NETWORK				
S.NO	**PRIMARY TOPICS**	**SUB TOPICS**	**POINTS TO BE COVERED**	**DURATION (Theory) in MIN**
1	**Living in a Network Centric World**			
		Network Supporting the Way we live	1. Network supporting the way we live 2. Network supporting the way we learn 3. Network supporting the way we work 4. Network supporting the way we play	90
		Examples of Today's Popular communication	1. What is communication 2. Quality of communication 3. Communicating over networks 4. Examples of today's popular communication tools 5. What is converged networks 6. Advantages of network	
		Network devices	1. NIC 2. Hub 3. Repeater 4. Bridge 5. Switch 6. Router	
		Network Architecture Characteristics	1. What is network Architecture 2. What are the characteristics of network architecture (Fault Tolerance, Scalability)	
2	**Communicating over the Network**			
		Network Types	1. LAN 2. WAN 3. MAN 4. WLAN 5. SAN 6. CAN 7. PAN 8. DAN	30
		Network Topologies	1. Point-to-Point 2. Bus 3. Ring 4. Star 5. Mesh 6. Tree 7. Hybrid 9. Difference between each topologies 10 Advantages and Disadvantages over others and in each topologies	30
		Understanding the Host-to-Host Communications Model	Understanding Host-to-Host Communications 1.Older Model 2.Standard based Model	15
			The OSI Reference Model 1. Why a Layered network model 2. Befits of layered network model	15

		Layers with TCP/IP and OSI Model	1. Application layer 2. Presentation Layer 3. Session Layer 4. Transport Layer 5. Network Layer 6. Datalink Layer 7. Physical Layer **TCP/IP** 1. Application Layer 2. Transport Layer 3. Internet 4. Network Interface(Link Layer)	15
		Application Layer	1. What does the Application Layer do ? 2. Functionalities and Responsibilities of this Layer 3. Protocols used in this layer 4. Application API's	15
		Presentation layer	1. Role of Presentation Layer 2. Services provided by the Presentation Layer 3. Protocols used in this layer	15
		Session layer	1. What a Session layer will do? 2. Functionalities and Responsibilities of this layer 3. How the connections or sessions are being tracked	15
		Transport layer	1. What and Why the Transport Layer 2. Services provided by Transport Layer 3. Protocols used in this Layer 4. Elements of Transport Protocol 5. Connection less and Connection Oriented Transmission 6. Multiplexing and Demultiplexing Applications 7. TCP Congestion Control	30
		Network layer	1. What and why is Network Layer 2. Functionalities and Responsibilities of Network Layer 3. Protocols used in Network Layer 4. Devices used in Network Layer 5. Internet Protocol 6. Routing	30
		Data link layer	1. What is Datalink Layer 2. Data link Layer Functionalities 3. Sublayers of Datalink Layer 4. Framing & Addressing 5. Protocols Used in this layer 6. Datalink Layer Devices	25
		Physical layer	1. What is Physical Layer 2. Functionalities of Physical Layer 3. What is a Transmission medium 4. Protocols used in this layer	15

		Encapsulation and De-Encapsulation 1.How Encapsulation happens? 1.1 Example for encapsulation 2.How De-Encapsilation happens? 2.1 Example for De-Encapsulation		30
		Peer-to-Peer Communication 1.How exactly peer-to-peer Communication happens? 2.How the data changed in each layers? 2.1 Data 2.2 Segments 2.3 Frames 2.4 Packets 2.5 Bits		30
4	**Application Layer Functionality and Protocols**			
		The Interface Between Human and Data Networks		15
		Features, Operation, and Use of TCP/IP Application Layer Services		15
		FTP - File Transfer Protocol	What is FTP? Advantages & Limitations IN FTP	15
		TFTP - Trivial File Transfer Protocol	What is TFTP? Comparison of FTP & TFTP	15
		HTTP and HTTPS	What is HTTP? Advantages in HTTP Comparison of HTTP & HTTPS	15
		NTP - Network Time Protocol	What is NTP & HOW it works?	15
		POP3 & IMAP	1. What is POP3 & IMAP? 2. Advantages and Disadvantages of POP3 3. Advantages and Disadvantages of IMAP	
		SMTP	1. What is SMTP? 2. SMTP commands 3. SMTP limitations	
		DHCP and DNS	Introduction	
		Telnet and SSH	What is telnet? Port number used in Telnet Explanation About SSH?	15
		SNMP - Simple Network Management Protocol	What is SMTP Protocol? Advantages of SMTP Protocol	30
		SIP and RTP	What is SIP and RTP?	
		TLS	What is TLS?	

