is network diagnostic and error reporting protocol. ICMP belongs to IP protocol. unlike

and uses IP as carrier protocol. After constructing ICMP packet it is encapsulated in IP packet. Because IP itself is a best-effort

3

non-reliable protocol, so is ICMP.

Any feedback about network is back to the originally host. If some error in the network occurs, it is reported by means of ICMP.

ICMP-echo and ICMP-echo-reply are the most commonly used ICMP messages to check the reachability of end-to-end hosts. When a host receives an ICMP-echo request, it is bound to send back an ICMP-echo-reply. If there is any problem in the transit network, the ICMP will report that problem.

9

Ans. to the ques No- 1(c)

Q: what does internet protocol version 6 (IPv6) mean? Explain.

Ans: In Internet protocol version 6 (IPv6) it is the most recent version of the internet protocol, the communication protocol that provides an identification and location system for computers on network and routes traffic across the internet. Devices on the internet are assigned a unique IP address for identification and location definition. With the rapid growth of the internet after commercialization in the 1990s, it became evident that far more addresses would be needed to connect devices than the IPv4 address space had available.

Exhaustion of IPv4 addresses gave birth to a

generation internet protocol version 6. IPv6 addressing its nodes with 128-bit wide address providing plenty of addressing for future to be used on entire planet or beyond.

IPv6 has introduced a Anycast addressing but has removed the concept of broadcasting. IPv6 enables devices to self acquire an IPv6 address and communicate within that subnet. This auto-configuration removes the dependency of dynamic host configuration protocol. servers. This way even if the DHCP server on that subnet is down, the hosts can communicate with each other.

Ans. to the que No-2(a)

Q: Explain the TCP/IP model layer.

Ans: TCP/IP : functionality is divided in to four layers, each of which include specific protocols

i) The application layer - provides application with standardized data exchange. The protocols include the HTTP, FTP, post office protocol 3 (POP3), simple mail transfer protocol (SMTP), and simple network management protocol (SNMP). At the application layer, the payload is the actual application data.

ii) The transport layer - is responsible for maintaining end-to-end communications across the network. TCP handles communications between hosts and provides flow control, multiplexing, and reliability. The transport protocols include TCP and user

8.

Datagram protocol (UDP) which is sometimes used instead of TCP for special purposes.

iii) the network layer:- also called the internet layer, deals with packets and connects independent networks to transport the packet across network boundaries. The network layer protocols are the IP and the internet control message protocol (ICMP), which is used for error reporting.

Ans. to the ques No- 2(b)

Q: How TCP/IP works?

Ans: TCP/IP - uses the client-server model of communication in which a user on machine provides a service like sending a webpage by another computer in the network.

8.

collectively, the TCP/IP suite of protocols is classified as stateless, which means each client request is considered new because it is unrelated to previous requests. Being stateless frees up network path so they can be used continuously.

The transport layer itself, however, is stateful. It transmits a single message, and its connection remains in place until all the packets in a message have been received and reassembled at the destination.

9

Ans. to the Ques No-2 (c)

Ques write down the importance of TCP/IP.

N.B Importance of TCP/IP

TCP/IP is nonproprietary and as a result is not controlled by any single company. Therefore, the internet protocol suite can be modified easily. It is compatible with all operating systems. So it can communicate with any other system. The internet protocol suite is also compatible with all types of computer hardware and networks.

TCP/IP is highly scalable in as a routable protocol, can determine the most efficient path through the network. It is widely used in current internet architecture.

Ans. to the ques No-3(a)

Ques: what is tunnelling?

Ans: If there are two geographically separate networks, which want to communicate with each other, they may deploy a dedicated line between or they have to pass their data through intermediate networks. Tunnelling is a mechanism by which two or more same networks communicate with each other, by passing intermediate networking equipment. Tunnelling is configured at both ends.

When the data enters from one end of Tunnel, it is tagged. This tagged data is then routed inside the intermediate or transit network to reach the other end of Tunnel.

Ans. to the que No-3(b)

Explain packet fragmentation.

Ans: most Ethernet segments have their maximum transmission unit fixed to 1500 bytes. A data packet can have more or less packet length depending upon the application. Devices in the transit path also have their hardware and software capabilities which tell what amount of data that data that device can handle and what size of packet it can process. If the data packet size is less than or equal to the size of packet the transmit network can handle, it is processed normally. If the packet is larger, it is broken into smaller pieces and then forwarded. This is packet fragmentation. Each fragment contains the

destination and source address and routed through transmit path easily. All the receiving end it is assembled again.

If it is a packet with OF bits set to 1 comes to a router which can not handle the packet because of its length, the packet is dropped.

