PRACTICAL NO.1

A) AIM:- Single-Area OSPF Link Costs and Interface Priorities.

CODE:-

R1# configure terminal

R1(config)# interface Loopback1

R1(config-if)# description Engineering Department R1(config-if)

ip address 10.1.1.1 255.255.255.0

R1(config-if)# exit

R1(config)# interface FastEthernet0/0

R1(config-if)# ip address 10.1.200.1 255.255.255.0

R1(config-if)# no shutdown

R2# configure terminal

R2(config)# interface Loopback2

R2(config-if)# description Marketing Department

R2(config-if)# ip address 10.1.2.1 255.255.255.0

R2(config-if)# exit

R2(config)# interface FastEthernet0/0

R2(config-if)# ip address 10.1.200.2 255.255.255.0

R2(configif)# no shutdown

R3# configure terminal

R3(config)# interface Loopback3

R3(config-if)# description Accounting Department

R3(config-if)# ip address 10.1.3.1 255.255.255.0

R3(config-if)# exit

R3(config)# interface FastEthernet0/0

R3(config-if)# ip address 10.1.200.3 255.255.255.0

R3(config-if)# no shutdown

R1(config)# interface Serial 0/0/0

R1(config-if)# ip address 10.1.100.1 255.255.255.0

R1(config-if)# clockrate 64000 R1(configif)# bandwidth 64

R1(config-if)# no shutdown

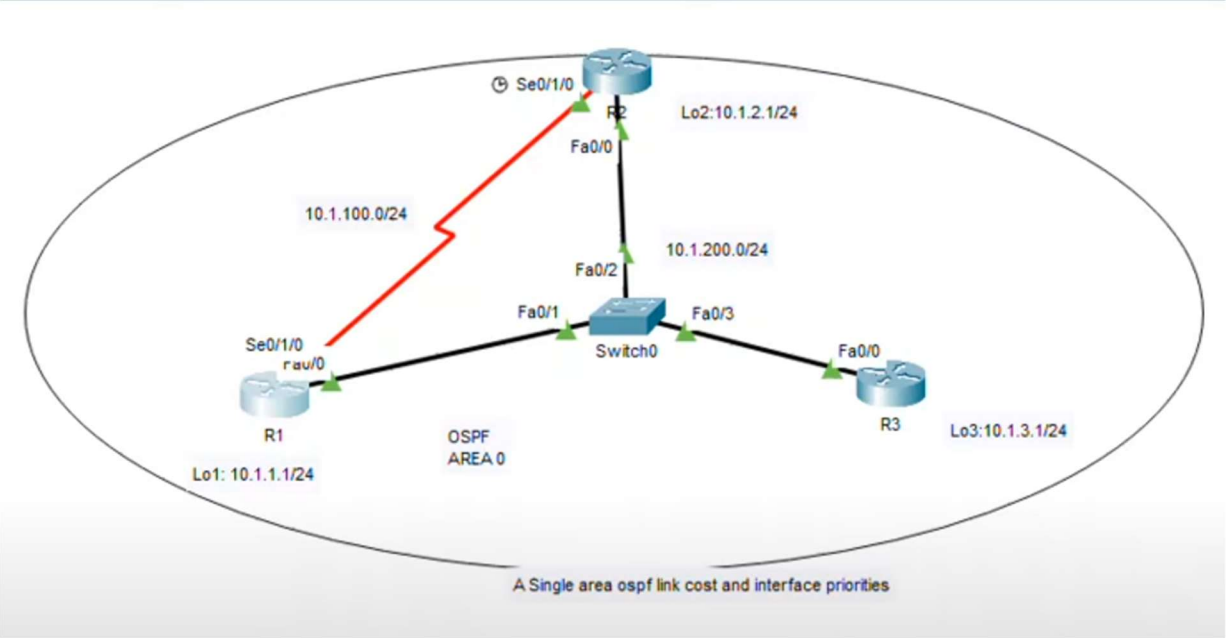
R2(config)# interface Serial 0/0/0

R2(config-if)# ip address 10.1.100.2 255.255.255.0

R2(config-if)# bandwidth 64

R2(config-if)# no shutdown

OUTPUT:-



A Single area ospf link cost and interface priorities

B) AIM:- Multi-Area OSPF with Stub Areas and Authentication.

CODE:-

R1# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

R1(config)# interface loopback 1

R1(config-if)# description Engineering Department

R1(config-if)# ip address 10.1.1.1 255.255.255.0 R1(configif)# interface serial 0/0/0

R1(config-if)# ip address 10.1.12.1 255.255.255.0

R1(config-if)# clockrate 64000

R1(config-if)# no shutdown

R2# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

R2(config)# interface loopback 2

R2(config-if)# description Marketing Department

R2(config-if)# ip address 10.1.2.1 255.255.255.0 R2(configif)# interface serial 0/0/0

R2(config-if)# ip address 10.1.12.2 255.255.255.0

R2(config-if)# no shutdown

R2(config-if)# interface serial 0/0/1

R2(config-if)# ip address 10.1.23.2 255.255.255.0

R2(config-if)# clockrate 64000

R2(config-if)# no shutdown

R3# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

R3(config)# interface loopback 3

R3(config-if)# description Accounting Department

R3(config-if)# ip address 10.1.3.1 255.255.255.0 R3(configif)# interface loopback 20

R3(config-if)# description Connection to another AS

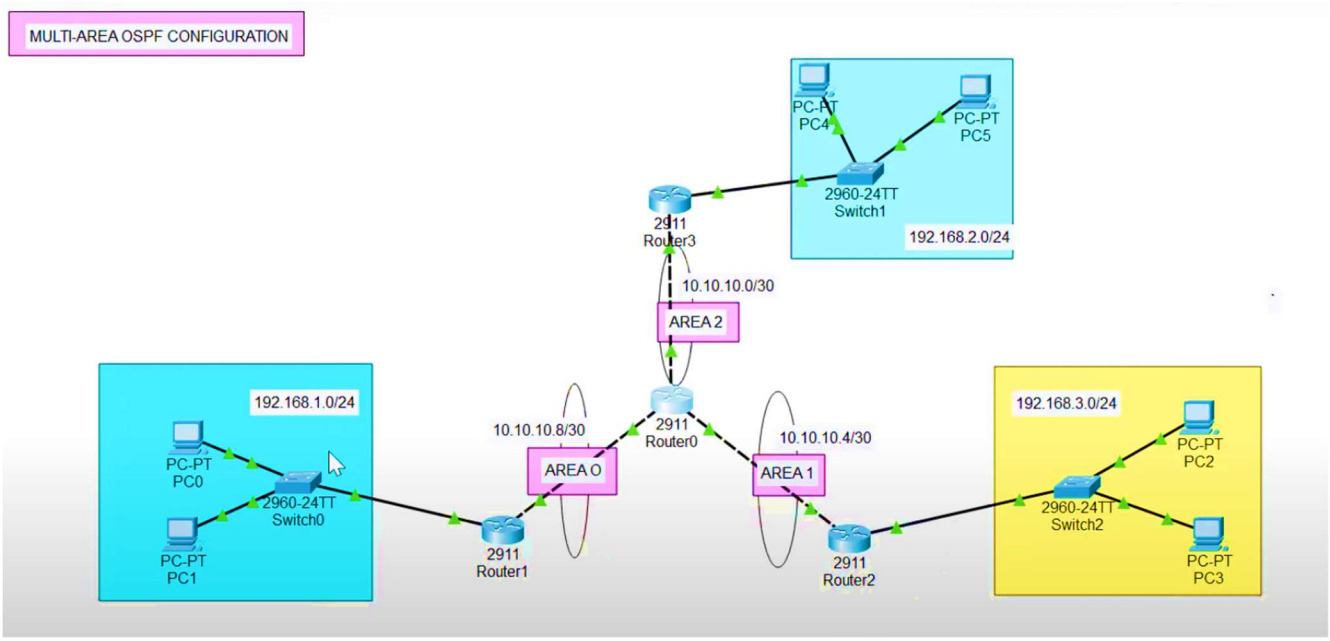
R3(config-if)# ip address 172.20.200.1 255.255.255.0

R3(config-if)# interface serial 0/0/1

R3(config-if)# ip address 10.1.23.3 255.255.255.0

R3(config-if)# no shutdown

OUTPUT:-



PRACTICAL NO.2

A) AIM:- OSPF Virtual Links and Area Summarization.

CODE:-

R1# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

R1(config)#interface loopback 1

R1(config-if)# description Engineering Department

R1(configif)# ip address 10.1.1.1 255.255.255.0

R1(config-if)# interface loopback 30

R1(config-if)# ip address 172.30.30.1 255.255.255.252

R1(config-if)# interface serial 0/0/0

R1(config-if)# ip address 10.1.12.1 255.255.255.0

R1(config-if)# clockrate 64000

R1(config-if)#no shutdown

R2# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

R2(config)# interface loopback 2

R2(config-if)# description Marketing Department

R2(config-if)# ip address 10.1.2.1 255.255.255.0

R2(configif)# interface serial 0/0/0

R2(config-if)# ip address 10.1.12.2 255.255.255.0

R2(config-if)# no shutdown

R2(config-if)# interface serial 0/0/1

R2(config-if)# ip address 10.1.23.2 255.255.255.0

R2(config-if)# clockrate 64000

R2(config-if)# noshutdown

R3# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

R3(config)# interface loopback 3

R3(config-if)# description Accounting Department

R3(config-if)# ip address 10.1.3.1 255.255.255.0

R3(config-if)# interface loopback 100

R3(config-if)# ip address 192.168.100.1 255.255.255.0

R3(config-if)# interface loopback 101

R3(config-if)# ip address 192.168.101.1 255.255.255.0

R3(config-if)# interface loopback 102

R3(config-if)# ip address 192.168.102.1 255.255.255.0

R3(config-if)# interface loopback 103

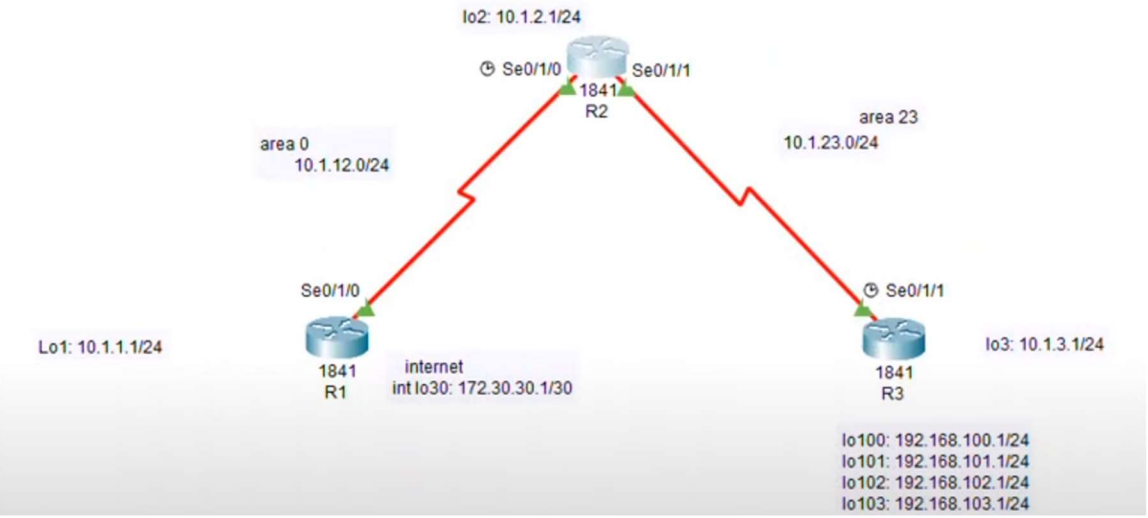
R3(config-if)# ip address 192.168.103.1 255.255.255.0

R3(config-if)# interface serial 0/0/1

R3(config-if)# ip address 10.1.23.3 255.255.255.0

R3(config-if)# no shutdown

OUTPUT:-



B) AIM:- OSPF over Frame Relay.

