(1) a) i) Network address is 109.64.0.0 and subnet mask is 255.192.0.0

ii) Host bit = 32 − 10 = 22

Host size = $2^{22} - 2 = 4194302$

b) LAN 2000 — 109.64.0.0/21

LAN 1400 — 109.64.8.0/21

WAN 1 — 109.64.16.0/30

WAN 2 — 109.64.16.4/30

WAN 3 — 109.64.16.8/30

(2) a) "TTL = 104" means initial TTL was 128 and the router crossed 24 hops

b) Given, header size = 35 bytes fragment size = 2883 bytes

i) Data per fragment = 2883 − 35 = 2848 bytes

Original datagram data size = 2848 × 10 = 28480 bytes.

ii) Offset = 2848/8 = 356

iii) If the value of MF is 0, then it is the last packet in a group of fragmented packets.

c) The reasons for which the packet is unable to reach R3 are — DHCP discover is a broadcast and ~~since~~ R3 is on different subnet, routers donot forward broadcasts. Configuring DHCP relay on router interface is the solution to the problem.

3) a) i) The algorithm used in this topology is Link state Routing.

ii) Shortest path from node 5 are

Node 4 — cost 1 — Path 5→4

Node 6 — cost 2 — Path 5→6

Node 8 — cost 6 — Path 5→8

Node 2 — cost 8 — Path 5→8→2

Node 1 — cost 11 — Path 5→4→1

b) Link state decides to send LSP when costs changes and periodic timer expires.

c) In distance vector algorithm there is no exchange of hello packets because neighbors are learned via routing updates.

CamScanner

(4) a) ip route 100.9.128.128 255.255.255.224 191.20.255.193

b) Static route with AD = 5

ip route 100.9.128.128 255.255.255.224 S1/1, 5

floating static route

ip route 100.9.128.128 255.255.255.224 10

c) This way is not recommended because it depends on next hop resolution and has extra recursive lookup.

It will be more efficient if

ip route 21.1.64.0 255.255.255.192 S0/1

(5) a) IPV6 handles a packet that requires fragmentation by using fragment extention header by source after the router drops the packet and sends message back to the source.

A router using IPV6 can add extra information through routing header, fragment header, hop-hop option header by replacing with Extension headers.

b) IPV6 doesnot support broadcast. It uses multicast to send packets.

c) DHCP V6 stateful ~~assignment~~ doesnot require method DAD as it has unique IPV6 address. Since uniqueness is gaurantee centrally DAD is not required.

6) a) Two parts of MAC addresses are - Organisationally unique identifier (24 bits) and NIC specific part (24 bits)

The bit 0 of MAC address signifies unicast and bit 1 signifies Multicast.

b) No, as host D is on different network host A will not find its MAC address in ARP table.

The devices Host B, Host C, SW1 and R1 will receive ARP request. ~~and sw1~~ Switch will flood ARP and C will reply its MAC address.

c) SW1 - Destination MAC is known, frame unicasted to SW1
SW2 - Destination unknown, frame flooded all ports exept incoming
Host D receives frame and learns host A's MAC.

Updated MAC tables

	MAC add.	Port
SW1	Host A	fa 0/1
	Host D	fa 0/3
SW2	Host A	fa 0/1