Ans. to the ques No- 3(c)

ques: what does Internet protocol version 4 (IPv4) mean? Explain.

Ans: Internet protocol version 4 (IPv4) is the fourth revision of the Internet protocol and a widely used protocol in data communication over different kinds of network. IPv4 is a connection less protocol used in packet-

switched layer 2 networks, such as Ethernet.

It provides the logical connection between network devices by providing identification for each device.

There are many ways to configure IPv4 with all kinds of devices - including manual and automatic configuration - depending on the network type. IP addresses are divided into many categories.

- class-A - it uses first octet for network address and last three octets for host addressing.
- class-B - it uses first two octets for network addresses and last two for host addressing
- class-C - it uses first three octets for network addressing.
- class-D - It provides flat IP addressing scheme it is constraint to hierarchical structure for above these.
- class-E - It is used on experimental. IPv4 also has well-defined address spaces to be used on private addresses.

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Ans. to the ques. No-4(a)

Ques: Define network routing.

Ans: when a device has multiple paths to reach a destination, it always selects one path by preferring it over others. This selection process is termed as Routing. Routing is done by special network devices called routers or it can be done by means of software processes.

Ans. to the ques No-4(b)

Ques: Explain different types of routing.

Ans: Diff:

unicast routing -

most of the traffic on the internet and intranets

known as unicast data or unicast traffic is sent

with a specified destination. Routing unicast data over the internet is called unicast routing. It is the simplest form of routing because the destination is already known.

Broadcast Routing -

By default, the broadcast packets are not routed and forwarded by the routers on any network.

Routers create broadcast domains. But it can be configured to forward broadcast in some special cases.

Multicast Routing -

Multicast routing is special case of broadcast routing with significant difference and challenges.

In broadcast routing, packets are sent to all nodes even if they do not want it.

But in multicast routing, the data is sent to only nodes which want to receive the packets.

Ans. to the Ques No 4(c)

Ques: Explain different types of routing protocols.

Ans: unicast Routing Protocols:-

There are two kinds of routing protocols available

to routes unicast packets:

i) distance vector routing protocol -

Distance vector routing protocol is simple.

Routing protocol which takes routing decision on the number of hops between source and destination. A route with less number of hops is considered as the best route.

Every router advertises its best route to other routers.

Ex: RIPv1, RIPv2.

ii) Link State Routing Protocol:

Link-state protocol is slightly complicated protocol than Distance vector. It takes into account the states of links of all the routers in a network. This technique helps routers build a common graph of the entire network. For example, Open shortest path first and intermediate system to intermediate system.

Multicast Routing protocols -

unicast routing protocols use graphs while Multicast Routing Protocols use trees, i.e. spanning tree to avoid loops.

.. DVMRP - Distance vector multicast routing protocol.

.. CBT - Cone Cone Tree

.. MDRP - Multicast open shortest path first.

.. PIM - Protocol Independent Multicast

Ans. to the Ques - No - 5(a)

Ques: Define Network layer and its features.

Ans: Network layer takes the responsibility for routing packets from source to destination, within or outside a subnet. Two different subnet may be different addressing schemes or non-compatible addressing types. Some with protocols, two different subnet may be operating on different subnet which are not compatible with each other. Protocols which are not compatible with each other, Network layer has the responsibility to route the packets with its standard functionalities, layer 3 can provide various features as:

- quality of service management.
- load balancing and link management.
- security.

19

Ans. to the que No-5(b)

Brie quer: Briefly explain Network Addressing.

Ans to: Layer 3 network addressing is one of the major task of Network layer. Network addresses are always logical i.e. those are software based addresses which can be changed by appropriate configurations. A network address always points to a host or it can represent a whole network. Network address is always configured by network interface card and is generally mapped by system with the mac address of the machine for layer 2.

IP addressing provides mechanism to differentiate between hosts and network. Because IP address are assigned in hierarchical manner, a host always resides

under a) specific network.

b) ~~specific~~ ~~specific~~ ~~specific~~ ~~specific~~ ~~specific~~

Ans. to The question No-5(c)

Ques: write down the protocols of network layer. And what are the functions of a protocol?

Ans: The following are examples of network layer.

- * CLNS - Connectionless-mode Network Service
- * DDP - Datagram Delivery protocol.
- * EGP - Exterior gateway protocol.
- * ICMP - Internet control message protocol.
- * IPv4 / IPv6 - Internet Protocol.

Ans. to the ques NO-6 (a)

Ques: There are two. Briefly explain how to control errors?

Ans: There are two ways to control errors. They are explained below.