CODE:-

Router R1 (Hostname HQ)

Router# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)# hostname HQ

HQ(config)# interface loopback 1

HQ(config-if)# ip address 10.1.1.1 255.255.255.0

HQ(configif)# interface serial 0/0/1

HQ(config-if)# ip address 10.1.123.1 255.255.255.0

HQ(config-if)# encapsulation frame-relay ietf

HQ(config-if)#no frame-relay inverse-arp

HQ(config-if)# frame-relay map ip 10.1.123.1 102

HQ(config-if)# frame-relay map ip 10.1.123.2 102

HQ(config-if)# frame-relay map ip 10.1.123.3 103

HQ(config-if)# no shutdown

Router R2 (Hostname EAST)

Router# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)# hostname EAST

EAST(config)# interface loopback 2

EAST(config-if)# ip address 10.1.2.1 255.255.255.0

EAST(config-if)# interface serial 0/0/1

EAST(config-if)# ip address 10.1.123.2 255.255.255.0

EAST(config-if)# clock rate 64000

EAST(config-if)# encapsulation frame-relay ietf

EAST(configif)# no frame-relay inverse-arp

EAST(config-if)# frame-relay map ip 10.1.123.1 201

EAST(config-if)# frame-relay map ip 10.1.123.2 201

EAST(config-if)# frame-relay map ip 10.1.123.3 201

EAST(config-if)# no shutdown

EAST(config-if)# interface FastEthernet 0/0

EAST(config-if)# ip address 10.1.23.2 255.255.255.0

EAST(config-if)# no shutdown

Router R4 (Hostname WEST)

Router# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)# hostname WEST

WEST(config)# interface loopback 3

WEST(config-if)# ip address 10.1.3.1 255.255.255.0

WEST(config-if)# interface serial 0/0/0

WEST(config-if)# ip address 10.1.123.3 255.255.255.0

WEST(config-if)# encapsulation frame-relay ietf

WEST(configif)# no frame-relay inverse-arp

WEST(config-if)# frame-relay map ip 10.1.123.1 301

WEST(config-if)# frame-relay map ip 10.1.123.2 301

WEST(config-if)# frame-relay map ip 10.1.123.3 301

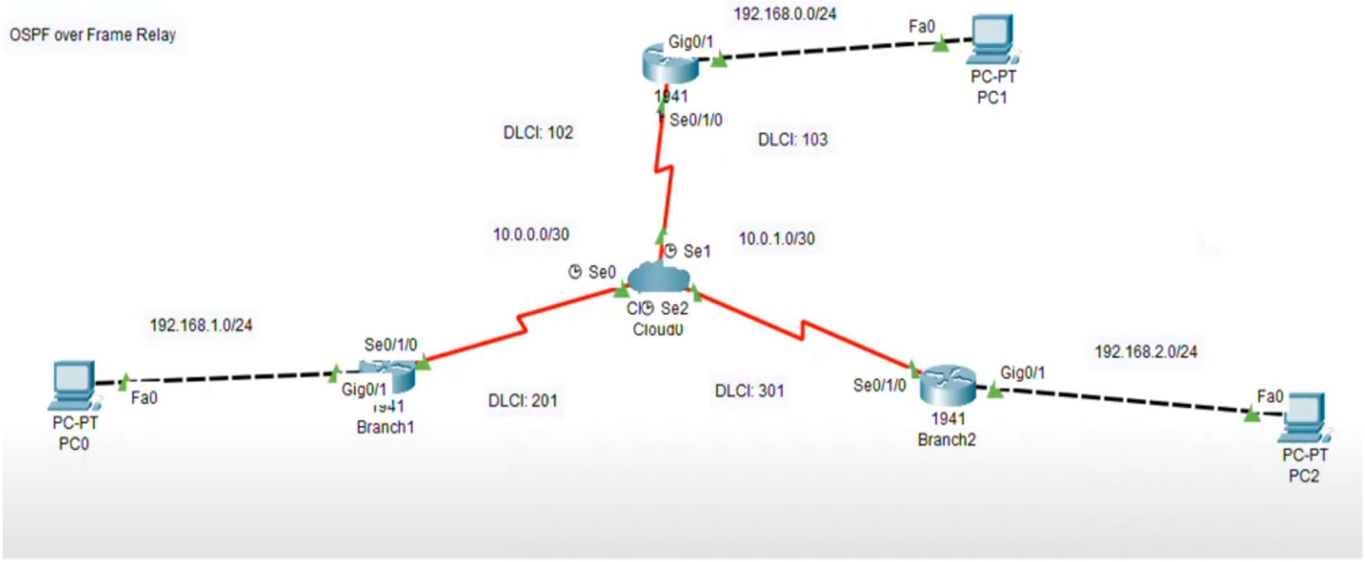
WEST(config-if)# no shutdown

WEST(config-if)# interface FastEthernet 0/0

WEST(config-if)# ip address 10.1.23.3 255.255.255.0

WEST(config-if)# no shutdown

OUTPUT:-


OSPF over Frame Relay
192.168.0.0/24
Fa0
Gig0/1
1941
PC-PT
PC1
Se0/1/0
DLCI: 102
DLCI: 103
10.0.0.0/30
10.0.1.0/30
Se1
Se0
Cloud0
Se2
192.168.1.0/24
Se0/1/0
192.168.2.0/24
Fa0
Gig0/1
Fa0
PC-PT
PC0
Gig0/1
1941
Branch1
DLCI: 201
DLCI: 301
Se0/1/0
Gig0/1
1941
Branch2
Fa0
PC-PT
PC2

PRACTICAL NO. 3

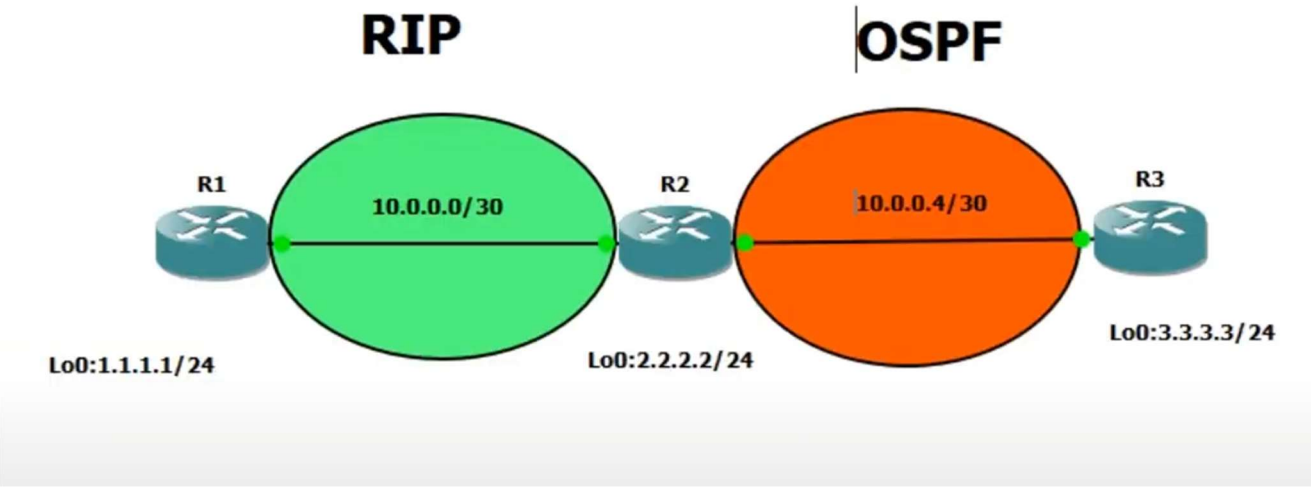
A) AIM:- Redistribution Between RIP and OSPF.

CODE:-

```
R1(config)# interface Loopback0
R1(config-if)# ip address 172.16.1.1 255.255.255.0
R1(config-if)# interface Loopback48
R1(config-if)# ip address 192.168.48.1 255.255.255.0
R1(config-if)# interface Loopback49
R1(config-if)# ip address 192.168.49.1 255.255.255.0
R1(config-if)# interface Loopback50
R1(config-if)# ip address 192.168.50.1 255.255.255.0
R1(config-if)# interface Loopback51
R1(config-if)# ip address 192.168.51.1 255.255.255.0
R1(config-if)# interface Loopback70
R1(config-if)# ip address 192.168.70.1 255.255.255.0
R1(config-if)# interface Serial0/0/0
R1(config-if)# ip address 172.16.12.1 255.255.255.0
R1(config-if)# clock rate 64000
R1(configif)# bandwidth 64
R1(config-if)# noshutdown
R2(config)# interface Loopback0
R2(config-if)# ip address 172.16.2.1 255.255.255.0
R2(config-if)# interface Serial0/0/0
R2(config-if)# ip address 172.16.12.2 255.255.255.0
R2(config-if)# bandwidth 64
R2(config-if)# no shutdown
```

```
R2(config-if)# interface Serial0/0/1
R2(config-if)# ip address 172.16.23.2 255.255.255.0
R2(config-if)# clock rate 64000
R2(configif)# bandwidth 64
R2(config-if)# noshutdown
R3(config)# interface Loopback0
R3(config-if)# ip address 172.16.3.1 255.255.255.0
R3(configif)# interface Loopback20
R3(config-if)# ip address 192.168.20.1 255.255.255.0
R3(config-if)# interface Loopback25
R3(config-if)# ip address 192.168.25.1 255.255.255.0
R3(config-if)# interface Loopback30
R3(config-if)# ip address 192.168.30.1 255.255.255.0
R3(config-if)# interface Loopback35
R3(config-if)# ip address 192.168.35.1 255.255.255.0
R3(config-if)# interface Loopback40
R3(config-if)# ip address 192.168.40.1 255.255.255.0
R3(config-if)# interface Serial0/0/1
R3(config-if)# ip address 172.16.23.3 255.255.255.0
R3(config-if)# bandwidth 64
R3(config-if)# noshutdown
```

OUTPUT:-


RIP
OSPF
R1
10.0.0.0/30
R2
10.0.0.4/30
R3
Lo0:1.1.1.1/24
Lo0:2.2.2.2/24
Lo0:3.3.3.3/24

B) AIM:- Manipulating Administrative Distances.

