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Q1

Here,

IpV4 : 200.100.50.25 /12

octets 4

Subnet calculation: /12

11111111.11110000.00000000.00000000

Subnet mask:

255.240.0.0

Network address

IP	Mask	Network
200	255	200
100	240	96
50	0	0
25	0	0

Network adress → 200.96.0.0

Block size = 256 − 240 = 16

network range is 200.96.0.0 to 200.111.255.255

∴ The broadcast adress is 200.111.255.255

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But second last usable is 200.111.255.253 → This is the default gateway

∴ Network address = 200.96.0.0

Default Gateway = 200.111.255.253

b) For efficiency there are 8 devices so need 8 so

$2^3 = 8$

New prefix = 12 + 3 = /15

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b) Range

200.96.0.0 → 200.111.255.255

First network

200.96.0.0 /13

Subnet mask

255.248.0.0

For second octale

256 - 248 = 8

Network	Mask	increment	
200.96.0.0	/13	8	256-248
200.96.8.0	/21	8	256-248
200.96.9.0	/24	256	256-0
200.96.9.128	/25	128	256-128
200.96.10.0	/26	64	256-192
200.96.10.64	/27	32	256-224

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Q_2

a) Fragment size = 268 bytes

Header = 20 bytes

Data per fragment = 248 bytes

offset = 186

offset unit = 8 bytes

I) Original packet size

offset for 7th fragment = 186 × 8 = 1488 bytes

Data per fragment = 248 bytes = last fragment

∴ Total data = 1488 + 248 = 1736 bytes

Now.

original packet size = header + Total data

= 20 + 1736

= 1756 bytes

DHAKA BD SCHOOL SHOP

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II) MTU = data + header

= 248+20 = 268 bytes

5th fragment offset = (248×4)/8 = 124

III) The MF value of 7th fragment is 0

b) I) There is a subnet mismatch here

DHCP Pool is : 255.255.254.0

but interface is 255.255.255.0

Invalid default gateway (1.1.0.255)

II) we should add

ip helper-address 1.1.3.0

This will fix the inconsistent subnet mask

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Q3) a)

I) The algorithm used here is Dijkstra's algorithm

A → F = 4	$N' = \{A\}$
A → E = 9	d(C) = 2
A → B = 5	d(F) = 4
E → B = 3	d(B) = 5
E → F = 3	d(E) = 9
E → G = 2	A → C
E → D = 9	d(D) = min(∞, d(C)+4) = 2+4 = 6
D → C = 4	
A → C = 2	A to 4 nodes
F → I = 1	A → C = 2
I → J = 2	A → F = 4
J → K = 3	A → B = 5
K → H = 8	A → I = 5
H → G = 2	
F → G = 4	

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b) Link state is better because for this each router has a link state database, runs SPF locally to calculate accurate shortest path also converges faster

c) Count to infinity.

4.a)

I) Recursive default route:

ip route 0.0.0.0 0.0.0.0 1.1.1.2

II) Backup route:

ip route 0.0.0.0 0.0.0.0 1.1.2.2 10

b) 1) given;

1.1.0.224/29 ~~2.1.1.221~~

1.1.0.232/29

1.1.0.240/29

1.1.0.248/29

ip route 1.1.0.224 255.255.255.224 1.1.1.1

II) Here we can lower the number of routes used here by summerizing. But if any of the route is missing there is a chance of losing the data

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(c)

Here,

S = static route

* = candidate default route

0.0.0.0/0 = default route

Usually static route AD = 1. As we manually configured here, as a floating static route with AD = 50, so it is used only when another preferred route is un available.

5) a) Multicast start with FF

IPV4 broadcast → IPV6 FF02::1

b) IPV6 header = fixed 40 bytes

for 20 bytes extra

40 + 20 = 60 bytes

c) Here,

No DAD because server assigns unique adress

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6)

a) First octet A2(hex) = 1010 0010

bits

b7	b6	b5	b4	b3	b2	b1	b0
1	0	1	0	0	0	1	0

b1 (U/L bit) = 1

As it is 1 ∴ its locally administered. It is portable because its software defined.

b) Destination MAC for ARP request.

MAC = FF:FF:FF FF:FF:FF

Here switch recieves ARP from port 1, floods the devices with broadcast.

Sent to ports : 2, 3, 4

Source MAC to Host A as Host A is not at the table

71 : 2B : 13 : 45 : 61 : 41 → Port 1

Others remain unchanged