- **ACN → VVIMP instruction – prepare all numerical sums from pdf provided earlier**
- **Separate file for differentiate questions is given → for solutions of few listed questions notes are to be referred**
- **Refer notes for respective answers**

- **Unit 1:**
- **Definitions:**
- Internet:
    - Global information system logically linked together by globally unique address space based on IP and supports communication using TCP/IP providing higher level services
    - Network of networks
- **Intranet**
    - It is a private network utilized by companies or organizations.
    - It is the implementation of internet technology within a corporate organization
    - As this is a private network, so no one from the outside world can access this network.
    - Used to protect your data and provide data security
- **SUBNET:**
    - logical subdivision of IP network
    - Smaller network within larger network
    - Improves network security and efficiency
- **SUBNETTING (SUBNET ADDRESSING):**
    - Process of dividing larger network into smaller networks called as **subnetworks/subnet**, manageable segments
    - Sub division by borrowing bits from host position of IP address
    - Each segment with own **unique** range of IP addresses
- **Supernetting**
    - Process of combining multiple networks into a single larger network
    - Also called as CIDR (Classless Inter-Domain Routing)
    - A lot of unused address spaces in classful addressing
- **2 marks questions:**
- **Draw and label sketch if IPv4 packet format**
- **State the use of 6 flags in TCP header.**
- **State the importance of IPv6 over IPv4.**
- **Enlist services provided by internet**
- **State the need of IPv6.**
- **Enlist commonly used domains**
- **Enlist ISP**
- **Enlist classful addressing classes**
- **4 marks questions:**
- **Explain with diagram IPv6 packet format**

- **Explain classless addressing(CIDR)**
- **Explain address mapping by ARP(logical to physical and physical to logical)**
- **ARP packet format**
- **6 marks questions:**
- **Explain with diagram IPv4 packet format**
- **Explain in detail classful addressing scheme**
- **All numerical sums**

- **Unit 2:**
- **Definitions:**
- **Router**: "router is a networking device which forwards the data packets between computer networks"
- **Functions**:
- Router performs traffic diverting function on the network
- Determination of the path
- Packet forwarding
- **Inter Domain Routing**
- Routing between autonomous system is known as Inter Domain Routing
- Inter-domain routing directs network traffic between different autonomous systems on the internet
- Example of inter domain routing protocol is Path Vector Routing
- Each autonomous system is allowed to choose one or more intra domain routing protocols in order to handle routing inside A.S.
- But only inter domain routing protocol will handle routing between autonomous systems
- BGP is an implementation of path vector protocol
- **routing algorithm**
- Routing algorithm is a part of network layer software
- It is responsible for deciding the output line over which a packet is to sent
- Desirable Properties of routing algorithm:
    - Correctness
    - Robustness
    - Stability
    - Fairness
    - Optimality
- **2 marks questions:**
- **What are the major uses of a router?**
- Multiple Network Connection
- Managing Congestion
- Providing connectivity
- Connecting Subnets
- Port Forwarding
- Traffic Classification
- **Explain format of routing table in short**
- **What are the drawbacks of RIP?**

- **4 marks questions:**
- **: What are different types of routers?**
- **Explain Routing Architecture in details.**
- **What are different types of routing?**
- **Explain with diagram RIP or RIP 2 message format**
- **Explain OSPF with diagram and enlist types of links used by OSPF**
- **Explain BGP with detailed diagrams**
- **6 marks questions:**
- **What is Distance Vector Routing?**
- **Explain RIPv2**
- **Explain 'Link State Routing-Open Shortest Path'**

- **Unit 3:**
- **Definitions:**
- **Multiplexing**
- **Demultiplexing**
- **Connectionless services**
- **Connection-oriented services**
- **2 marks questions:**
- **Elaborate need of domain name system.**
- **What are advantages of UDP over TCP?**
- **Enlist and explain features of UDP**
- **Write down applications of UDP**
- **List services provided by transport layer**
- **4 marks questions:**
- **What is UDP? Enlist the services provided by UDP?**
- **Enlist Well known ports with UDP.**
- **Enlist and explain TCP features**
- **Explain TCP connection establishment using Three-way handshaking mechanism**
- **what is Flow control and Error control in TCP?**
- **Describe working of TLS**
- **6 marks questions:**
- **Explain TCP services in detail**
- **Draw and explain TCP Segment structure / TCP header format**
- **What is SCTP and enlist SCTP services**