CODE:-

```
R1# conf t
R1(config)# interface loopback 1
R1(config-if)# ip address 172.16.1.1 255.255.255.0
R1(config-if)# interface loopback 101
R1(config-if)# ip address 192.168.101.1 255.255.255.0
R1(config-if)# interface fastethernet 0/0
R1(config-if)# ip address 172.16.12.1 255.255.255.0
R1(config-if)# no shutdown
R1(config-if)# interface serial 0/0/1
R1(config-if)# bandwidth 64
R1(config-if)# ip address 172.16.13.1 255.255.255.0
R1(configif)# no shutdown
R2# conf t
R2(config)# interface loopback 2
R2(config-if)# ip address 172.16.2.1 255.255.255.0
R2(configif)# interface loopback 102
R2(config-if)# ip address 192.168.102.1 255.255.255.0
R2(config-if)# interface fastethernet 0/0
R2(config-if)# ip address 172.16.12.2 255.255.255.0
R2(config-if)# no shutdown
R2(config-if)# interface fastethernet 0/1
R2(config-if)# ip address 172.16.23.2 255.255.255.0
R2(configif)# no shutdown
```

R3# conf t

R3(config)# interface loopback 3

R3(config-if)# ip address 172.16.3.1 255.255.255.0

R3(config-if)# interface loopback 103

R3(config-if)# ip address 192.168.103.1 255.255.255.0

R3(config-if)# interface fastethernet 0/0

R3(config-if)# ip address 172.16.23.3 255.255.255.0

R3(config-if)# no shutdown

R3(config-if)# interface serial 0/0/0

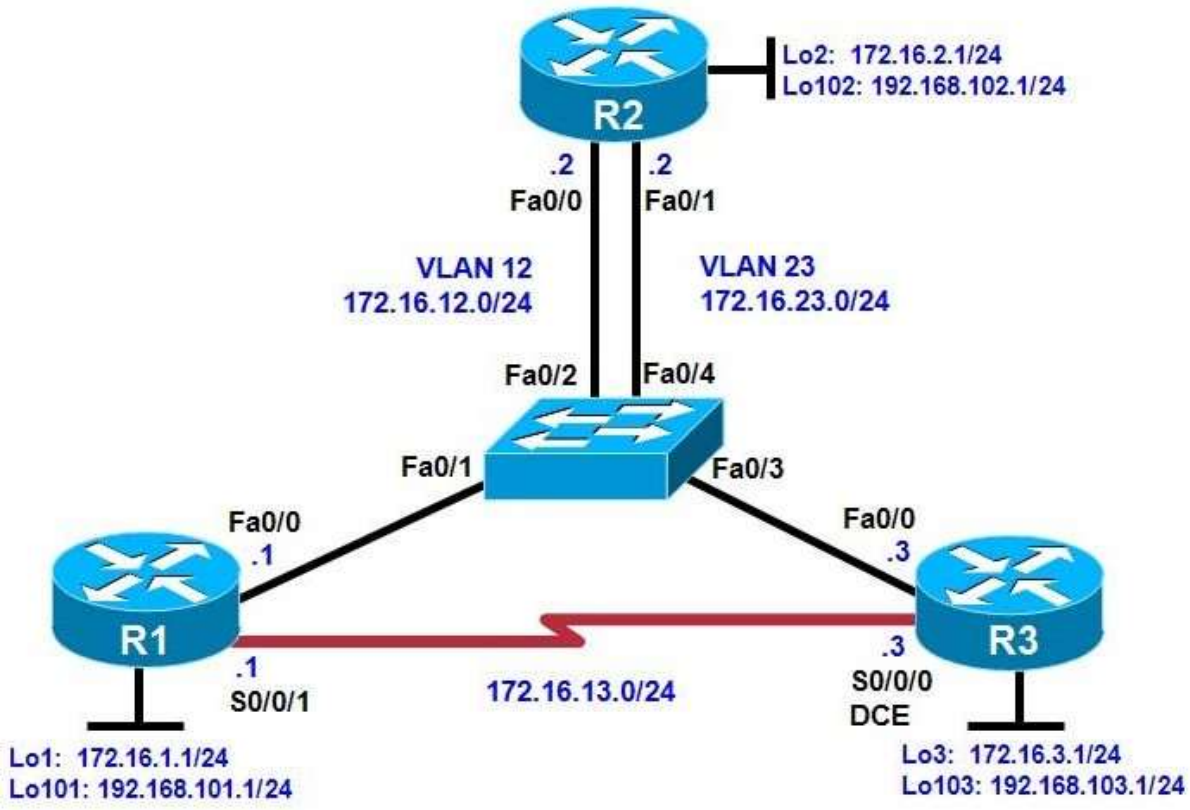
R3(config-if)# bandwidth 64

R3(config-if)# ip address 172.16.13.3 255.255.255.0

R3(config-if)# clock rate 64000

R3(config-if)#no shutdown

OUTPUT:-



PRACTICAL NO.4

A) AIM:- Configuring BGP with Default Routing.

CODE:- Router ISP1 (R1)

hostname ISP1 ! interface Loopback0

description ISP1 Internet network ip

address 10.1.1.1 255.255.255.0 !

interface Loopback100 ip address

192.168.100.1 255.255.255.0 ! interface

Serial0/0/0 description ISP1 -> ITA

ip address 10.0.0.1 255.255.255.252

clock rate 128000 no shutdown ! router

bgp 200 no synchronization network

10.1.1.0 mask 255.255.255.0 network

192.168.100.0 neighbor 10.0.0.2

remote-as 100 no auto-summary ! end

Router ITA (R2)

hostname ITA ! interface Loopback0

description Core router network link 1

ip address 192.168.0.1 255.255.255.0!

interface Loopback1 description Core

router network link 2 ip address

192.168.1.1 255.255.255.0 !

interface Serial0/0/0 description

ITA -> ISP1 ip address 10.0.0.2

255.255.255.252 no shutdown !

interface Serial0/0/1 description ITA

ISP2 ip address 172.16.0.2

255.255.255.252 clock rate 128000

No shutdown

! router bgp 100 no

synchronization network 192.168.0.0

network 192.168.1.0 neighbor 10.0.0.1

remote-as 200 neighbor 10.0.0.1

distribute-list 1 out neighbor

172.16.0.1 remote-as 300 neighbor

172.16.0.1 distribute-list 1 out no

auto-summary ! ip default-network

192.168.100.0 ip route 0.0.0.0 0.0.0.0

172.16.0.1 220 !

access-list 1 permit 192.168.0.0 0.0.1.255

! end

Router ISP2 (R3)

hostname ISP2 ! interface Loopback0

description ISP2 Internet Network

ip address 172.16.1.1 255.255.255.0!

interface Serial0/0/1 description

ISP2 -> ITA ip address 172.16.0.1

255.255.255.252 no shutdown ! router

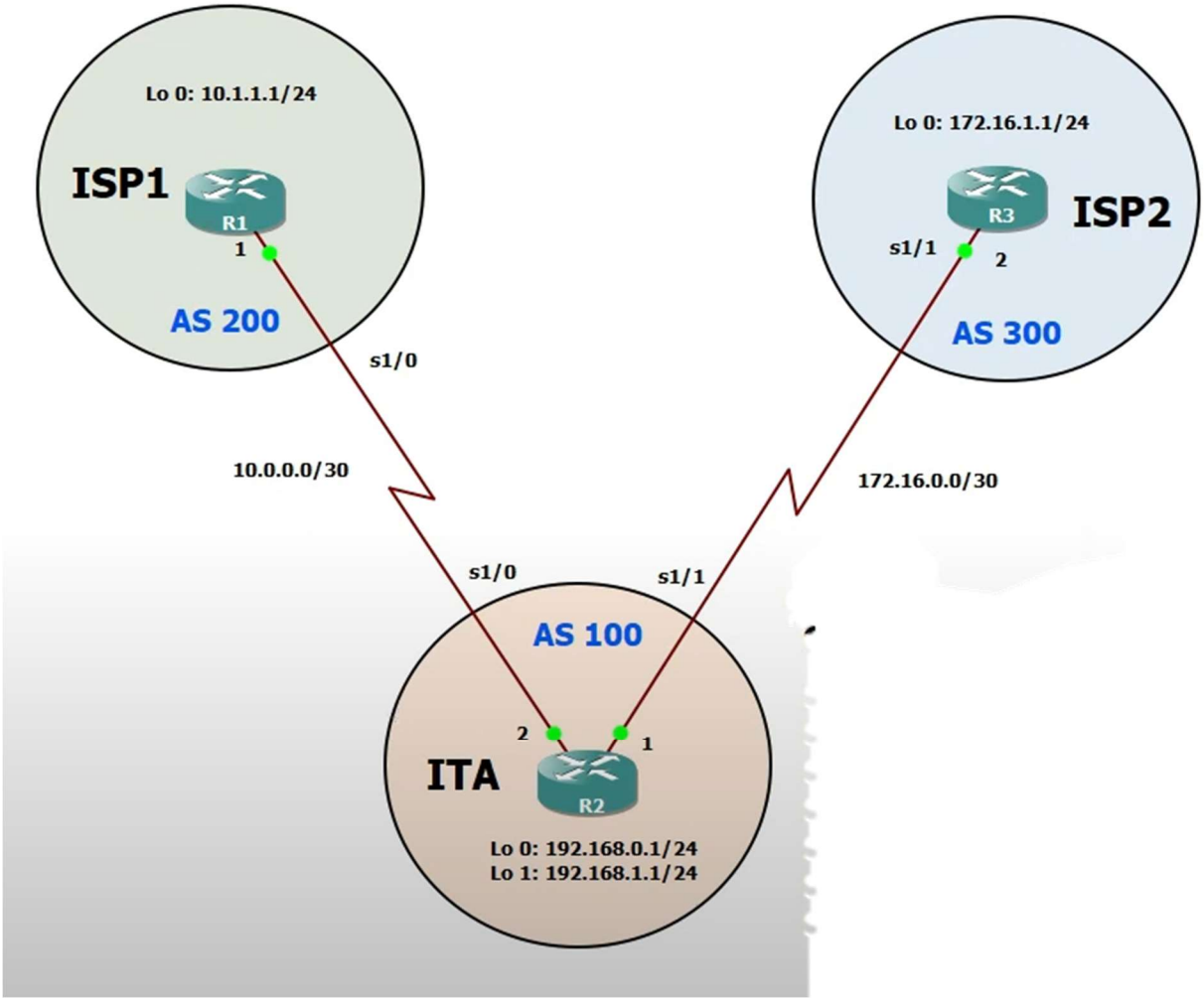
bgp 300 no synchronization network

172.16.1.0 mask 255.255.255.0

neighbor 172.16.0.2 remote-as 100

no auto-summary ! end

OUTPUT:-


Lo 0: 10.1.1.1/24
ISP1
R1
1
AS 200
s1/0
10.0.0.0/30
Lo 0: 172.16.1.1/24
R3
ISP2
s1/1
2
AS 300
172.16.0.0/30
s1/0
s1/1
AS 100
2
1
ITA
R2
Lo 0: 192.168.0.1/24
Lo 1: 192.168.1.1/24

B) AIM:- Using the AS_PATH Attribute.

