1)

I) Given Broadcast address 7.16.255.191/18

2^{14} / 2^{13} 2^{12} 2^{11} ...

∴ Network address

7.16.192.0/18

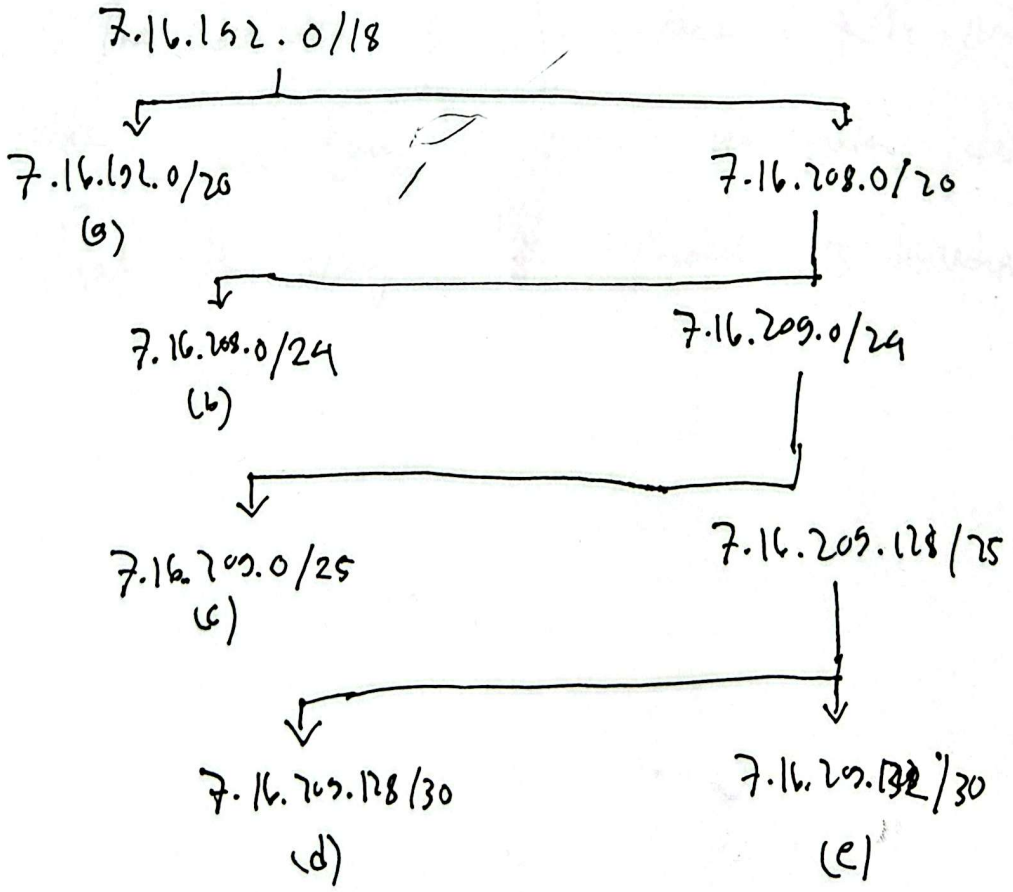
subnet 255.255.192.0

AND 7.16.192.0/18

18 20 24 25 30

7.16.11 00 0000 0000 0000

			Host	Prefix
a	2500	2512	4096	12	20
b	125	130	256	8	24
c	64	66	128	7	25
d	2	4	4	2	30
e	2	4	4	2	30



III) For R_4 64+1=65 nos

$2^7-2=126$

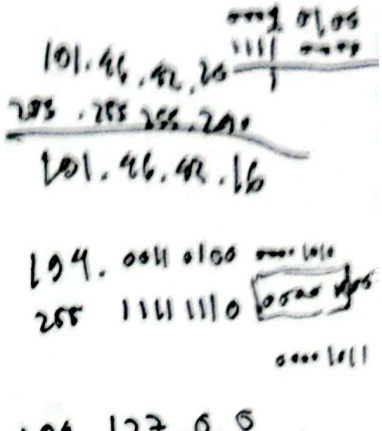
126−65 = 61

2)

1) For R_3: a) 191.46.42.16/28

b) 194.[illegible].0.0/15

c) 191.54.20.124/25



II) ip route 192.[illegible].12 255.255.255.252 s0/0/0 50

III) ip route 0.0.0.0.0.0.0.0. 192.64.52.2

IV) Any value greater than 1 will be applicable

V) The destination is not present in R4's routing table and there is also no gateway default. That is why the packet is discarded

3) Packet with header = 2584 ∴ Data = 2584-32

I) Header = 32 bytes

= 2552

9th packet

Size = 272 MF=1 ∴ data = 272-32 = 240

∴ MTU = 240 bytes + 32 bytes = 272 bytes

II) First packet offset = $0 \times \frac{240}{8}$

∴ 7th packet = $6 \times \frac{240}{8} = 180$

∴ offset = 180

III) Total data size = 2584 - 32 = 2552

MTU = 272 - 32 = 240

∴ Packets need = $\frac{2552}{240} = 10.63$

$= 11$

∴ 11 fragment packets are needed.

4]

R2 will know by:-

i) Physically connected to other nets

ii) Periodic updates

ii) Discovery neighbors

iv) Share routing table

Info from 1st Router.

i) Directly connected networks

ii) Total cost metrics

5]

1) 2001 : 0db8 : 12af : 0000 : 0000 : 0a20 : 0004

Remove leading zeros: 2001 : db8 : 12af : 0 : 0 : 0 : a20 : 4

= 2001 : db8 : 12af : : a20 : 4

Purpose: Global Unicast

II) : : 1

Loopback address used by a device to send network traffic to itself.

6)

I) Two possible reasons:-

i) Missing default gateway

ii) Access Control List Restricted

II) Yes using tracing tools it is possible

a) Packets are sent with increasing TTL (time to live)

b) If stops at first few hops means its inside the campus

c) If passes through all campus routers means any external network misconfiguration

Pings are used to keep test for it.

7)

I) For 13 bit 2^{13} (8192) possible ways are there. Each state represents. $8192 \times 8 =$ 6536 where frame allows with the IPv4 packet

I2) Purpose of Identification field is to identify all fragments belong to the same original packet

8)

I) 2) PC does not yet know its IP address or even the existence of DHCP server on the local network

2) It can do Unicast as it does not have any desired IP.

II) Response of DHCP server -

1) Proposed IP address
2) Subnet Mask
3) Default gateway
4) DNS server address

It sent by broadcasting a DHCP request message.

9)

I) The receiver cannot access the server because private IP address like 10.10.5.50 are not routable on the public internet.

II) The network admin should set up port forwarding so that the incoming traffic is directly forwarded to the designated server.

10)

IPv6 efficiency:-

i) Fixed header length

ii) No header checksum

iii) No router side fragmentation

12) Significance of Plug and Play

a) Self Learning devices

b) No manual configuration

c) Automatically detects the MAC address

11)

I) Packet Type: ARP request Source MAC: AA-AA-AA-AA-AA-AA

Destination MAC: FF-FF-FF-FF-FF-FF

Switch process:-

a) S2 receives from on port F1

b) S2 receives the flooded frame on F3.