



1. What are the prevailing trends in Telecommunication?

Ans.:

Industry Trends, Technology Trends and Business Application Trends

2. Explain - The Business Values of Telecommunication.

Ans.: (Same as Question 29)

Overcome – **Geographic, Time, Cost, Structural** – Barriers

3. What are the advantages of a computer network in an organization?

Ans.:

File Sharing, Resource Sharing, Remote Access, Shared DB, Fault Tolerance, Internet Access and Security

4. What are the telecommunication processors in any telecommunication network?

Ans.:

- A. **NIC** : A computer hardware component that connects a computer to a computer network.
- B. **Modem** : An encoding as well as decoding device used in the data transmission
- C. **Multiplexer** : A communications processor that allows a single communications channel to carry simultaneous data transmissions from many terminals
- D. **Switch** : Multiport Connecting Device based on Hardware Address
- E. **Router** : Multiport Connecting Device based on Network Address
- F. **Hub** : A port sharing Communication Processor, This allows to sharing of network resources
- G. **Bridge** : Communication Processor To Magnify the data transmission signal, generally, used in LANs. (Similar Network)
- H. **Repeater** : Communication Processor To Boost / Amplifies the signals
- I. **Gateway** : Communication Processor to connect Network with Dissimilar Network

5. Explain - Channel / Media in Telecommunication Network Model

Ans.:

A. Guided:

- ✓ Twisted Pair Wire
- ✓ Coaxial Cable
- ✓ Fiber Optics

B. Unguided:

- ✓ **Terrestrial Microwave** :
Earthbound microwave systems, which transmit high-speed radio signals in a line-of-sight path between relay stations spaced approximately 30 miles apart

✓ **Radio Waves :**

An invisible form of *Electromagnetic Radiation* that varies in wavelength from around a millimeter (mm) to 100,000 km.

✓ **Micro Waves :**

Radio waves with wavelengths ranging from as long as one meter to as short as one millimeter.

✓ **Infrared Waves :**

Used in Night-vision devices, it uses infrared light

✓ **Communication Satellite :**

Use the atmosphere (microwave radio waves) as the medium through which to transmit signals

6. Explain functions of Network Management Software.

Ans.:

- A. Traffic Management
- B. Security
- C. Network Monitors
- D. Capacity Planning

7. Advantages and disadvantages of various types of Topology:

Ans.:

Topology	Advantages	Disadvantages
Star	1. Can use the central unit	1. Whole network is affected
	2. Easy to add new nodes and remove existing nodes	2. Less reliable than a ring network
	3. Node failure does not bring down the entire network	3. Heavily dependent on the central host
	4. Easier to diagnose network problems	4. Cost of cabling – Very High
Bus	1. Reliable as well as easy	1. Heavy network traffic can slow a bus
	2. Not affect the entire network	2. Weakens the electrical signal
	3. Less expensive	3. The bus configuration can be difficult to troubleshoot
	4. Easy to extend	
Ring	1. Do not require a central computer	1. Expensive and difficult to install
	2. Communicate directly with the other computers	2. Affect the whole network
	3. Not as susceptible to breakdowns as the star network	3. Difficult to troubleshoot
	4. High performance	4. Adding or removing computers can disrupt the network
	5. Span longer distances	
	6. Easily extendable	



Mesh	1. Yields the greatest amount of redundancy (Unemployment)	1. Its high cost of installation and maintenance
	2. Network problems are easier to diagnose	2. More cable is required than any other configuration

8. Explain - Transmission Technologies

Ans.:

A. Serial Transmission :

Data bits are transferred serially on a single way i.e. one after another

➤ Synchronous:*Allow characters to be sent down through the line without 0 & 1 bits (Continuous)*➤ Asynchronous:*Each data word is accomplice by start (0) & stop (1) (With irregular Intervals)*B. Parallel Transmission : Data bits are transferred simultaneously on the parallel ways.**9. What is Transmission Modes?**

Ans.:

Transmission Modes – Direction of Signal Flow

✓ Simplex : Only in one direction (& Not in other) from Transmitter(T) to Receiver®