CODE:-

Router SanJose

hostname SanJose

! interface Loopback0 ip address

10.1.1.1 255.255.255.0

! ! interface Serial0/0/0 ip address

192.168.1.5 255.255.255.252 clock rate

128000 no shutdown

! router bgp 100 no synchronization

network 10.1.1.0 mask 255.255.255.0

neighbor 192.168.1.6 remote-as 300

no auto-summary ! end

Router ISP

hostname ISP

! interface Loopback0 ip address

10.2.2.1 255.255.255.0

! interface Serial0/0/0 ip address

192.168.1.6 255.255.255.252

no shutdown

! interface Serial0/0/1 ip address

172.24.1.17 255.255.255.252 clock rate

128000 no shutdown

! router bgp 300 no synchronization

network 10.2.2.0 mask 255.255.255.0

neighbor 172.24.1.18 remote-as 65000

neighbor 172.24.1.18 filter-list 1 out

neighbor 192.168.1.5 remote-as 100

neighbor 192.168.1.5 remove-private-as

no auto-summary !

ip as-path access-list 1 deny ^100$

ip as-path access-list 1 permit * ! end

Router CustRtr hostname CustRtr

! interface Loopback0 ip address

10.3.3.1 255.255.255.0

!interface Serial0/0/1 ip address

172.24.1.18 255.255.255.252

no shutdown

! router bgp 65000 no

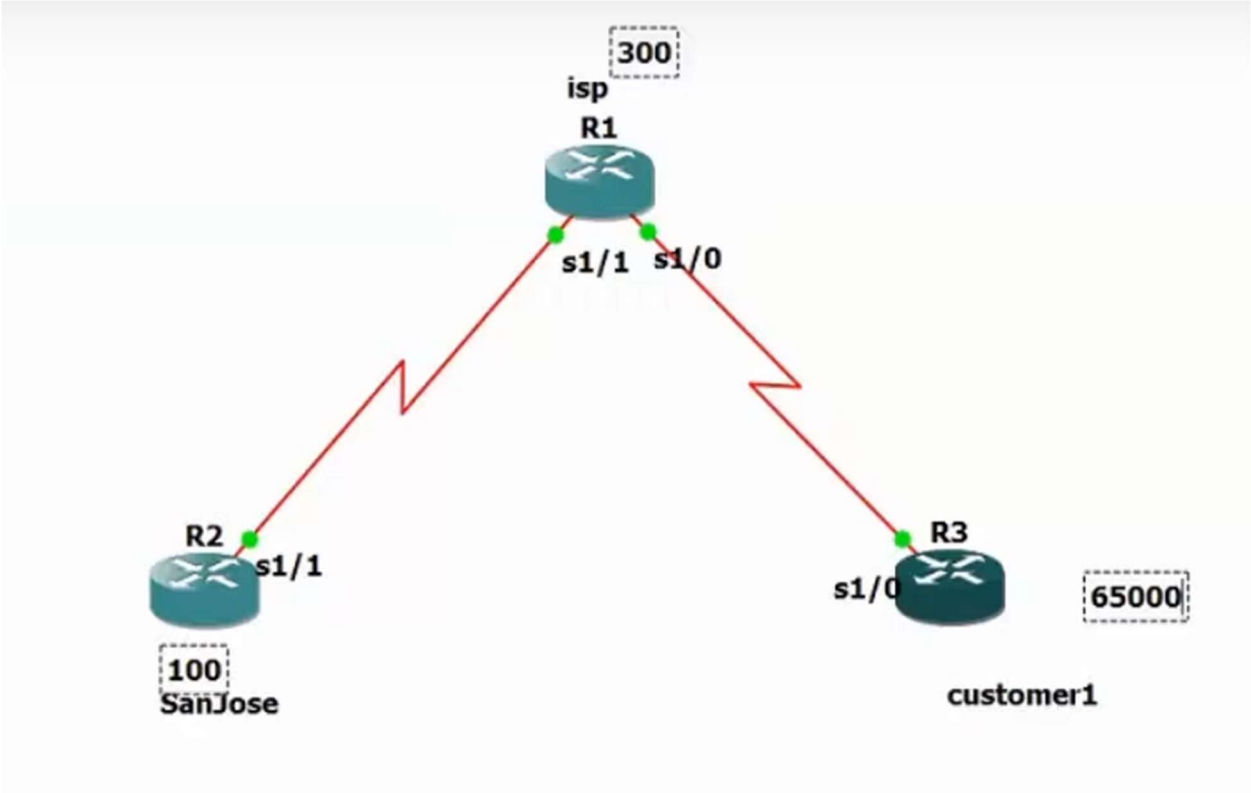
synchronization network 10.3.3.0

mask 255.255.255.0 neighbor

172.24.1.17 remote-as 300 no auto

summary ! end

OUTPUT:-



C) AIM:- BGP Route Reflectors and Route Filters.

CODE:-

Router SanJose1 (R1)

hostname SanJose1

! interface Serial0/0/0

ip address 192.168.1.5 255.255.255.252

clock rate 128000 no shutdown

!router rip version 2

network 192.168.1.0

no auto-summary

! router bgp 100 no synchronization

neighbor 192.168.1.6 remote-as 100

no auto-summary

! end

Router SanJose2 (R2)

hostname SanJose2

! interface Loopback0 ip address

10.2.2.1 255.255.255.0

! interface

Serial0/0/0

ip address 192.168.1.6 255.255.255.252

no shutdown

! interface Serial0/0/1 ip address

172.24.1.17 255.255.255.0 clock rate

128000 no shutdown

! router rip version

2 network

172.24.0.0 network

192.168.1.0 network

10.0.0.0 no auto summary

! router bgp 100 no synchronization neighbor

172.24.1.18 remote-as 100 neighbor 172.24.1.18 route

reflector-client neighbor 192.168.1.5 remote-as 100

neighbor 192.168.1.5 route-reflector-client neighbor

192.168.1.5 prefix-list SUPERNETONLY out no auto

summary ! ip prefix-list SUPERNETONLY seq 5 permit

198.0.0.0/8 ip prefix-list SUPERNETONLY seq 10 permit

172.24.1.0/24 ip prefix-list SUPERNETONLY seq 15

permit 10.2.2.0/24 ! end

Router SanJose3 (R3)

hostname SanJose3

! interface Loopback0 .

ip address 198.133.219.1 255.255.255.0

! interface Serial0/0/1 ip address

172.24.1.18 255.255.255.0

no shutdown

! router rip version 2 network

172.24.0.0 no auto-summary

! router bgp 100 no synchronization network

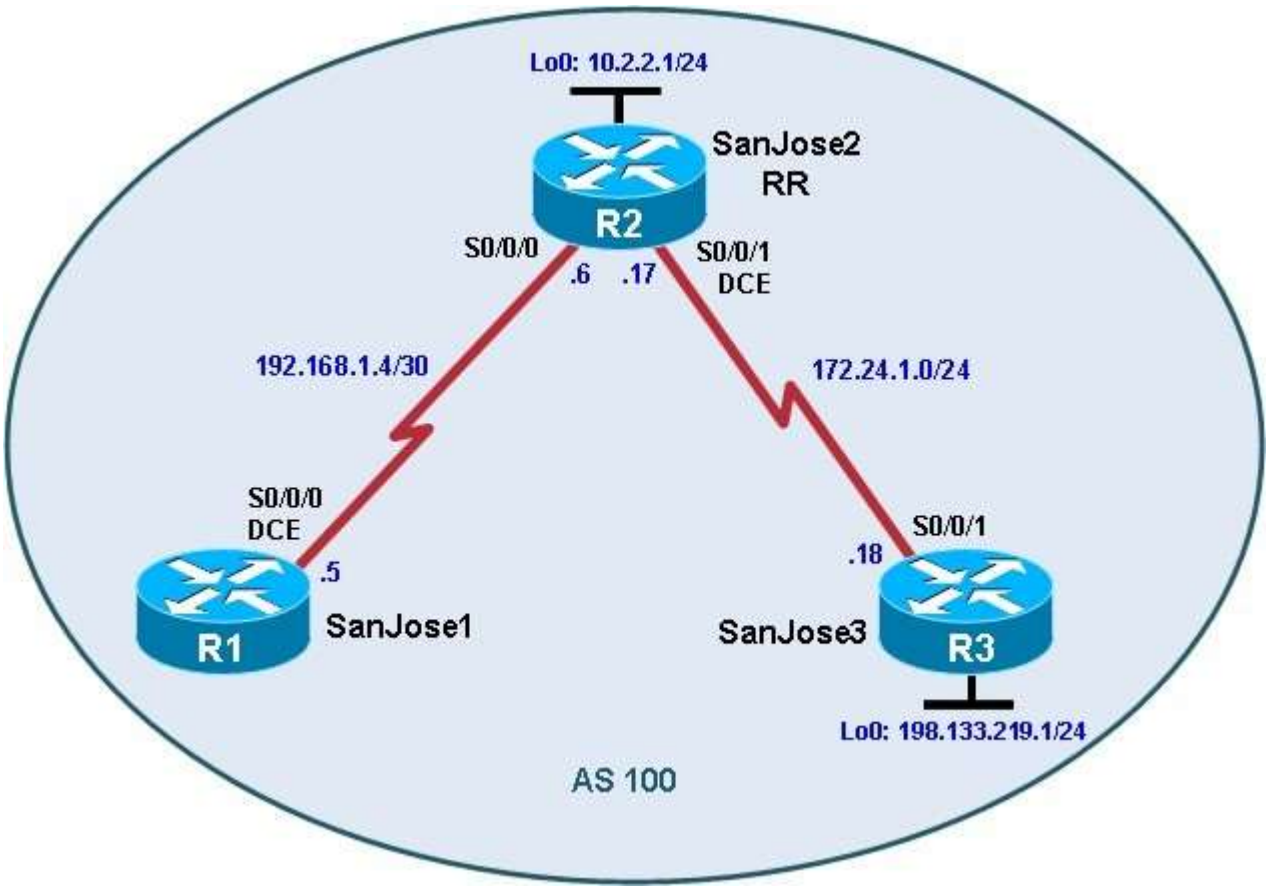
198.133.219.0 aggregate-address

198.0.0.0 255.0.0.0 neighbor

172.24.1.17 remote-as 100

no auto summary end

OUTPUT:-



PRACTICAL NO.5

A) AIM:- Configuring OSPF for IPv6.

