***2021/2022***

***Question 1***

***Define the following terminologies as used in networking***

1. De Jure standards – are standards set by the law
2. Line configuration – refers to the way 2 or more communicating devices attach to a link
3. Logical topology – layout of a network in terms of how data travels.
4. Timeliness – data must be delivered within the required time
5. Session initiation – arranges session desired and required services between session participants
6. Socket – is one endpoint of a 2-way communication link between two programs running on the network.

**b) *Discuss how address classes are managed in IPv4***

there are 5 classes; Class A to Class E

Class A – for very large networks only, 1st 8 bits are used leaving 24 for host identification

Class B – medium sized networks; 1st 16 used leaving 16 for host

Class C – smaller networks; 1st 24 bits used to leave 8 for host identification

Class D – multicast range; can’t be used for labels; addresses have no network / host structure

Class E – reserved for experimental purposes; 1st 4 bits are always IIII

**c) *What is a network? Explain various types of networks***

network – A set of devices within nodes are connected by media links

LAN – local area network – up to 5 kilometers. Mainly used by offices, institutions

MAN – metropolitan area network – covers up to 15 km, used in towns / Cable Televisions

WAN – wide area network – covers the whole world, example the Internet

***Question 2***

1. ***List and explain the top-level domains currently in use***
2. ***Discuss how transmission control protocol (TCP) internet protocol (IP)operates***
3. ***To be considered effective and efficient a network must meet a number of criteria***

***Explain these criteria***.

Performance – Transit time and response time needs to be smaller

No of users, Type of transmission medium, Hardware and software need to be considered

Reliability – time it takes to recover, frequency of failure, protection from catastrophe

Security – Protecting the data from unauthorized access. & Viruses

***Question 3***

1. ***Discuss various factors considered when choosing a type of network topology to be used***

* Type of line configuration – multitop/multipoint or point to point
* Cost of establishment – cost of cables, hubs for star topology, droplines etc.
* Performance required – e.g., Star is faster than Ring
* Available hardware resources-servers etc.
* Scalability – ability to expand the network
* Administrative effort required

***b) State various standards organizations and explain their defined roles***ISO – international standards Organization – Makes technical recommendations about data communication

IEEE – Best known for Standards of LANS (Local Area Networks)  
ANSI – American national Standards Institute – coordinating organization for US national system of technical and non-technical standards

ITU – Technical standards setting organization for telecommunication devices

c) Write short notes on subnet mask.

***Question 4***

1. ***What is the difference between ISO and OSI? Explain the layers in the OSI model***

ISO; international standards organization – it’s an organization for making standards while OSI open system interconnection   
Application – Allows end users to access the network by providing a set of utilities for application program. Common services offered are File services, Email services, Network printing services, Database services

Presentation – Formats data for presentation to the user. Has 3 main jobs Data presentation, data compression, Data encryption

Session – Initiates, maintains and terminates each logical session between session participants.

Transport – Deals with end-to-end issues such as procedures for entering into the network

Network – addresses and delivers packets & performs routing

Data link – manages 2 types of transmission, connection-oriented transmission and connection-less oriented transmission

Physical -

1. ***State and explain the steps performed in configuring the IP addresses.***

Step 1 execute Ipconfig

Step 2: Ipconfig /all – defines whether IP routing is enabled

Step 3: Ipconfig /? – describes ipconfig and what it does.

Step 4: Ipconfig /all compartments – network adapters can be compartmentalized so that traffic from one device doesn’t leak to the other.

Step 5: Work with dynamically assigned address

1. ***Discuss briefly the different transmission modes***

Simplex – communication is unidirectional – occurs in only one direction

Half-duplex – Each station can both transmit and receive data but not at the same time

Full duplex – both stations can receive and transmit data simultaneously

***Question 5***

1. ***Discuss the phases involved in circuit switching***

Circuit establishment – once the connection is established then a dedicated path will exist until the connection is terminated.

Data transfer – data communication i.e., Exchange of data between two devices via the connection established. Acknowledgement must be received after a request signal is sent to receiver.

Circuit disconnects – a disconnect signal is sent to all involved switches to release the resource and break the connection.

Advantages of circuit switching

* Data rate is fixed and dedicated because connection is established using dedicated physical connection or circuits.
* Due to dedicated transmission routing paths involved it is a good choice for continuous transmission over a long duration.
* Data transmission is negligible no waiting time in involved switches.

Disadvantages

-the dedicated channel cannot be used for other data transmission.

- requires more bandwidth and continuous transmission offers wastage of bandwidth when there is a silence period.

- highly inefficient when utilizing the system resource, we cannot use the resource for other connection as it is allocated for the entire conversation.

- takes huge time during establishment of physical links between sender and receiver.

1. ***What is a network topology? Explain the types of network topologies***
2. ***List and discuss briefly the formal standardization process stages***

***Question 6***

1. ***Explain various roles performed at the session layer***

Initiating, maintaining and terminating each logical session between computers.

Handles dialog control and dialog separation

Handles session accounting so that correct party receives the bill when dealing by session time or data volume as it is done with some wan connections.

1. ***Discuss various devices used in networking and state the layers in which they operate***

Transport layer – firewall- reliability

Network layer -router -address routing

Data link- switch, bridge, access point-logical link control, media access control

Physical layer – hub, NIC, cable wireless-transmission.

1. ***Explain briefly how internetworks operates***

***Question 7***

1. ***State and explain the reasons that might lead an organization to install a wireless network in their premises***

Increased efficiency

Flexibility

Cost savings

New opportunities

Increased scalability

Easy to setup

Mobile and portable

1. ***Discuss in detail with the help of a sketch how packet switching operates***

-the msg splits into smaller pieces known as packets

Packets will travel across the network taking shortest path as possible

All the packets are reassembled at the receiving end in their correct order

-if any pkt is missing, the sender will resend the message

If correct order of packet is reached the acknowledgement msg will be sent

S4

S2

A

4|2|1

B

S1

S6

S5

S3

1. ***Explain the role of ipconfig and ping in networking***