✓ Half Duplex : Only in one direction OR Other, But not simultaneously ('T to R' OR 'R to T')

✓ Full Duplex : Data flows in both direction, Simultaneously ('T to R' AND 'R to T')

10. Explain - Transmission Techniques

Ans.:

A. **Broadcast Networks** –Data transmitted by one node is received by many, sometimes, All of the other nodes. This refers to a method of transferring a message to all recipients *simultaneously*.B. **Switched Networks** –

The way in which the nodes switch data from one link to another, as it is transmitted from source to destination node, is referred to as a switching technique

Circuit Switching:

Establishes Fixed Bandwidth Circuit (Channel/Path) before communication

Packet Switching:

Not Fixed Path, Message is broken up into small transmission units call IP Packets, routed through best/shortest path available at that time.

11. Explain - Network ArchitectureOSI Model:-

Layers:

A layer is a collection of conceptually similar functions that provide services to the layer above it and receives services from the layer below it.



- A. Application Layer : interacts with software application and provides users services by file transfer, file sharing etc
- B. Presentation Layer : This layer at times referred as 'Syntax layer' also is usually part of OS, that converts incoming & outgoing data from one presentation format to another
- C. Session Layer : This layer sets up, coordinates, & terminates conversations, exchange & dialogs between the applications at the each end
- D. Transport Layer : This layer also ensure reliable & transparent transfer of data between user processes , assembles & disassemble message packets , provides error recovery & flow control.
- E. Network Layer : The network layer provides the functional & procedural means of transferring variable length data sequences *from a source to a destination* via. one or more networks, while maintaining the quality of service requested by the transport layer
- F. Logical Link layer : The data link layer responds to service requests from the network layer & issue service requests to the physical layer
- G. Physical Layer : The physical layer is a hardware layer which specifies mechanical features as well as electromagnetic features of the connection between the devices and the transmission.

TCP or IP Model:-

TCP/IP		The OSI Model	
Application or Process Layer		Application Layer	Provides communications services for end user applications
		Presentation Layer	Provides appropriate data transmission formats and codes
		Session Layer	Supports the accomplishment of telecommunications sessions
Host-to-Host Transport Layer		Transport Layer	Supports the organization and transfer of data between nodes in the network
Internet Protocol (IP)		Network Layer	Provides appropriate routing by establishing connections among network links
Network Interface		Data Link Layer	Supports error-free organization and transmission of data in the network
Physical Layer		Physical Layer	Provides physical transmission of data on the telecommunications media in the network



12. Explain the term – ‘Protocols’

Ans.:

Protocols = Set of Rules

3 Aspects of Digital Communication;

- A. **Syntax** – The format of data being exchanged, character set used, type of error correction used, type of encoding schema (e.g., signal levels) being used.
- B. **Semantics** – Type and order of messages used to ensure reliable & error free information transfer
- C. **Timing** – Defines data rate selection and correct timing for various events during data transfer

Network Security Protocols

- A. SSH – Secure Shell
- B. SFTP – The SSH File Transfer Protocol
- C. HTTPS – Hyper Text Transfer Protocol Secure
- D. SSL – Secure Socket Layer

13. Explain - Area Coverage Based Classification of Telecommunication Network

Ans.:

➤ LAN:

A group of computers and network devices connected together, usually within the same building, campus or spanned over limited distance. It provides High Speed (1 to 30 mbps) data transfer and is Relatively inexpensive.

➤ MAN:

It is a larger network that usually spans in the same city or town. *High speed of 10 mbps Network connects within 40 km from 1 point to another. E.G.:- Cable Television*

➤ WAN :

It is not restricted to a geographical location, although it might be confined within the bounds of a state or country. The technology is high speed and relatively expensive.

14. Explain - Ownership Based Classification of Telecommunication Network

Ans.:

➤ Public Data Network:

For User not belonging to a Single organization

➤ Private Data Network :

It provide businesses, government agencies and organizations of all sizes as ‘A dedicated network’

➤ VPN:

Create Private Network by using Public Network
(i.e. Virtually Private, over Public for high security)

**15. Explain - Functional Based Classification of Telecommunication Network**

Ans.:

- Client Server Network (C/S) – have become predominate information architecture of enterprise computing

Client:A. Fat/Thick Client:

Performs the bulk of any data processing operations itself, and does not necessarily rely on the server.