CODE:-

Router R1

hostname R1 ! ipv6 unicast-routing

ipv6 cef ! interface Loopback0

ip address 10.1.1.1 255.255.255.0

ipv6 address FEC0::1:1/112 ipv6

ospf 1 area 0 ! interface

Serial0/0/0 ipv6 address FE80::1

link-local ipv6 address

FEC0::12:1/112 ipv6 ospf 1 area 0

clock rate 64000 bandwidth 64

no shutdown ! interface Serial0/0/1

ipv6 address FEC0::13:1/112 ipv6

ospf 1 area 0 bandwidth 64

no shutdown ! end

Router R2

hostname R2 ! ipv6

unicast-routing ipv6 cef

! interface Loopback0 ip address

10.1.2.1 255.255.255.0 ipv6

address FEC0::2:1/112 ipv6 ospf 1

area 0 ! interface FastEthernet0/0 ipv6

address FEC0:23::/64 eui-64 ipv6

ospf 1 area 0 no shutdown !

interface Serial0/0/0

ipv6 address FEC0::12:2/112

ipv6 address FE80::2 link-local

ipv6 ospf 1 area 0 bandwidth 64

no shutdown ! end

Router R3

hostname R3 ! ipv6 unicast-routing

ipv6 cef ! interface Loopback0 ip

address 10.1.3.1 255.255.255.0

ipv6 address FEC0::3:1/112 ipv6

ospf 1 area 0 ! interface

FastEthernet0/0 ipv6 address

FEC0:23::/64 eui-64 ipv6 ospf 1

area 0 no shutdown ! interface

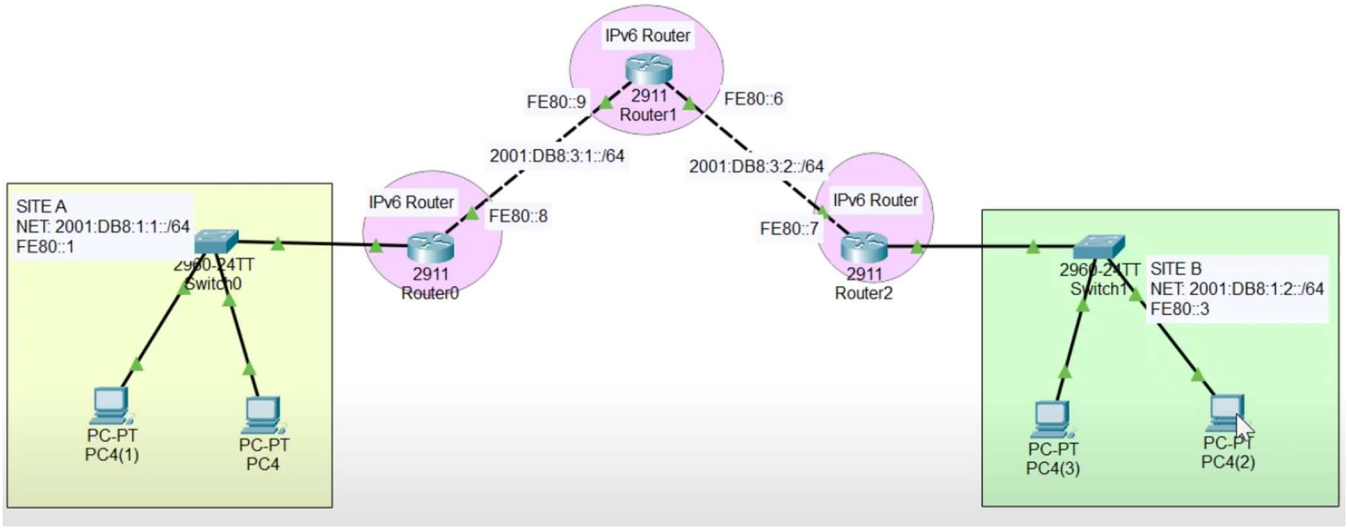
Serial0/0/0 ipv6 address

FEC0::13:3/112 ipv6 ospf 1 area 0

clock rate 64000 bandwidth 64

no shutdown ! end

OUTPUT:-


IPv6 Router
2911
Router1
FE80::9
FE80::6
2001:DB8:3:1::/64
2001:DB8:3:2::/64
IPv6 Router
FE80::8
2911
Router0
IPv6 Router
FE80::7
2911
Router2
SITE A
NET: 2001:DB8:1:1::/64
FE80::1
2960-24TT
Switch0
PC-PT
PC4(1)
PC-PT
PC4
2960-24TT
Switch1
SITE B
NET: 2001:DB8:1:2::/64
FE80::3
PC-PT
PC4(3)
PC-PT
PC4(2)

B) AIM:- Configuring 6 to 4 Tunnels.

CODE:-

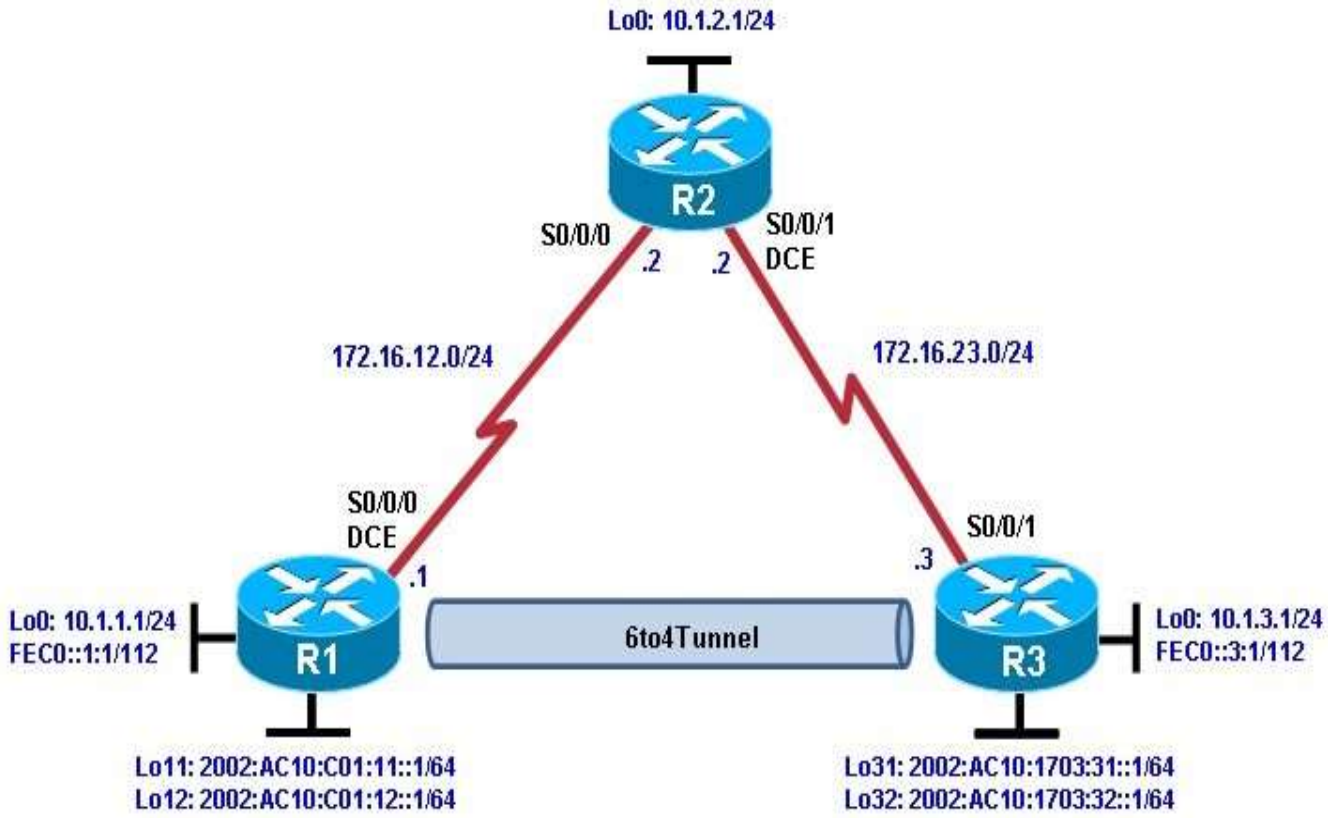
```
R1(config)# interface loopback0
R1(config-if)# ip address 10.1.1.1 255.255.255.0
R1(config-if)# ipv6 address FEC0::1:1/112
R1(config-if)# interface serial0/0/0
R1(config-if)# ip address 172.16.12.1 255.255.255.0
R1(config-if)# clockrate 64000
R1(config-if)# bandwidth 64
R1(config-if)# no shutdown
R2(config)# interface loopback0
R2(config-if)# ip address 10.1.2.1 255.255.255.0
R2(config-if)# interface serial0/0/0
R2(config-if)# ip address 172.16.12.2 255.255.255.0
R2(config-if)# bandwidth 64
R2(config-if)# no shutdown
R2(config-if)# interface serial0/0/1
R2(config-if)# ip address 172.16.23.2 255.255.255.0
R2(config-if)# clockrate 64000
R2(config-if)# bandwidth 64
R2(config-if)# no shutdown
R3(config)# interface loopback0
R3(config-if)# ip address 10.1.3.1 255.255.255.0
R3(config-if)# ipv6 address FEC0::3:1/112
R3(config-if)# interface serial0/0/1
```

R3(config-if)# ip address 172.16.23.3 255.255.255.0

R3(config-if)# bandwidth 64

R3(config-if)# no shutdown

OUTPUT:-



PRACTICAL NO.6

A) AIM:- Static VLANS, VLAN Trunking and VTP Domains and Modes.

