Computer Networks

(Sem - VI) Theory Examination 2017-2018

Section - A

Q-1.

Q-1.(a) What are the applications of Computer Networks?

Ans – Applications of Computer Networks are:
(i) Information and Resource sharing
(ii) Retrieving Remote Information
(iii) Speedy Interpersonal Communication
(iv) E - Commerce
(v) Internet access

Q-1.(b) List the advantages and disadvantages of ring topology.

Ans – Advantages
1. Easy and Cheap to install and expand.
2. Transmitting network is not affected by high traffic or by adding more nodes, as only the nodes having token can transmit data.

Disadvantages
1. Troubleshooting is difficult in ring topology.
2. Failure of one computer disturbs the entire network.

Q-1.(c) What is count-to-infinity problem?

Ans — Count-to-infinity is just another name for a routing loop. In distance vector routing (DVR), routing loops usually occur when an interface goes down. It can also occur when two routers send updates to each other at the same time.

Q-1.(d) Given the IP address 180.25.21.172 and the Subnet mask 255.255.192.0, what is the Subnet address?

✓

Ans —
IP address — 180.25.21.172

as, given IP address belongs to class B

←16 bits→ ←16 bits→

Network ID	Host ID

←0g by tes→ ←2 bytes→
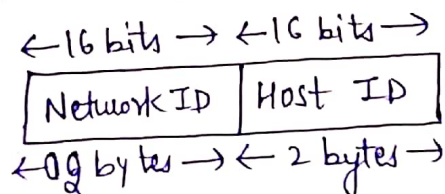
Subnet mask — 255.255.192.0

therefore, Subnet address is
180.25.0.0

Q-1. (e) What is piggybacking?

Ans – In two-way communication, whenever a frame is received, the receiver waits and does not send the control frame (ACK) back to the sender immediately.

The receiver waits until its network layer passes in the next data packet. The delayed acknowledgement is then attached to this outgoing data frame. This technique of temporarily delaying the acknowledgement so that it can be et hooked with next outgoing data frame is known as **piggybacking**.

Q-1. (f) Measurement of slotted ALOHA channel with infinite number of users show that the 10 percent of slots are idle.

(i) What is channel load?

(ii) What is throughput.

Ans – when a slot is idle, there is 0 frame generated in that frame time.

therefore, $P[0] = 0.1$

$$\{ P[0] = G^0 e^{-G}/0! \}$$

$P[0] = e^{-G} = 0.1$

$-G = \ln(0.1)$

$G = 2.303$

Throughput, $S = G e^{-G}$

$= (2.303) \times e^{-2.303}$

$= 2.303 \times 0.1$

$S = 0.2303$

Q-1. (g) Provide few reasons for congestion in a network?

Ans – 1. Too many hosts in broadcast domain.

2. Broadcast storms

3. Low Bandwidth

4. Adding Retransmitting ~~reasons~~ Hubs

5. Multicasting

6. Bad Configuration management

7. Artificial Congestion

Q-1. (h) How does transport layer perform duplication control?

Ans – Duplication control is important to consider as well because as the speed of networks continue to increase, it becomes possible for different messages to be identified as duplicated and discarded. Similarly if a packet can become corrupted or erroneous, it is possible then for the sequence number of real message to be incorrect and cause a duplicate. Also it is entirely possible for a duplicate message to be sent by the sender itself, and therefore this duplicate should be detected to avoid errors.

Q-1. (i) If a binary signal is sent over a 3kHz channel. whose signal to Noise ratio is 20db what is maximum achievable data rate?

Ans –

Q-1.(j) Mention the use of HTTP.

Ans – 1. HTTP is used mainly to access data on the World Wide Web.

2. It specifies a request/response protocol.

3. It is used for distributed and collaborative information systems.

Q-2. Explain network topological design with necessary diagram and brief the advantages and disadvantages of various topologies.

Ans- Network Topology is the schematic description of a network arrangement, connecting various nodes (sender and receiver) through links of connection.

Types of Network Topologies

1. **Bus Topology** — Bus topology is a network topology in which every computer and network device is connected to single cable. It is multipoint. One long cable act as a backbone to link all the devices in a network.
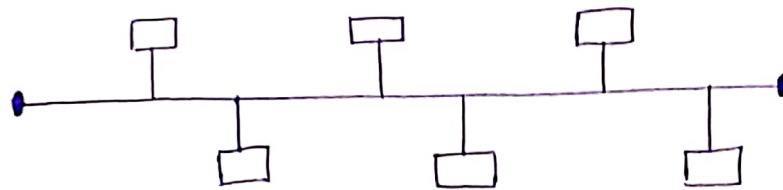

Advantages - (i) Used in small networks

(ii) It is easy to understand

(iii) less Cable required as compared to other network topology.