Error detection: Errors in the received frames are detected by mean of parity check and cyclic Redundancy check (CRC). In both cases, few extra bits are sent along with actual data to confirm that bits received at other end are same or they were send. If the counter-check at receiver end fails, the bits are considered corrupted.

Parity check: one extra bit is sent along with the original bits to make the number of 1's even in case of even parity, or odd in case

odd parity. The sender while creating a frame counts the number of 1s in it. The receiver simply counts the number of 1s in a frame. If the count of 1s is even and even parity is used, the frame is considered to be not corrupted and is accepted.

Cyclic Redundancy - Check (CRC)

- different approach to detect if the received frame contains valid data. This technique involves binary division of the data bits being sent. The divisor is generated using polynomial. The sender performs a division operation on the bits being send and calculates the remainder.

23

(Q) Ans. to the que. No - 6 (b)

Ques:

Ans: List the network layer functionalities.

Ans: Devices which work on network layer mainly focus on routing. Routing may include various tasks aimed to achieve a single goal.

These can be:

- Addressing devices and networks.
- Populating routing tables or static routes.
- Interworking between two different subnets.
- Delivering packets to destination with best effort.
- Provides connection oriented and connectionless mechanism.
- Queueing incoming and outgoing data and then forwarding them according to quality of service constraints set for those packets.

(Q) 3. Ques No - 6 (Q)

Ques A: How many different kinds of network addressing in existence.

Ans: There are different kinds of network addressing in existence:

- IP
- IPX
- AppleTalk

Ans. to the Ques No-7(a)

Ques: what are four SONET Layers? Discuss the function of each Sonet layers.

Ans: The Sonet Standard includes four functional

layers. The photonic, the section, the line and the path layer. They correspond to both the physical and link layers.

path layers: The path layer is responsible for the movement of a signal from its final source to its optical destination. At the optical device

the signal is changed from an electronic form to an optical form, multiplexed with other signals, and encapsulated in a frame.

line layers: The line layer is responsible for the movement of a signal across a physical line.

Line layer overhead is added to the frame at this layer. STS multiplexers and add multiplexers provide line layer function.

~~except point to point to network~~

~~and connection to the rest of Frame relay network~~

Ans. to the Ques No- 7(b)

Ques: Discuss about connection oriented?

Ans: In telecommunication, connection oriented describes a means of transmitting data in which the devices at the end points use a preliminary protocol to establish an end-to-end connection ... before any data is sent. Connection-oriented protocol service is sometimes called a reliable network service, because it guarantees that data will arrive in the proper sequence.

The alternatives to connection-oriented transmission in the connectionless approach, in which data is sent from one end point to another without prior arrangement.

Ans) to the Ques No - 7(c)

Ques: what is signal? Define the type of signal.

Ans: A signal is a way of conveying information, gestures, semaphore, images, sound all can be signals.

Technically - a function of time, space or another observation variable that conveys information.

We will distinguish 3 forms of signals.

• continuous-Time/ analog Signal

• discrete - Time signal.

• Digital Signal.

Ans. to the ques No-8 (a)

Ques: what is data encoding? Mention the types of data encoding.

Ans: It is the process of employing number of patterns of voltage and current levels to show the state of the digital signal on the transmission line. Unipolar, polar, bipolar and Manchester are the general types of line coding.

Encoding techniques;

i. Analog data to analog signals: Techniques such as frequency, modulation, amplitude, modulation and phase modulation of analog signals come under this category.

- Along with data to digital signals, pulse code

~~modulation (PCM)~~ does the digitization process
also called digital modulation

- Digital data to Analog Signals; Techniques such as Amplitude Shift Keying, frequency shift keying, phase shift keying etc come under this category.

Ans. to the Ques No-8 (b)

Ques: How do you define by channel capacity?

Ans: channel capacity is a maximum rate that a channel can transmit. It is measured in bits per second (bps). channel capacity is a rough value as measuring takes into account only the whole amount of data transferred, but fails to ac-

30 08

out of account communication quality. ~~Bandwidth~~.

Bandwidth can be considered as a subset of channel capacity term. When bandwidth is measured, the maximum volume of information that can be accurately transferred per unit of time is taken into account.

Ans. to the ques No-8(c)

ques: Explain the types of transmission media.

Ans: The transmission medium can be defined as a pathway that can transmit information from a sender to a receiver. Transmission media are located below the physical layer.

and are controlled by the physical layer.

Transmission media are also called communication channels.

Transmission media are of two ~~layer~~ types

- Guided transmission medium.
- Unguided transmission medium.

Guided transmission medium: are also called bounded media or wired media. They comprise cables or wires through which data is transmitted.

Unguided transmission medium: are also called wireless media. They transport data in the form of electromagnetic waves that do not require any cables for transmission.