CODE:-

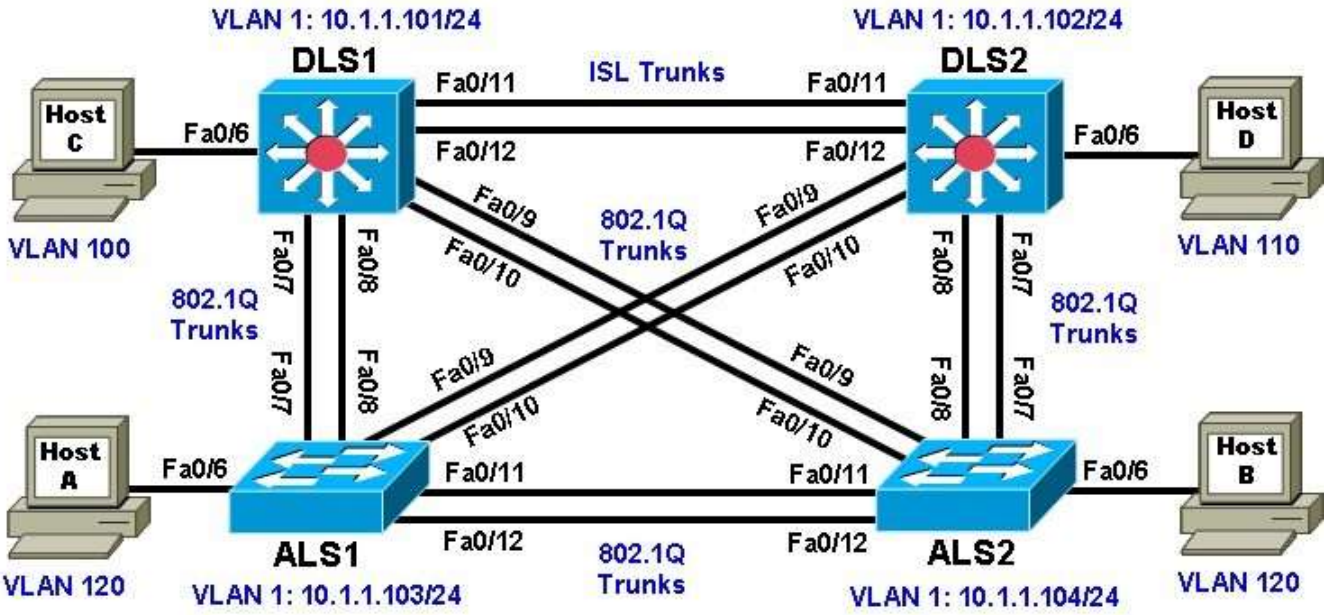
```
R1(config)#interface loopback
R1(config-if)# ip address 10.1.1.1 255.255.255.0
R1(config-if)# ipv6 address PRC011111/112
Rt (config-if)# interface serial0/0/0
R1(config-if)# ip address 172.16.12.1 255.255.255.0
R1(config-if)# clockrats 64000
R1(config-if)# bandwidth 64
R1(config-if)# no shutdown
R2(config)#interface loopbacko
R2(config-if)# ip address 10.1.2.1 255.255.255.0
R2(config-if)# interface serial0/0/0
R2(config-if)# ip address 172.16.12.2 255.255.255.0
R2(config-if)# bandwidth 64
R2(config-if)# no shutdown
R2(config-if)# interface serial0/0/1
R2(config-if)#ip address 172.16.23.2 255.255.255.
R2(config-if)# clockrate 64000
R2(config-if)# bandwidth 64
R2(config-if)#no shutdown
R3(config)#interface loopback
R3(config-if)# ip address 10.1.3.1 255.255.255.0
R3(config-if)# ipv6 address FECO::3:1/112
R3(config-if)#interface serial0/0/1
```

R3(config-if)# ip address 172.16.23.3 255.255.255.0

R3(config-if)#handwidth 64

R3(config-if)# no shutdown

OUTPUT:-



B) AIM:- Configuring EtherChannel

CODE:-

```
R1(config)#interface loopback
R1(config-if)# ip address 10.1.1.1 255.255.255.0
R1(config-if)# ipv6 address PRC011111/112
Rt (config-if)# interface serial0/0/0
R1(config-if)# ip address 172.16.12.1 255.255.255.0
R1(config-if)# clockrats 64000
R1(config-if)# bandwidth 64
R1(config-if)# no shutdown
R2(config)#interface loopbacko
R2(config-if)# ip address 10.1.2.1 255.255.255.0
R2(config-if)# interface serial0/0/0
R2(config-if)# ip address 172.16.12.2 255.255.255.0
R2(config-if)# bandwidth 64
R2(config-if)# no shutdown
R2(config-if)# interface serial0/0/1
R2(config-if)#ip address 172.16.23.2 255.255.255.
R2(config-if)# clockrate 64000
R2(config-if)# bandwidth 64
R2(config-if)#no shutdown
R3(config)#interface loopback
R3(config-if)# ip address 10.1.3.1 255.255.255.0
R3(config-if)# ipv6 address FECO::3:1/112
R3(config-if)#interface serial0/0/1
R3(config-if)# ip address 172.16.23.3 255.255.255.0
```

R3(config-if)#handwidth 64

R3(config-if)# no shutdown

OUTPUT:-

PRACTICAL NO.7

A) AIM:- Spanning Tree Protocol (STP) Default Behavior

CODE:-

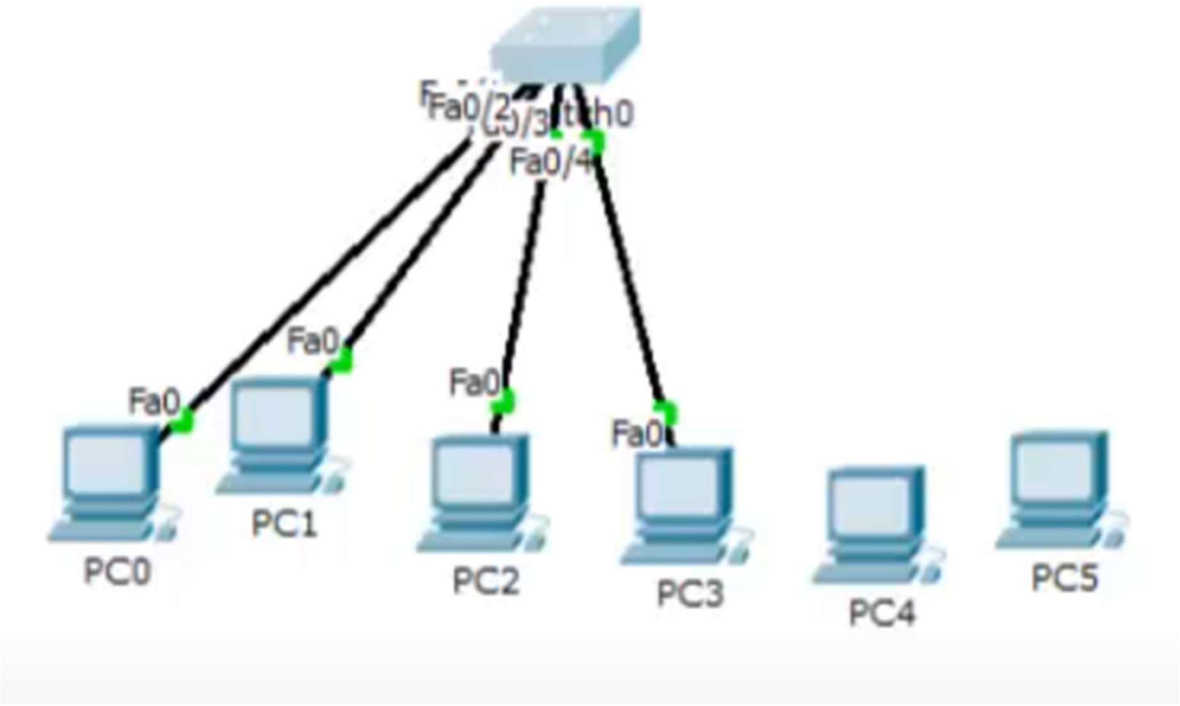
```
R1(config)#interface loopback
R1(config-if)# ip address 10.1.1.1 255.255.255.0
R1(config-if)# ipv6 address PRC011111/112
Rt (config-if)# interface serial0/0/0
R1(config-if)# ip address 172.16.12.1 255.255.255.0
R1(config-if)# clockrats 64000
R1(config-if)# bandwidth 64
R1(config-if)# no shutdown
R2(config)#interface loopbacko
R2(config-if)# ip address 10.1.2.1 255.255.255.0
R2(config-if)# interface serial0/0/0
R2(config-if)# ip address 172.16.12.2 255.255.255.0
R2(config-if)# bandwidth 64
R2(config-if)# no shutdown
R2(config-if)# interface serial0/0/1
R2(config-if)#ip address 172.16.23.2 255.255.255.
R2(config-if)# clockrate 64000
R2(config-if)# bandwidth 64
R2(config-if)#no shutdown
R3(config)#interface loopback
R3(config-if)# ip address 10.1.3.1 255.255.255.0
R3(config-if)# ipv6 address FECO::3:1/112
R3(config-if)#interface serial0/0/1
```

R3(config-if)# ip address 172.16.23.3 255.255.255.0

R3(config-if)#handwidth 64

R3(config-if)# no shutdown

OUTPUT:-



B) AIM:- Modifying Default Spanning Tree Behavior

CODE:-

R1(config)#interface loopback

R1(config-if)# ip address 10.1.1.1 255.255.255.0

R1(config-if)# ipv6 address PRC011111/112

Rt (config-if)# interface serial0/0/0

R1(config-if)# ip address 172.16.12.1 255.255.255.0

R1(config-if)# clockrats 64000

R1(config-if)# bandwidth 64

R1(config-if)# no shutdown

R2(config)#interface loopbacko

R2(config-if)# ip address 10.1.2.1 255.255.255.0

R2(config-if)# interface serial0/0/0

R2(config-if)# ip address 172.16.12.2 255.255.255.0

R2(config-if)# bandwidth 64

R2(config-if)# no shutdown

R2(config-if)# interface serial0/0/1

R2(config-if)#ip address 172.16.23.2 255.255.255.