Disadvantages - (i) Cable fails then whole network fails

(ii) If network traffic is heavy or nodes are more the performance of the network decreases

(iii) Cable has limited length.

2. __Star Topology__ - In star topology, all devices are connected to a single hub through a cable. This hub is the central node and all other nodes are connected to the central node.
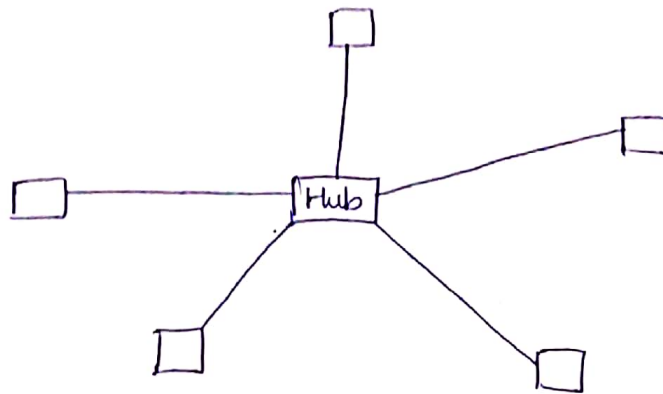
Advantages- (i) Hub can be upgraded easily.
(ii) Easy to troubleshoot
(iii) Easy to setup and modify.

Disadvantages - (i) Expensive to use
(ii) Cost of installation is high
(iii) If the hub failed then the whole network is stopped because all the nodes depend on the hub

3. __Ring Topology__ - In this topology, it forms a ring as each computer is connected to other computer, with the last one connected to the first. Exactly two neighbours for each device.
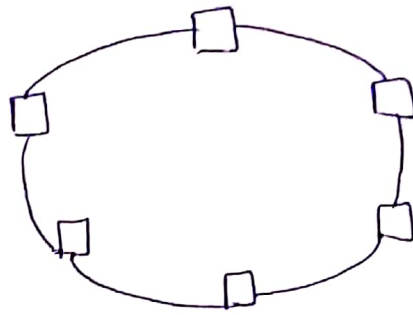
Advantages — (i) Cheap to install and expand.

(ii) Transmitting network is not affected by high traffic, as only the nodes having tokens can transmit data.

Disadvantages — (i) Troubleshooting is difficult

(ii) Failure of one computer disturbs the whole network.

4. **Mesh Topology** — It is a point-to-point connection to other nodes or devices. Mesh has $n(n-1)/2$ physical channels to link n devices.
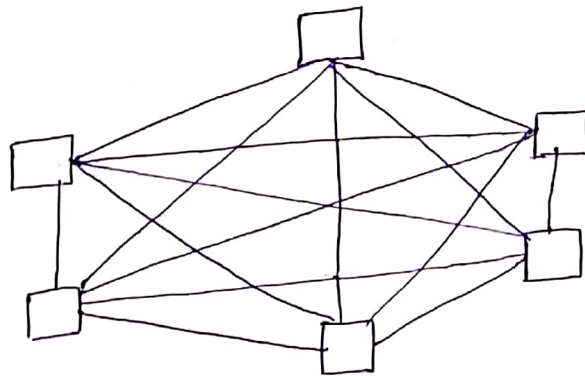
Types of Mesh Topology

(i) Partial Mesh Topology — In this, some of the systems are connected in the same fashion as mesh topology but some devices are only connected to two or three devices.

(ii) Full mesh Topology — Each and every nodes or device are connected to each other.

Advantages — (i) Fault is diagnosed easily.
(ii) Provides security and privacy

Disadvantages — (i) Cabling cost is more
(ii) Installation and configuration is difficult.

5. Hybrid Topology — This topology is a collection of two or more topologies which are described above. This is a scalable topology which can be expanded easily.
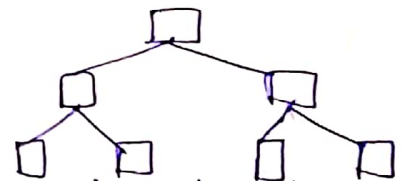
Advantages — (i) Effective and Flexible
(ii) Reliable

Disadvantages — (i) Complex in design
(ii) Costly

6. Tree Topology — It has a root node and all other nodes are connected to it forming a hierarchy. It is also called hierarchical topology.

Advantages — (i) Error detection is easily done.
(ii) Easily managed and maintained.

Disadvantages — (i) Heavily cabled
(ii) Central hub fails, network fails.
(iii) Costly