B. Thin Client:

Necessarily depend on Server i.e. on host computer

C. Hybrid:

Client processes locally, but relies on the server for the storing persistent data

What are the Prominent Characteristics of Server?

Ans.:

Service, Shared Resources, Transparency of Location, Mix and Match, Scalability, Integrity

Advantages & disadvantages of various computer networks:

		Advantages	Disadvantages
1	C/S (Similar to Centralized Computing and Star Topology)	-	Server goes down or crashes, all the computers connected to it become unavailable to use
		-	Simultaneous access to data and services by the user takes little more time
2	P2P Two or more PCs connected together and share resources <i>without going through a separate server computer.</i>	Easy and simple to set up and only require a Hub or a Switch	Problem in accessing files if computers are not connected properly
		Very simple and cost effective	Does not support connections with too many computers
		One computer fails to work, all other computers connected to it continue to work	Data security is very poor
3	Single Tier A single computer that contains a database and a front-end (GUI)	Requires only one stand-alone computer	Used by only one user
		Only one installation of proprietary software	Impractical for an organization which requires two or more users to interact with the organizational data stores at the same time



4	Two Tier consists of a client and a server i.e. A. Presentation Tier B. Database Tier	System performance is higher	Performance deteriorates (Weakens) if number of users increases
		More users could interact with system	Restricted flexibility and choice of DBMS
		Easy to setup and maintain	
5	N Tier / Three Tier i.e. A. Presentation Tier B. Application Tier C. Database Tier	Clear separation of user-interface-control and data presentation from application-logic	Creates an increased need for network traffic management, server load balancing, and fault tolerance
		Dynamic load balancing	Current tools are relatively immature and are more complex
		Change management	Maintenance tools are currently inadequate

16. Explain - Virtualization

Ans.:

Create A virtual version of a device or resource (by division / consolidation)such as a server, storage device, network or even an operating system by using specific software for the same.**Major Applications of Virtualization:**

- A. Server consolidation
- B. Disaster Recovery
- C. Testing & Training
- D. Portable Applications
- E. Portable Work-paces

Types of Virtualization:A. Hardware Virtualization –

The creation of a virtual machine that acts like a real computer with an operating system
Small physical servers into one large logical server or One large physical servers into Small logical servers

B. Network Virtualization –

This allows a large physical network to be provisioned into multiple smaller logical networks and conversely allows multiple physical LANs to be combined into a larger logical network.

C. Storage Virtualization –

It is the apparent pooling of data from multiple storage devices, even different types of storage devices, into what appears to be a single device that is managed from a central console.



17. Explain - Grid Computing

Ans.:

- ✓ Use computing power of thousand computers
- ✓ Grid computing is A Decentralized model, Where computation could occurs on many computers/domains.

Benefits of Grid Computing:

1. Making use of Under-utilized Resources
2. Resource Balancing
3. Parallel CPU Capacity
4. Virtual resources and virtual organizations for collaboration
5. Access to additional resources
6. Reliability (More)
7. Management (Easy)

Types of Resources used in Grid Computing:

1. Computation:
2. Storage
3. Communications:
4. Software and Licenses:
5. Special Equipment, Capacities, Architectures, and Policies:

Using a Grid: User's Perspective

1. Enrolling and installing Grid Software
2. Logging onto the grid
3. Queries and submitting jobs
4. Data configuration
5. Monitoring progress and recovery
6. Reserving resources

Using a Grid: An Administrative Perspective

1. Planning
 - A. Security and B. Organization
2. Installation
3. Managing enrollment of donors and users
4. Data sharing
5. Certificate Authority
6. Resource Management

Grid Computing Security

1. Single Sign on
2. Protection of Credentials
3. Interoperability with local security solutions



4. Exportability
5. Support for secure group communication
6. Support for multiple implementations

18. Explain - Cloud computing

Ans.:

The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.