R2(config-if)# clockrate 64000

R2(config-if)# bandwidth 64

R2(config-if)#no shutdown

R3(config)#interface loopback

R3(config-if)# ip address 10.1.3.1 255.255.255.0

R3(config-if)# ipv6 address FECO::3:1/112

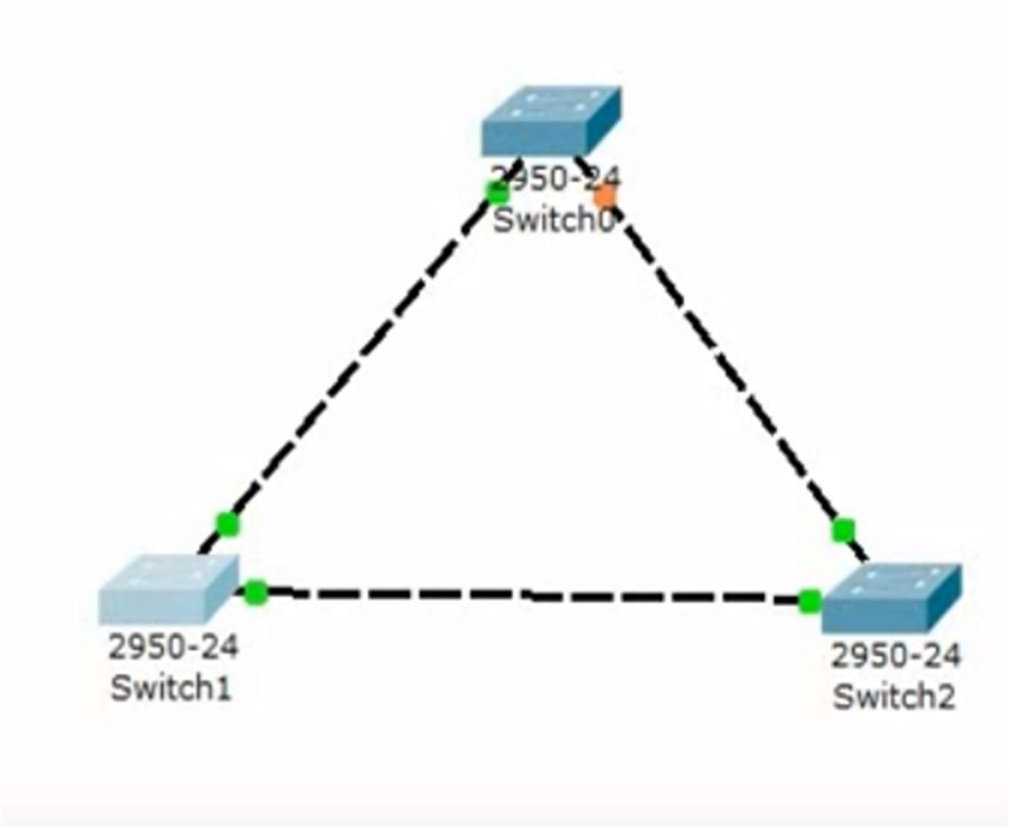
R3(config-if)#interface serial0/0/1

R3(config-if)# ip address 172.16.23.3 255.255.255.0

R3(config-if)#handwidth 64

R3(config-if)# no shutdown

OUTPUT:-



PRACTICAL NO.8

A) AIM:- Per-VLAN Spanning Tree Behavior

CODE:-

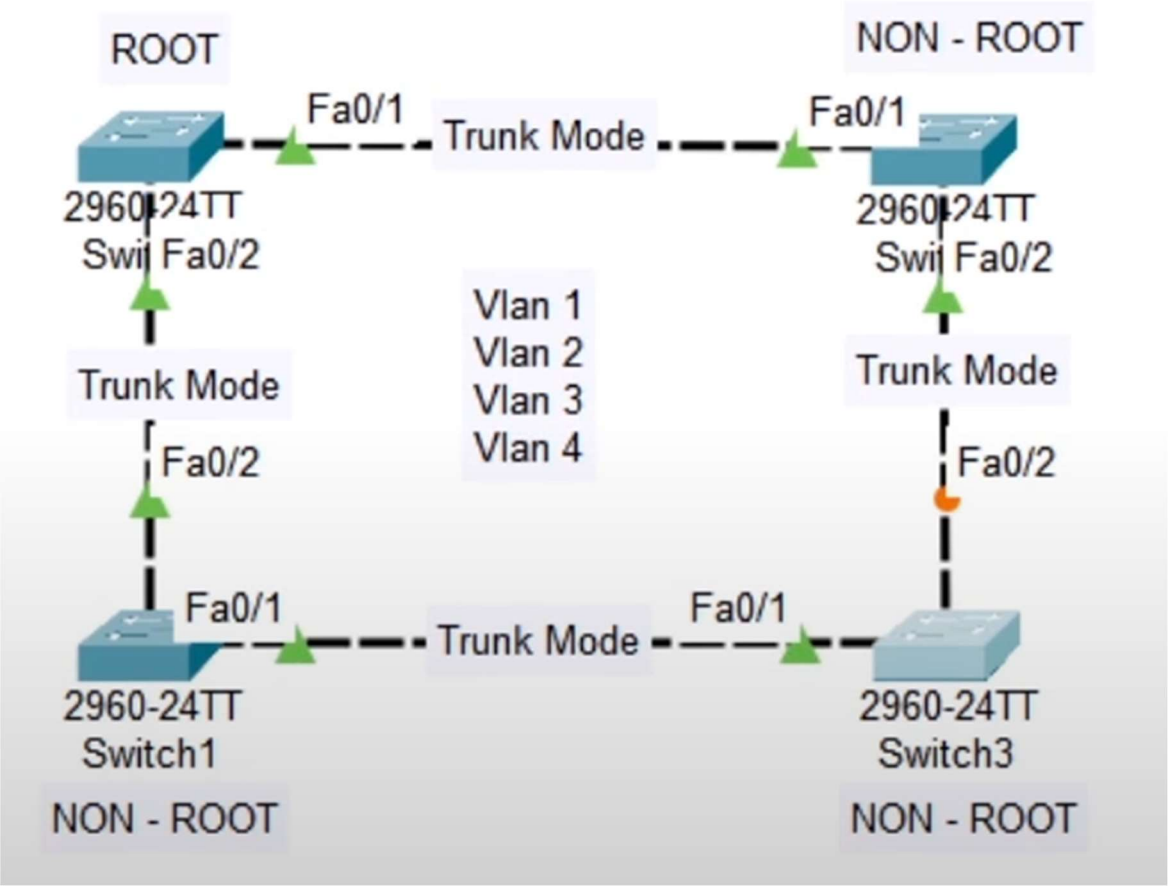
```
R1(config)#interface loopback
R1(config-if)# ip address 10.1.1.1 255.255.255.0
R1(config-if)# ipv6 address PRC011111/112
Rt (config-if)# interface serial0/0/0
R1(config-if)# ip address 172.16.12.1 255.255.255.0
R1(config-if)# clockrats 64000
R1(config-if)# bandwidth 64
R1(config-if)# no shutdown
R2(config)#interface loopbacko
R2(config-if)# ip address 10.1.2.1 255.255.255.0
R2(config-if)# interface serial0/0/0
R2(config-if)# ip address 172.16.12.2 255.255.255.0
R2(config-if)# bandwidth 64
R2(config-if)# no shutdown
R2(config-if)# interface serial0/0/1
R2(config-if)#ip address 172.16.23.2 255.255.255.
R2(config-if)# clockrate 64000
R2(config-if)# bandwidth 64
R2(config-if)#no shutdown
R3(config)#interface loopback
R3(config-if)# ip address 10.1.3.1 255.255.255.0
R3(config-if)# ipv6 address FECO::3:1/112
R3(config-if)#interface serial0/0/1
```

R3(config-if)# ip address 172.16.23.3 255.255.255.0

R3(config-if)#handwidth 64

R3(config-if)# no shutdown

OUTPUT:-



B) AIM:- Multiple Spanning Tree

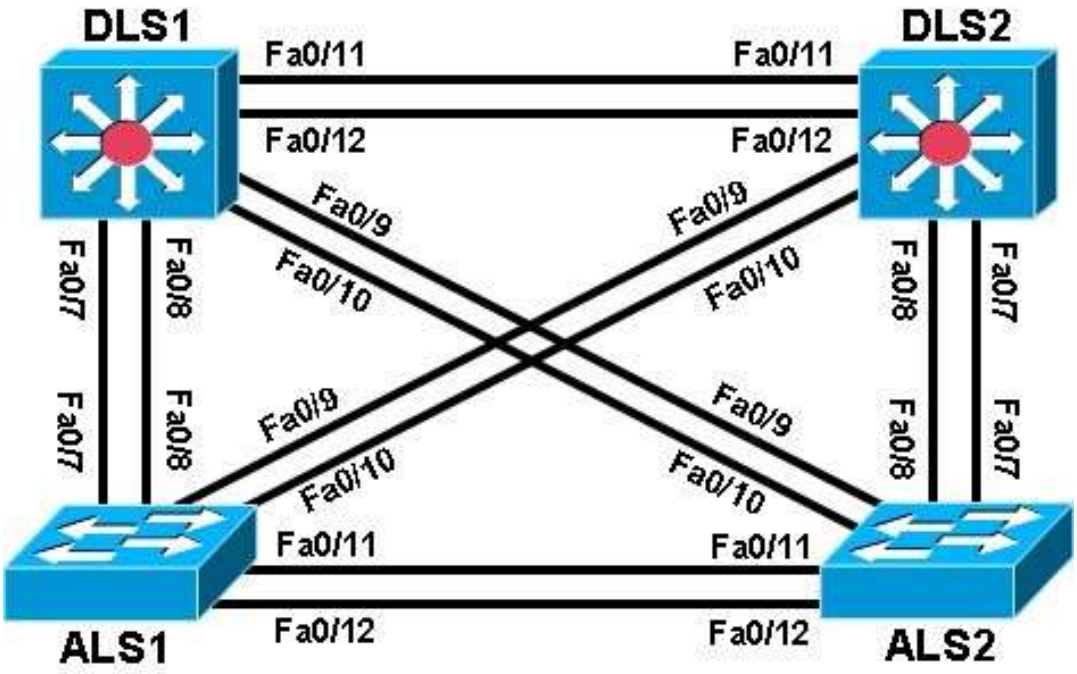
CODE:-

```
R1(config)#interface loopback
R1(config-if)# ip address 10.1.1.1 255.255.255.0
R1(config-if)# ipv6 address PRC011111/112
Rt (config-if)# interface serial0/0/0
R1(config-if)# ip address 172.16.12.1 255.255.255.0
R1(config-if)# clockrats 64000
R1(config-if)# bandwidth 64
R1(config-if)# no shutdown
R2(config)#interface loopbacko
R2(config-if)# ip address 10.1.2.1 255.255.255.0
R2(config-if)# interface serial0/0/0
R2(config-if)# ip address 172.16.12.2 255.255.255.0
R2(config-if)# bandwidth 64
R2(config-if)# no shutdown
R2(config-if)# interface serial0/0/1
R2(config-if)#ip address 172.16.23.2 255.255.255.
R2(config-if)# clockrate 64000
R2(config-if)# bandwidth 64
R2(config-if)#no shutdown
R3(config)#interface loopback
R3(config-if)# ip address 10.1.3.1 255.255.255.0
R3(config-if)# ipv6 address FECO::3:1/112
R3(config-if)#interface serial0/0/1
R3(config-if)# ip address 172.16.23.3 255.255.255.0
```

R3(config-if)#handwidth 64

R3(config-if)# no shutdown

OUTPUT:-



PRACTICAL NO.9

A) AIM:- Inter-VLAN Routing with an External Router

CODE:-

R1(config)#interface loopback

R1(config-if)# ip address 10.1.1.1 255.255.255.0

R1(config-if)# ipv6 address PRC011111/112

Rt (config-if)# interface serial0/0/0

R1(config-if)# ip address 172.16.12.1 255.255.255.0

R1(config-if)# clockrats 64000

R1(config-if)# bandwidth 64

R1(config-if)# no shutdown

R2(config)#interface loopbacko

R2(config-if)# ip address 10.1.2.1 255.255.255.0

R2(config-if)# interface serial0/0/0

R2(config-if)# ip address 172.16.12.2 255.255.255.0

R2(config-if)# bandwidth 64

R2(config-if)# no shutdown

R2(config-if)# interface serial0/0/1

R2(config-if)#ip address 172.16.23.2 255.255.255.