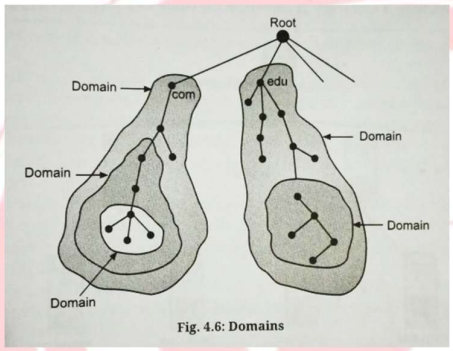
- **Unit 4:**
- **Definitions:**
- **DNS(Domain Name System)**
- Domain name space consists of tree data structure
- Name space is abstract space or collection of - all possible addresses names, identifiers of objects on a network, inter network, internet.
- DNS should assign names unambiguously
- Names are bound with IP addresses
- Bound in two ways → Flat name space and hierarchal name space
- **Domain:**
  - Domain is s subtree of domain name space
  - Name of the domain is the name of the node at the top of subtree
  - Domain is itself can be divided in to subdomains
  - 

Fig. 4.6: Domains
- **Remote logging**
- Remote Logging is the process of collecting log data from multiple systems or devices and sending it to a centralized server over a network. It helps in monitoring, troubleshooting, and securing systems by analysing logs from different sources in one place.
- **World Wide Web (WWW)**
- The World Wide Web (WWW) is a system of interlinked hypertext documents accessed via the internet. It allows users to browse and interact with web pages using a web browser.
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- **2 marks questions:**
- **What is DNS and enlist needs/purpose of DNS?**
- **Enlist 3 major components of E-mail**
- **Enlist basic functions of E-mail**
- **Draw format of E-mail**
- **Functions of IMAP4**
- **Enlist different versions of IMAP**
- **4 marks questions:**
- **Describe different types of name spaces in DNS.**
- **How to map domain name with IP address**
- **Describe name server with diagram and explain its types**
- **Explain domain name resolution and mapping to physical address(VVIMP)**
- **MTA→ SMTP**

- **MAA→ POP3 or IMAP (as mentioned in questions)**
- **Explain TELNET working in details**
- **Describe www or HTTP**
- **PGP and key rings**
- **6 marks questions:**
- **Describe DNS architecture in detail.**
- **What are the types of domains? Explain domain levels in DNS**
- **Explain format of e-mail and architecture of email with 4 scenarios**
- **Describe working of SMTP with diagram**
- **Describe FTP commands and wrking**

- **Unit 5:**
- **Definitions:**
- **Wireless Technologies:**
- Wireless technologies like Wi-Fi, Bluetooth, and cellular networks allow devices to connect without physical cables.
- The term "wireless network" refers to setups where communication happens through radio waves or infrared signals.
- **SDN:**
- SDN (Software Defined Network) is an approach to the networking in which control is decoupled from hardware and given to a software application called controller.
- **OR**
- **SDN** (Software Defined Network) is a technology to networking that allows **centralised, programmable control planes** so that network operators can control, and manage directly their own virtualized networks**.**
- **NFV:**
- NFV is a modern networking approach that replaces traditional hardware-based network functions (like firewalls, routers, and load balancers) with software-based solutions.
- These functions run on standard servers or virtual machines, rather than specialized hardware.
- NFV improves flexibility, scalability, and cost-efficiency by allowing service providers to deploy and manage network services faster.
- It supports technologies like cloud computing, SDN, and IoT, and is essential for 5G infrastructure.
- **Edge Computing**
- Edge computing is a distributed computing model that processes data closer to where it's generated—such as IoT devices or local servers—rather than relying solely on centralized cloud data centres
- **Edge Networking**
- Edge networking refers to the architecture that places data processing and network resources closer to the devices generating data—at the "edge" of the network—rather than relying solely on centralized cloud servers
- **Multimedia Wireless Networks**
- Multimedia Wireless Networks are communication systems designed to transmit multimedia content—such as audio, video, and data—over wireless channels. These networks support **real-time application**s like video streaming, online gaming, and video conferencing by **ensuring** high bandwidth,

low latency, and Quality of Service (QoS). Technologies like Wi-Fi, 4G/5G, and Bluetooth play a key role in enabling seamless multimedia delivery across mobile and smart devices.

- **2 marks questions:**
- **Benefits of wireless network**
- **Challenges of wireless network**
- **Explain different models of SDN**
- **Enlist applications of wireless multimedia networks**
- **4 marks questions:**
- **What are the components in wireless networking?**
- **Explain edge networking with diagram.**
- **Write down features of 3G, 4G and 5G**
- **Explain applications of SND**
- **Explain benefits of NFV**
- **Write down applications of edge networking**
- **6 marks questions:**
- **Describe SDN architecture and working in detail**
- **Explain working of NFV and components of NFV architecture**
- **How does VOIP work explain with diagram**
- **Explain working of RTP and RSTP**