

Answer no-1

a)

Given, IPv4 address = 17.50.96.81

Subnet = 255.255.128.0

i)

Network address = 17.50.0.0

Broadcast address = 17.50.127.255

ii) Usable IP range : 17.50.0.1 to 17.50.127.254

1st usable IP is 17.50.0.1

2nd " " is 17.50.0.2 (Default gateway)

b)

	constraints	Prefix	Subnet Address
S-One (512 hosts)	$n=10$ bits	/22	17.50.0.0/22
S-Three (254 hosts)	$n=9$ bits	/23	17.50.4.0/23
S-Three (13 hosts)	$n=4$ bits	/28	17.50.6.0/28

For Routers to Routers total (4 links, 2 hosts each).

constraint,  $n=2$  bits Prefix = /30.

Link 1 : 17.50.6.16/30

Link 2 : 17.50.6.20/30

Link 3 : 17.50.6.24/30

Link 4 : 17.50.6.28/30

## Answer no-2

Q ①

First problem is the network command  $10.10.1.1\ 255.255.255.0$  uses a host IP instead of a network address. Instead we can use network  $10.10.1.0\ 255.255.255.0$ .

second problem is the web server has a static IP of  $10.10.1.253$  which is not excluded from the DHCP pool, leading to IP problems. Solution is IP dhcp excluded-address  $10.10.1.253$ .

①② Setup the DHCP relay with R-THREE, interface: Gig0/0.

①③ If there had been a wan link between R-one and R-three the setup interface would not be different because the DHCP relay agent must always be configured on the interface of the router acting as the default gateway for the client LAN to capture broadcast Discover packets.

⑥ ① 8th fragment  $(230 - 22) = 208$  bytes

Before 8th fragment  $(\text{Offset} \times 8) = 182 \times 8 = 1456$  bytes.

$\therefore$  Total data :  $1456 + 208 = 1664$  bytes.

$\therefore$  Intact Packet size =  $1664 + 22 = 1686$  bytes.

(ii)

Since Fragments are equal size, MTU is the size of the largest fragment.  $MTU = 230$  bytes.

Total data before 6th fragment is  $208 \times 5 = 1040$  bytes.  
Offset is  $1040/8 = 130$ .

(iii)

MF for 6th fragment is 1 indicating more fragments follow as this is the 6th of 8 fragments.

### Answers no-3

Q (i) The name of the algo is Distance Vector Routing.

(ii) 1 Iteration E is not sending any updates to A.

$$D(A, B) = 5$$

$$D(A, C) = 2$$

$$D(A, D) = 6$$

$$D(A, F) = 4$$

$$D(A, E) = 9$$

Q (b) Link state algo neighbours tracking to maintain an accurate Link State Database.

② Routers only know the distance to a destination via a neighbour without knowing the full topology. So, Distance Vector algo may fail to show the real shortest path.

### Answer no-4

① Directly Attached Route for R4 LAN on R1 The R4 LAN network is 1.1.0.0/24.

Target Network: 1.1.0.0

Subnet Mask: 255.255.255.0

Exit Interface: S0

Administrative Distance AD: 5

Command ip route 1.1.0.0 255.255.255.0 S0 5

①① The alternative path from R1 to R4 is switch S1.

Command ip route: 1.1.0.0 255.255.255.0 1.1.2.1/10

② If a router does not have a static default route (0.0.0.0/0) and does not have a specific route for a destination network

in its routing table, it will drop the packet and send an ICMP message back to the source.

①  $\rightarrow 10.0.0.1 [50/0]$  via  $17.69.66.2$

Here "0" represents the metric of a static route as the cost is not calculated by a dynamic protocol.

50 indicates a Floating static route whereas 1 represents a default static route.

### Answers no-5

① In Multicast a packet is delivered to all devices belonging to the group.

In Anycast a packet is delivered to the single nearest device.

Any cast is used in DNS to route queries to the geographically closest DNS servers to reduce latency.

⑥ IPV6 do not fragment packets rather it drops a packet if the size exceeds the MTU.

⑦ SLAAC is stateless because no servers like DHCP maintains a record of which IP is assigned to which host.