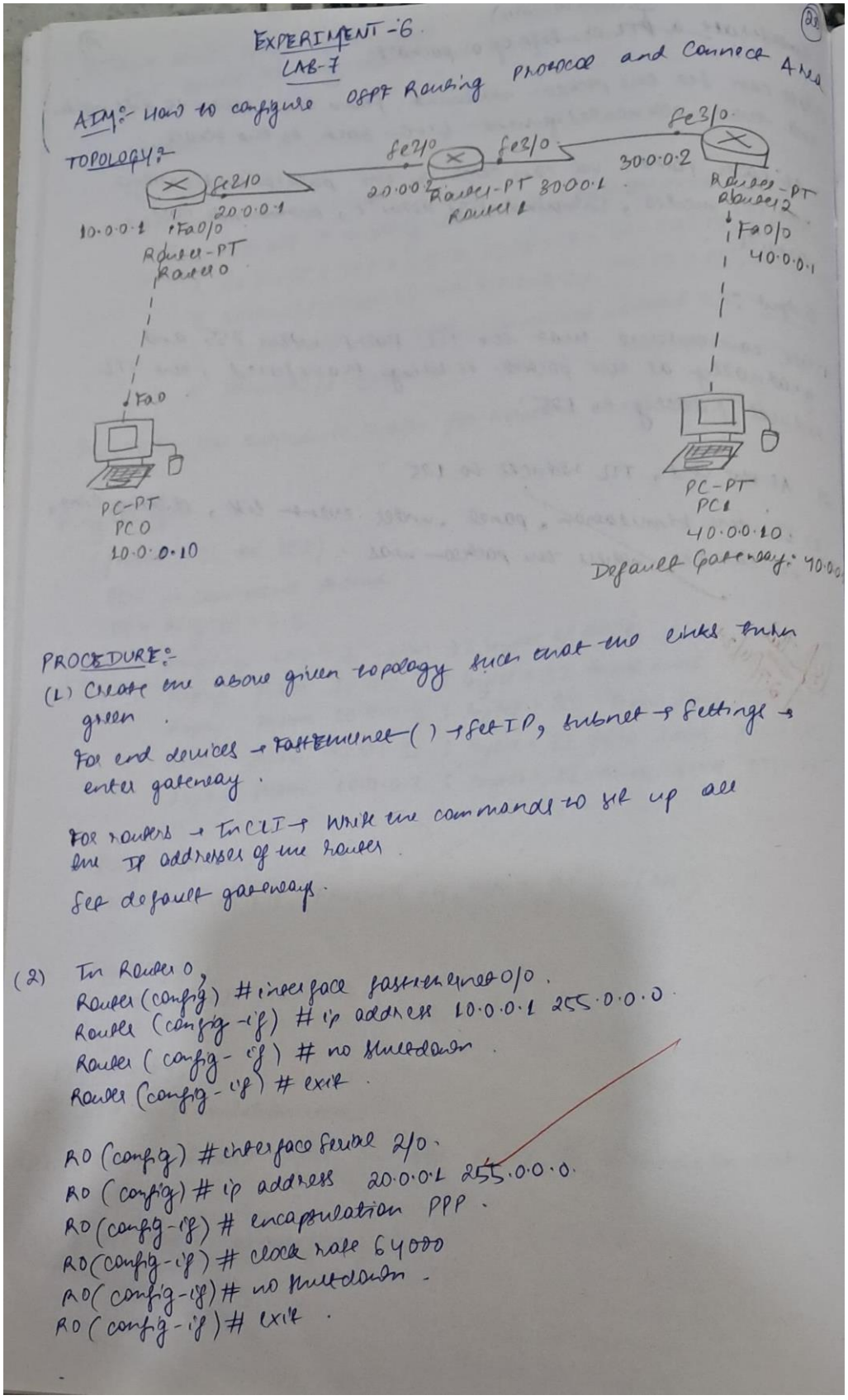
Program 7

Aim: Configure OSPF routing protocol.