Cloud Computing Architecture:

- A. Front end Architecture
- B. Back end Architecture

Cloud Computing Environment / Types of Cloud

- A. Public Cloud –
This environment can be used by the General Public
- B. Private Cloud –
This cloud computing environment resides within the boundaries of an organization and is used exclusively for the organization's benefits. These are also called internal clouds.
- C. Hybrid Cloud –
This is combination of both at least on private (internal) and at least public (external) cloud computing environments
- D. Community Clouds -
This is the sharing of computing infrastructure in between organizations of the same community

Cloud Computing Models

1. Infrastructure as a Service (IaaS) – Providers/offer computers, more often virtual machines
2. Platform as a Service (PaaS) – Hardware + Operating System (OS)
3. Software as a Service (SaaS) – Provides users to access large variety of applications over internets.
4. Network as a Service (NaaS) – Provide Networking Services like VPN etc
5. Communication as a Service (CaaS) – Provide Communication Services

Characteristics of Cloud Computing

- A. Elasticity and Scalability
- B. Pay-per-Use
- C. On Demand
- D. Resiliency
- E. Multi Tenancy
- F. Workload Movement



Advantages of Cloud Computing (CA BA is Easy & Quick)

1. Cost Efficient:
2. Almost Unlimited Storage:
3. Backup and Recovery:
4. Automatic Software Integration
5. Easy Access to Information:
6. Quick Deployment:

Disadvantages of Cloud Computing

1. Technical Issues
2. Security in the cloud
3. Prone to Attack

19. Mobile Computing

Ans.:

Mobile Computing is the use of portable computing devices (such as laptop and handheld computers) in conjunction with mobile communications technologies to enable users to access the Internet and data on their home or work computers from anywhere in the world.

Mobile computing involves...

- A. Mobile Communication
- B. Mobile Hardware
- C. Mobile Software

Major concerns relating to mobile computing are given as follows...

1. Mobile computing has its fair share of security concerns as any other technology.
2. Dangers of misrepresentation - Another problem plaguing (harassing) mobile computing are credential verification.
3. Power consumption: When a power outlet or portable generator is not available, mobile computers must rely entirely on battery power.
4. Potential health hazards.

20. Explain - Basic Objective of Network Security

Ans.:

- A. To safeguard assets, and
- B. To ensure and maintain the data integrity.

21. Two Types of System Security

Ans.:

- A. Physical Security
- B. Logical Security



22. What is threats and explain types of threats?

Ans.:

Threats:

Danger that can disrupt operation, functioning, and CIA of Network and System...

1. Unstructured Threats (from inexperienced individuals)
2. Structured Threats (from individuals who are highly motivated and technically competent)
3. External Threats (from individuals or organizations working outside an organization)
4. Internal Threats (from individuals who have authorized access to the network)

23. What are Facts responsible for Vulnerability?

Ans.:

Vulnerability:

An inherent weakness in the design, configuration, or implementation of a network or system

1. Software Bugs
2. Timing Windows
3. Insecure default configurations
4. Trusting Untrustworthy info.
5. End users

24. What are the steps of Security Programs?

Ans.:

1. Preparing project plan for enforcing security
2. Asset identification (Calculator / Computer)
3. Asset valuation (100 Rs. / 40,000 Rs.)
4. Threat identification (Power Failure, Water etc.)
5. Threats probability of occurrence assessment (80%)
6. Exposure analysis (Total Loss)
7. Controls adjustment
8. Report generation outlining the levels of security to be provided for individual systems, end user, etc.

25. Explain - Network Security

Ans.:

1. Privacy (Confidentiality):

Cryptography - Encryption and Decryption of Data

2. Message Authentication:

This means that the receiver is sure of the sender's identity and that an imposter (Fraud) has not sent the message.

**3. Message Integrity:**

This means that the data must arrive at the receiver exactly as it was sent. There must not be any changes during the transmission – either accidental or malicious.

4. Non-Repudiation:

This means that a receiver must be able to prove that a received message came from a specific sender and the sender must not be able to deny sending it.