R2(config-if)# clockrate 64000

R2(config-if)# bandwidth 64

R2(config-if)#no shutdown

R3(config)#interface loopback

R3(config-if)# ip address 10.1.3.1 255.255.255.0

R3(config-if)# ipv6 address FECO::3:1/112

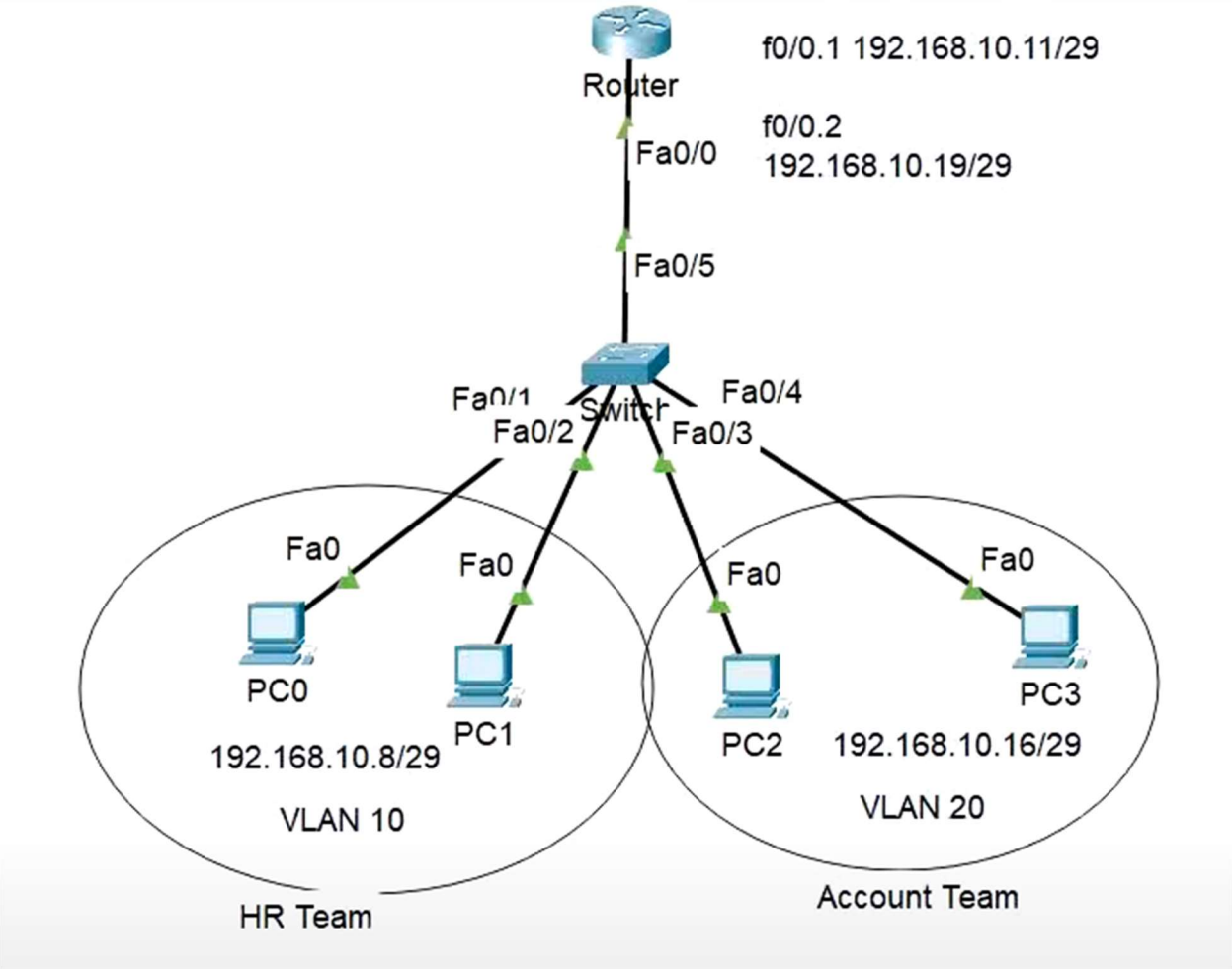
R3(config-if)#interface serial0/0/1

R3(config-if)# ip address 172.16.23.3 255.255.255.0

R3(config-if)#handwidth 64

R3(config-if)# no shutdown

OUTPUT:-



B) AIM:- Inter-VLAN Routing with an Internal Route Processor

CODE:-

R1(config)#interface loopback

R1(config-if)# ip address 10.1.1.1 255.255.255.0

R1(config-if)# ipv6 address PRC011111/112

Rt (config-if)# interface serial0/0/0

R1(config-if)# ip address 172.16.12.1 255.255.255.0

R1(config-if)# clockrats 64000

R1(config-if)# bandwidth 64

R1(config-if)# no shutdown

R2(config)#interface loopbacko

R2(config-if)# ip address 10.1.2.1 255.255.255.0

R2(config-if)# interface serial0/0/0

R2(config-if)# ip address 172.16.12.2 255.255.255.0

R2(config-if)# bandwidth 64

R2(config-if)# no shutdown

R2(config-if)# interface serial0/0/1

R2(config-if)#ip address 172.16.23.2 255.255.255.

R2(config-if)# clockrate 64000

R2(config-if)# bandwidth 64

R2(config-if)#no shutdown

R3(config)#interface loopback

R3(config-if)# ip address 10.1.3.1 255.255.255.0

R3(config-if)# ipv6 address FECO::3:1/112

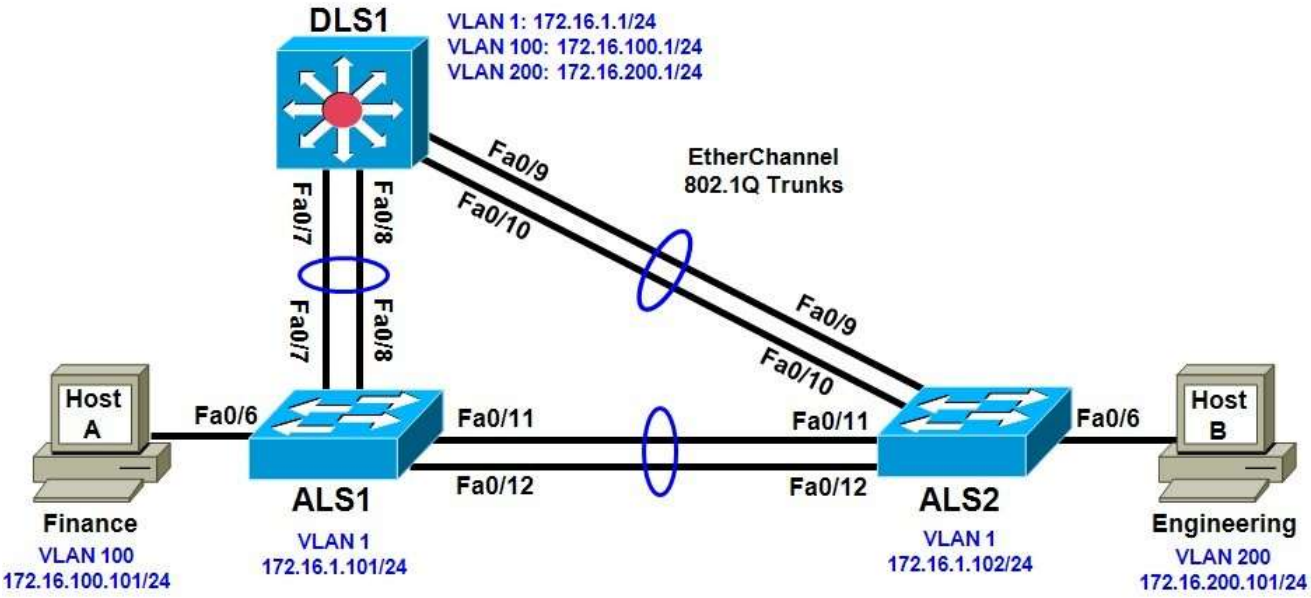
R3(config-if)#interface serial0/0/1

R3(config-if)# ip address 172.16.23.3 255.255.255.0

R3(config-if)#handwidth 64

R3(config-if)# no shutdown

OUTPUT:-



PRACTICAL NO.10

AIM:- Configure NAT Services

CODE:-

```
R1(config)#interface loopback
R1(config-if)# ip address 10.1.1.1 255.255.255.0
R1(config-if)# ipv6 address PRC011111/112
Rt (config-if)# interface serial0/0/0
R1(config-if)# ip address 172.16.12.1 255.255.255.0
R1(config-if)# clockrats 64000
R1(config-if)# bandwidth 64
R1(config-if)# no shutdown
R2(config)#interface loopbacko
R2(config-if)# ip address 10.1.2.1 255.255.255.0
R2(config-if)# interface serial0/0/0
R2(config-if)# ip address 172.16.12.2 255.255.255.0
R2(config-if)# bandwidth 64
R2(config-if)# no shutdown
R2(config-if)# interface serial0/0/1
R2(config-if)#ip address 172.16.23.2 255.255.255.
R2(config-if)# clockrate 64000
R2(config-if)# bandwidth 64
R2(config-if)#no shutdown
R3(config)#interface loopback
R3(config-if)# ip address 10.1.3.1 255.255.255.0
R3(config-if)# ipv6 address FECO::3:1/112
R3(config-if)#interface serial0/0/1
```

R3(config-if)# ip address 172.16.23.3 255.255.255.0

R3(config-if)#handwidth 64

R3(config-if)# no shutdown

OUTPUT:-