Topology, Procedure and Observation:



Finally we set up the IP's of R1 and R2 while the setup of ① parameters remains same, the setting up of serial connections has 2 extra lines (encapsulation PPP, clock rate 64000).
clock rate 64000 must only be written if the serially connected port shows a ⑤ symbol.
Here, we write clock rate command for R0, serial 2/0, R1 serial 3/0.
After this step all the connections must have turned green.

3. To enable IP routing by configuration of OSPF routing protocol in all routers.

Router R0 → CLI
R0(config)# router ospf 1.
R0(config-router)# router-id 1.1.1.1.
R0(config-router)# network 10.0.0.0 0.255.255.255 area 3.
R0(config-router)# network 20.0.0.0 0.255.255.255 area 1.
R0(config-router)# exit.

Router R1 → CLI
R1(config)# router ospf 1.
R1(config-router)# router-id 2.2.2.2.
R1(config-router)# network 20.0.0.0 0.255.255.255 area 1.
R1(config-router)# network 30.0.0.0 0.255.255.255 area 0.
R1(config-router)# exit.

Router R2 → CLI
R2(config)# router ospf 1.
R2(config-router)# router-id 3.3.3.3.
R2(config-router)# network 30.0.0.0 0.255.255.255 area 0
R2(config-router)# network 40.0.0.0 0.255.255.255 area 2.
R2(config-router)# exit.

4 Once the setting up of networking area is done, we configure loopback address to routers
R0(config-if)# interface loopback 0.
R0(config-if)# ip add 172.16.1.252 255.255.255.0.0
R0(config-if)# no shutdown.

R2(config-if) # interface loopback 0.
R2(config-if) # ip add 172.16.1.254 255.255.0.0
R2(config-if) # no shutdown.

R1(config-if) # interface loopback 0.
R1(config-if) # ip add 172.16.1.253 255.255.0.0.
R1(config-if) # no shutdown.

5. On checking routing table of R3 using 'show ip route' we can see that R3 doesn't know about area 3. Gateway of last resort is not set.

O IA 20.0.0.0/8 [110/128] via 30.0.0.1 serial 1/0.
C 40.0.0.0/8 is directly connected, fastethernet 0/0
C 30.0.0.0/8 is directly connected, serial 2/0.

Since R3 doesn't know about area 3 we have to create a virtual link between R0 & R1.

6. Creating virtual link between R1, R0.

In Router R0.
R0(config) # router ospf 1.
R0(config-router) # area 1 virtual link 2.2.2.2.
R0(config-router) #exit

In Router R1.
R1(config) # router ospf 1.
R1(config-router) # area 1 virtual-link 1.1.1.1.
R1(config-router) #exit.

7. Now, check routing table of R3. Once all these steps are completed, the message can now be pinged from 1 end-device to other.

Observation

In R2
Router # show ip route.

O IA 200.0.0/8 [110/128] via 30.0.0.1, 00:57:25, serial 2/0.
C 40.0.0.0/8 is directly connected, fastethernet 0/0.
O IA 10.00.0/8 [110/129] via 30.0.0.1 00:57:25, serial 2/0.
C 30.0.0.0/8 is directly connected, serial 2/0
C 172.16.0.0/16 is directly connected, Loopback

Similarly the output is shown for Router 0 and 1.

Ping output.
(from PC0 to PC1)
PC0 → Command prompt
C:\> ping 40.0.0.10.
Pinging 40.0.0.10 with 32 bytes of data.

Request time out
Reply from 40.0.0.10 : bytes = 32 time = 21 ms TTL = 125
Reply from 40.0.0.10 : bytes = 32 time = 2 ms TTL = 125
" " " " = 2 ms TTL = 125

Pinging statistics for 40.0.0.10.
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss).

15/12/24

Screen Shots: