

I. **General Networking Theory**

- A. General Routing Concepts
 - 1. Link State and Distance Vector Protocols
 - 2. Split Horizon
 - 3. Summarization
 - 4. Classful and a Classless routing protocol
 - 5. Routing decision criteria
- B. Routing Information Base (RIB) and Routing Protocols Interaction
 - 1. Administrative Distance
 - 2. Routing Table
 - 3. RIB and Forwarding Information Base interaction
- C. Redistribution
 - 1. Redistribution between routing
 - 2. Troubleshooting routing loop

II. **Bridging and LAN Switching**

- A. Spanning Tree Protocol (STP)
 - 1. 802.1d
 - 2. 802.1w
 - 3. 802.1s
 - 4. Loopguard
 - 5. Rootguard
 - 6. Bridge Protocol Data Unit (BPDU) Guard
 - 7. Storm Control
 - 8. Rapid Spanning Tree Protocol (RSTP)
 - 9. Unicast flooding
 - 10. STP port roles, failure propagation and loopguard operation
- B. LAN Switching
 - 1. Trunks
 - 2. VLAN Trunking Protocol (VTP) administrative functions
- C. Ethernet
 - 1. Speed
 - 2. Duplex
 - 3. Ethernet
 - 4. Fast Ethernet
 - 5. Gigabit Ethernet

III. **IP**

- A. Addressing
 - 1. Subnetting
 - 2. Hot Standby Routing Protocol (HSRP)
 - 3. Gateway Load Balancing Protocol (GLBP)

- 4. Virtual Router Redundancy Protocol (VRRP)
- 5. Network Address Translation (NAT)
- B. Services
 - 1. Network Time Protocol (NTP)
 - 2. Dynamic Host Control Protocol (DHCP)
 - 3. Web Cache Communication Protocol (WCCP)
- C. Network Management
 - 1. Logging and Syslog

IV. IP Routing

- A. OSPF
 - 1. Standard OSPF area
 - 2. Stub area
 - 3. Totally stub area
 - 4. Not-so-stubby-area (NSSA)
 - 5. Totally NSSA
 - 6. Link State Advertisement (LSA) types
 - 7. Adjacency on a point-to-point and on a multi-access (broadcast)
 - 8. OSPF graceful restart
 - 9. Troubleshooting failing adjacency formation to fail
 - 10. Troubleshooting of external route installation in the RIB
- B. BGP
 - 1. Protocol on which BGP peers communicate
 - 2. Next Hop
 - 3. Peering
 - 4. Troubleshooting of BGP route that will not install in the routing table
- C. EIGRP
 - 1. Best path
 - 2. Loop free paths
 - 3. EIGRP operations when alternate loop free paths are available and when it is not available
 - 4. EIGRP queries
 - 5. Manual summarization
 - 6. Auto-summarization
 - 7. EIGRP Stubs
 - 8. Troubleshooting of EIGRP neighbor adjacencies
- D. Policy Routing
 - 1. Concept of policy routing

V. QoS

- A. Modular QoS command-line (MQC) applied to:
 - 1. Network-Based Application Recognition (NBAR)

2. Class-based weighted fair queueing (CBWFQ) / Modified Deficit Round Robin (MDRR)
3. Policing
4. Shaping
5. Marking
6. Random Early Detection (RED)

VI. WAN

- A. Frame Relay
 1. Local Management Interface (LMI)
 2. Traffic Shaping
 3. HUB and Spoke routers
 4. Dynamic Multipoint VPN (DMVPN)
 5. DE

VII. IP Multicast

- A. Internet Group Management Protocol (IGMP) v2
- B. Group addresses
- C. Shared Trees
- D. Source Trees
- E. Protocol Independent Multicast (PIM) Mechanic
- F. PIM Sparse Mode
- G. Auto-RP
- H. Anycast RP

VIII. Security

- A. Extended IP access lists
- B. Unicast Reverse Path Forwarding (uRPF)
- C. IP Source Guard
- D. Context Based Access Control (CBAC)

IX. MPLS (New)

- A. Label Switching Router (LSR)
- B. Label Switched Path (LSP)
- C. Route Descriptor
- D. Label Format
- E. Label imposition/disposition
- F. Label Distribution

- X. **IPv6 (New)**
 - A. IPv6 Addressing and types
 - B. IPv6 Neighbor Discovery
 - C. Basic IPv6 functionality protocols
 - D. IPv6 Multicast and related Multicast protocols
 - E. Tunneling Techniques
 - F. OSPFv3
 - G. EIGRPv6