**Title of practical:** Implementing IP routing using IGRP

**Theory:**

**EIGRP** (Enhanced Interior Gateway Routing Protocol) is a network protocol that lets routers exchange information more efficiently than with earlier network protocols.

EIGRP use shortest path to routing based on bandwidth & delay.

Using EIGRP, a router keeps a copy of its neighbor's routing tables. If it can't find a route to a destination in one of these tables, it queries its neighbors for a route and they in turn query their neighbors until a route is found. When a routing table entry changes in one of the routers, it notifies its neighbors of the change only.

To keep all routers aware of the state of neighbors, each router sends out a periodic "hello" packet. A router from which no "hello" packet has been received in a certain period of time is assumed to be inoperative.

Some of the many advantages of EIGRP are:

* very low usage of network resources during normal operation; only hello packets are transmitted on a stable network
* when a change occurs, only routing table changes are propagated, not the entire routing table; this reduces the load the routing protocol itself places on the network
* rapid convergence times for changes in the network topology (in some situations convergence can be almost instantaneous)

EIGRP is an enhanced distance vector protocol, relying on the Diffused Update Algorithm (DUAL) to calculate the shortest path to a destination within a network.

**Code:**

**Configuration of router R1-**

R1#config t

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

R1(config)#int fastEthernet 1/0

R1(config-if)#ip address 20.0.0.1 255.0.0.0

R1(config-if)#no shut

\*Feb 8 16:52:21.971: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up

\*Feb 8 16:52:21.971: %ENTITY\_ALARM-6-INFO: CLEAR INFO Fa1/0 Physical Port Administrative State Down

\*Feb 8 16:52:22.971: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

R1(config-if)#exit

R1(config)#int loopback 0

\*Feb 8 16:52:42.343: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R1(config-if)#ip address 21.0.0.5 255.0.0.0

R1(config-if)#no shut

R1(config-if)#exit

**Configuration of router R2-**

R2#config t

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

R2(config)#int fastEthernet 1/0

R2(config-if)#ip address 20.0.0.2 255.0.0.0

R2(config-if)#no shut

\*Feb 8 17:01:53.671: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up

\*Feb 8 17:01:53.671: %ENTITY\_ALARM-6-INFO: CLEAR INFO Fa1/0 Physical Port Administrative State Down

\*Feb 8 17:01:54.671: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

R2(config-if)#exit

R2(config)#int fastEthernet 1/1

R2(config-if)#ip address 30.0.0.1 255.0.0.0

R2(config-if)#no shut

\*Feb 8 17:06:45.843: %LINK-3-UPDOWN: Interface FastEthernet1/1, changed state to up

\*Feb 8 17:06:45.843: %ENTITY\_ALARM-6-INFO: CLEAR INFO Fa1/1 Physical Port Administrative State Down

\*Feb 8 17:06:46.843: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to up

R2(config-if)#exit

R2(config)#int loopback 0

\*Feb 8 17:07:10.015: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R2(config-if)#ip address 25.0.0.6 255.0.0.0

R2(config-if)#no shut

R2(config-if)#exit

**Configuration of router R3-**

R3#config t

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

R3(config)#int fastEthernet 1/0

R3(config-if)#ip address 30.0.0.2 255.0.0.0

R3(config-if)#no shut

\*Feb 8 17:11:37.439: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up

\*Feb 8 17:11:37.439: %ENTITY\_ALARM-6-INFO: CLEAR INFO Fa1/0 Physical Port Administrative State Down

\*Feb 8 17:11:38.439: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up

R3(config-if)#exit

R3(config)#int loopback 0

\*Feb 8 17:11:54.327: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R3(config-if)#ip address 15.0.0.4 255.0.0.0

R3(config-if)#no shut

R3(config-if)#exit

**EIGRP configuration of R1-**

R1(config)#router eigrp 2

R1(config-router)#no auto-summary

R1(config-router)#network 20.0.0.0

R1(config-router)#network 21.0.0.0

R1(config-router)#exit

**EIGRP configuration of R2-**

R2(config)#router eigrp 2

R2(config-router)#no auto-summary

R2(config-router)#network 25.0.0.0

R2(config-router)#network 20.0.0.0

\*Feb 8 17:20:30.967: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 2: Neighbor 20.0.0.1 (FastEthernet1/0) is up: new adjacency

R2(config-router)#network 30.0.0.0

R2(config-router)#exit

**EIGRP configuration of R3-**

R3(config)#router eigrp 2

R3(config-router)#no auto-summary

R3(config-router)#network 30.0.0.0

\*Feb 8 17:22:41.387: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 2: Neighbor 30.0.0.1 (FastEthernet1/0) is up: new adjacency

R3(config-router)#network 15.0.0.0

R3(config-router)#exit

**Screenshot:**