26. Explain - Network Security Techniques

Ans.:

1. IDS (Intrusion Detection System)

A Device OR Software Application that monitors network or system activities for malicious activities or policy violations and produces reports to a Management Station

NID – Network Intrusion Detection : on a network to analyze traffic

HID – Host Based Intrusion Detection : On given Host

2. Firewalls –

Firewalls are systems that control the flow of traffic between the Internet and the firm's internal LANs and systems.

3. NAC – Network Access Control**4. Site Blocking****5. Anti-Malware****27. What is Network Administration and Management?**

Ans.:

O A PM - Operation, Administration, Provisioning, Maintenance

28. Characterizing Network Management – FCAPS

Ans.:

A. Fault Management:

B. Configuration Management:

C. Accounting Management:

D. Performance Management:

E. Security Management

29. What are examples of the business value of e-Business Applications of Telecommunications Networks due to internet?

Ans.: Overcome - **Geographic, Time, Cost, Structural** –Barriers

30. What are the business Use of the Internet?

Ans.:

A. Strategic business alliances (Union)

B. Providing customer and vendor support

C. Collaboration among business partners

D. Buying and selling products and services



- E. Marketing, sales, and customer service applications
- F. Growth of cross-functional business applications
- G. Emergence of applications in engineering, manufacturing, human resources and accounting.
- H. Enterprise communications and collaboration
- I. Attracting new customers with innovative marketing and products.
- J. Retaining present customers with improved customer service and support.
- K. Developing new web-based markets and distribution channels for existing products.
- L. Developing new information-based products accessible on the Web.
- M. Generating revenue through electronic commerce applications is a growing source of business value.
- N. Electronic commerce

31. Explain – Intranet

Ans.:

The Intranet is a type of information system that facilitates communication within the organization, among widely dispersed departments, divisions, and regional locations.

32. Explain – Extranet

Ans.:

An Extranet is an extension of an Intranet that makes the latter accessible to outside companies or individuals with or without an Intranet.

The Five Rules of the Extranet:

1. Be as flexible as the business
2. Deploy in "Internet time"
3. Protect the interests of the data owner
4. Serve the partner as a customer
5. Drive information to the decision-maker

33. Explain - Benefits of E-commerce

Ans.:

- A. Reduced costs to buyers
- B. Reduced costs to suppliers
- C. Reduced time to complete business transactions
- D. Reduced inventories and reduction of risk of obsolete inventories
- E. Reduced advertising costs.
- F. Reduced design and manufacturing cost.
- G. Improved market intelligence and strategic planning.
- H. More opportunity for niche marketing.
- I. Access to new markets.
- J. Reduced overhead costs through uniformity, automation, and large-scale integration of management processes.



34. Explain the Risks involved in e-Commerce.

Ans.:

- A. Problem of anonymity:
- B. Repudiation of contract:
- C. Lack of authenticity of transactions:
- D. Data Loss or theft or duplication:
- E. Attack from hackers:
- F. Denial of Service:
- G. Non-recognition of electronic transactions
- H. Lack of audit trails:
- I. Problem of piracy:

35. What are the types of E-commerce?

Ans.:

- A. Business-to-Business (B2B) e-Commerce
- B. Business-to-Consumer (B2C) e-Commerce
- C. Consumer-to-Business (C2B) e-Commerce
- D. Consumer-to-Consumer (C2C) e-Commerce
- E. Business-to-Government (B2G) e-Commerce
- F. Business-to-Employee (B2E) e-Commerce

36. Explain - Mobile Commerce

Ans.:

M-commerce (Mobile Commerce) is the buying and selling of goods and services through wireless handheld devices such as cellular telephone and Personal Digital Assistants (PDAs) Known as next-generation e-commerce, m-commerce enables users to access the Internet without needing to find a place to plug in.

37. Write a Note on 'EFT – Electronic Fund Transfer & Types of EFT'.

Ans.:

- A. ATMs
- B. PoS Transactions,
- C. Preauthorized Transfers
- D. Telephone Transfers

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