Ans to the question no. 01

a) Given, First usable = 109.64.0.1

i) Network Address = 109.64.0.0

Second last usable = 109.127.255.253

∴ broadcast = 109.127.255.255

Now, 64 = 01 000000

127 = 01111111

They share first 2 bits (01). and first octate is fixed 109 (8 bits).

∴ prefix length = 8+2 = /10.

∴ Network Address = 109.64.0.0/10

and mask = (255.192.0.0).

ii) Host bits = 32 - 10 = 22

Total address = 2^{22} = 4194304

Usable = 4194304 - 2

= 4194302

(b)

For LAN1, minimum host bit = 11 (2^{11} = 2048)

usable = 2046 prefix = /21

For LAN2, usable = 2046, prefix = /21

For 4 routers, usable = 6, prefix = /29

For WAN Link, usable = 2, prefix = /30

Now,

in LAN1 waste = 2046 - 2000 = 46

" Lan2 " = 2046 - 1400 = 646

" 4 routers " = 6 - 4 = 2

"WAN " = 2 - 2 = 0

∴ Total waste = 96+696+270

= 694 addresses

~~This the optimal (Ans:)~~

∴ Subnet Address = 109.64.0.0/21

109.64.8.0/21

109.64.16.0/29

109.64.16.8/30

(Ans:)

Ans to the question no. 02

(a)

TTL = 104, means, when the reply reached your computer, its remaining hop limit was 104. The routers that forwards the packet decrements TTL by 1. If TTL reaches 0, the packet is discarded.

(b)

i) For each of the 10 MF = 1 fragments.

Data = 2883 − 35 = 2848 bytes.

Total data carried by those 10 fragments

10 × 2848 = 28,480 bytes

For the last (MF=0) fragment

Data = 985 − 35 = 950 bytes.

∴ Original datagram data size = 950 + 28480 = 29430.

ii) Fragment 1 data length = 2848 bytes.

So fragment 2 starts at by number 2848.

offset field = 2848/8

= 356

Ans:)

iii) In IPV4 fragmentation, the last fragment is identified by

MF (More Fragments) flag = 0

∴ MF = 0.

c) Because no DHCP relay configured on the router interface that recieves PC 1's broadcast. So the DHCP Discover never gets converted to a unicast and forwarded to R3.

Solution: configure DHCP relay on R2 g1 pointing to the DHCP server address on R3.

Ans to the question no. 03

a)

i) Dijkstra's Shortest Path First algorithm.

ii) Shortest path from 5.

1) 5 - 4 cost = 1
2) 5 - 6 " = 2
3) 5 - 4 - 8 " = 4
4) 5 - 6 - 2 " = 6
5) 5 - 8 " = 6

b) A router sends LSP when it has newer information than the neighbour.

c) Because it don't require separate "hello" because neighbour discovery are typically inferred from the periodic reception of routing updates.

Ans to the question no. 04

a) ip route 100.9.128.255.255.255.224

112.191.63.3

b) ip route 100.9.128.128 255.255.255.224 s1/1 5

Backup.

ip route 100.9.128.128 255.255.255.224

191.20.255.194.10

c) Because next hop is on a pointtopoint so, specifying only only a next-hop causes an extra recursive lookup.

Solution.

ip route 21.1.64.0 255.255.255.192 s0/0.

Ans to the question no.05

a) ~~If fragmentation is needed in IPV6 the drop routers~~

a) By adding extra informations in IPV6 by using Extension Headers.

b) Use multicast instead.

c) For DHCPV6 stateful assignment DAD is not required because the servers ensures it does not lease duplicate addresses.

Ans to the question no. 6

a) Two parts of a MAC address:

OUI (first 24 bits) + NIC/device identifier (last 24 bits)

LSB of the first bit (bit 0)

if 0 then unicast,

if 1 then multicast.

b) No. ARP broadcasts don't cross routers; A will learn R1's MAC, not D's.

SW1 will recieved the ARP request and floods it out all ports except A's port. B, C and R1 recieves it. and C will reply with an ARP reply.

c) First sw1 learns A's MAC address on A's port & floods out all the other ports. And sw2 recieves frame on uplink; learns A's MAC on uplink port and destination floods to C and D ports.

Updated MAC table will be:

sw1 MAC table: A → port to A (unchanged)

sw2 MAC table: A → (uplink port towards sw1)