5	**OSI Transport Layer**			
		Transport Layer Role and Services	1. Explain the major role of transport layer in OSI model 3. Port Addressing 4. Port Numbers 4. What is TCP & UDP 5. TCP & UDP headers 6.What is the difference between TCP&UDP	30
		Application and Operation of TCP Mechanisms	1. TCP Segment header fields 2. TCP Connection establishment & Termination	20
		Managing TCP Sessions	1. Acknowledgement & Windowing 2. TCP conjestion and flow control 3. TCP Retransmission	20
		UDP Protocol	1. Characteristics of UDP protocol & types of communication for which it is best suited 2. Process of UDP protocol to reassemble PDU's at the destination device	30
6	**OSI Network layer**			
		Network Layer Protocols and Internet Protocol	What is network layer? Function of network layer IPV6/IPV4 , IP sec	30
		Grouping Devices into Networks and Hierarchical Addressing	IPV4 notations ? fundamentals of routes ? What is Packet forwarding ? What is default Gateway ?	20
		Fundamentals of Routes, Next Hop Addresses and Packet Forwarding	Concept of Routing ? What is host routing table and default routes?	60
7	**Addressing the Network – IPv4**			
		IP Addressing Structure	1.Introduction to IP Address 2.Explanation about octets 3.Explaining binary concepts 4.Binary to Decimal & Decimal to Binary conversions	45
		Classify and Define IPv4 Addresses	1.Name the three types of addresses in the network > Network Address > Broadband Address > Host Address 2.How to determine the network, broadcast and host addresses for a given address and prefix combination 3.Explanation about the three types of communication in the Network Layer > Unicast > Broadcast > Multicast 4.The historic method for assigning addresses and ranges > Class A > Class B > Class C > Class D > Class E 5.Explanation about Private, Public and loopback address & its ranges	60

		Assigning Address	1.Explain the importance of using a structured process to assign IP addresses to hosts and the implications for choosing private vs. public addresses 2.Explain how end user devices can obtain addresses either statically through an administrator or dynamically through DHCP 3.Explain which types of addresses should be assigned to devices other than end user devices 4.Describe the process for requesting IPv4 public addresses, the role ISPs play in the process, and the role of the regional agencies that manage IP address registries 5.Identify different types of ISPs and their roles in providing Internet connectivity 6.Identify several changes made to the IP protocol in IPv6 and describe the motivation for migrating from IPv4 to IPv6	30
		Determine the network portion of the host address and the role of the subnet mask	1.Describe how the subnet mask is used to create and specify the network and host portions of an IP address 2.Use the subnet mask and ANDing process to extract the network address from the IP address 3.Use ANDing logic to determine an outcome 4.Observe the steps in the ANDing of an IPv4 host address and subnet mask 5.Using the subnet mask to determine network address	30
		Calculating Addresses	1.Use the subnet mask to divide a network into smaller networks and describe the implications of dividing networks for network planners > How to borrow bits for subneting 2.Extract network addresses from host addresses using the subnet mask 3.Calculate the number of hosts in a network range given an address and subnet mask 4.How to calculate the network address, host addresses and broadcast address using a given subnet mask 5.Given a pool of addresses and masks, assign a host parameter with address, mask and gateway 6.Given a diagram of a multi-layered network, address range, number of hosts in each network and the ranges for each network, create a network scheme that assigns addressing ranges to each network	60

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		Testing the Network Layer	1.Describe the general purpose of the ping command, trace the steps of its operation in a network, and use the ping command to determine if the IP protocol is operational on a local host 2.Use ping to verify that a local host can communicate with a gateway across a local area network 3.Use ping to verify that a local host can communicate via a gateway to a device in remote network 4.Use tracert/traceroute to observe the path between two devices as they communicate and trace the steps of tracert/traceroute's operation 5.Describe the role of ICMP in the TCP/IP suite and its impact on the IP protocol 6. Difference between ping local address and ping loopback address	30

8	**OSI Data Link Layer**			
		Sublayers of Datalink Layer	1. Logical Link Control 2. Media Access Control 2.1Multiple Access Protocol (CSMA/CD, CSMA/CA) 2.2 Physical Addressing 2.3 Packet Switching 2.4 MAC Filtering 2.5 Store and Forward Switching or Cut through Switching 2.6 Quality of Service Control	30
		Services of Datalink Layer	1. Error Detection and Correction 3.1 Backward Error Correction (BEC) 3.2 Forward Error Correction (FEC) 2. Addressing 3. Flow Control	30
		Protocols of Datalink Layer	1. Address Resolution Protocol 2. Asynchronous transfer mode 3. PPP 4. Ethernet 5. HDLC 6. FDDI 7. Frame relay 8. MPLS	30
9	**OSI Physical Layer**			
		Physical Signaling Sublayer		10
		Functions of Physical Layer	1. Definition of Hardware Specifications 2. Encoding and Signaling 3. Data Transmission and Reception 4. Topology and Physical Network Design	15
		Services in Physical Layer	1. Bit-by-Bit Delivery 2. Transmission Medium (Twisted pair, DSL, ADSL, Coaxial, Optical, Fiber, Wireless Communication) 3. Modulation 4. Line Coding 5. Circuit Switching 6. Multiplexing 7. Carrier Sense and Collision detection 8.Equalization Filtering 9. Forward Error Correction 10. Bit interleaving	30
		Other Concerns	1. Bit rate 2. Line configuration(point to point, multipoint, point to multipoint) 3 Serial or Parallel Communication 4 Simplex, half duplex or full duplex	30

10	**TCP/IP Suite**			
		TCP/IP Suite	1.TCP/IP Stack 2.TCP/IP Stack Vs. OSI Model	90
11	**WLAN**			
		Exploring Wireless Networking	Understanding the satellite systems	
			Understanding the Paging systems	
			Difference between LAN and WLAN	
			802.11 standards	
		Implementing WLAN	BSA Wireless topology	
			ESA	
			Access point	
			Wireless Troubleshooting	