

Layered Architecture of ATM or ATM Reference Model

It consists of three layers.

- ATM Adaption layer. It is also known as AAL
- ATM layer
- Physical layer

ATM Adaption Layer: Classes of AAL is

- AAL1
- AAL2
- AAL3/4
- AAL5

- ① Physical layer of ATM Protocol: ATM physical layer has four functions
- ① Cells are converted into bits stream.
 - ② Transmission and receipt of bits on the physical medium are controlled.
 - ③ ATM cell boundaries are tracked.
 - ④ Cells are packaged into the appropriate frame.

Physical layer is divided into two subparts:

- ① Physical medium dependent (PMD): It provides two key functions
 - ① It synchronizes transmission and reception by sending and receiving a continuous flow of bits with associated time information.
 - ② It specifies the physical media for the physical medium including ^{connectors} ~~connectors~~ type and cables.

II TC (Transmission Convergence): TC Sublayer

has four functions:

- 1) Cell delimitation.
- 2) Header error control/
- 3) Sequence verification & generation
- 4) Cell Rate decoupling
- 4) Transmission frame Adaptation

I: ATM layer: This layer combine with ATM Adaptation layer, ATM layer is roughly analogous to the data link layer of the OSI reference model.

ATM layer is responsible for the simultaneous sharing of virtual circuit over a physical link and passing cells through the ATM network. To perform this particular task, it uses the BVPT and VCI information in the header of each ATM cell.

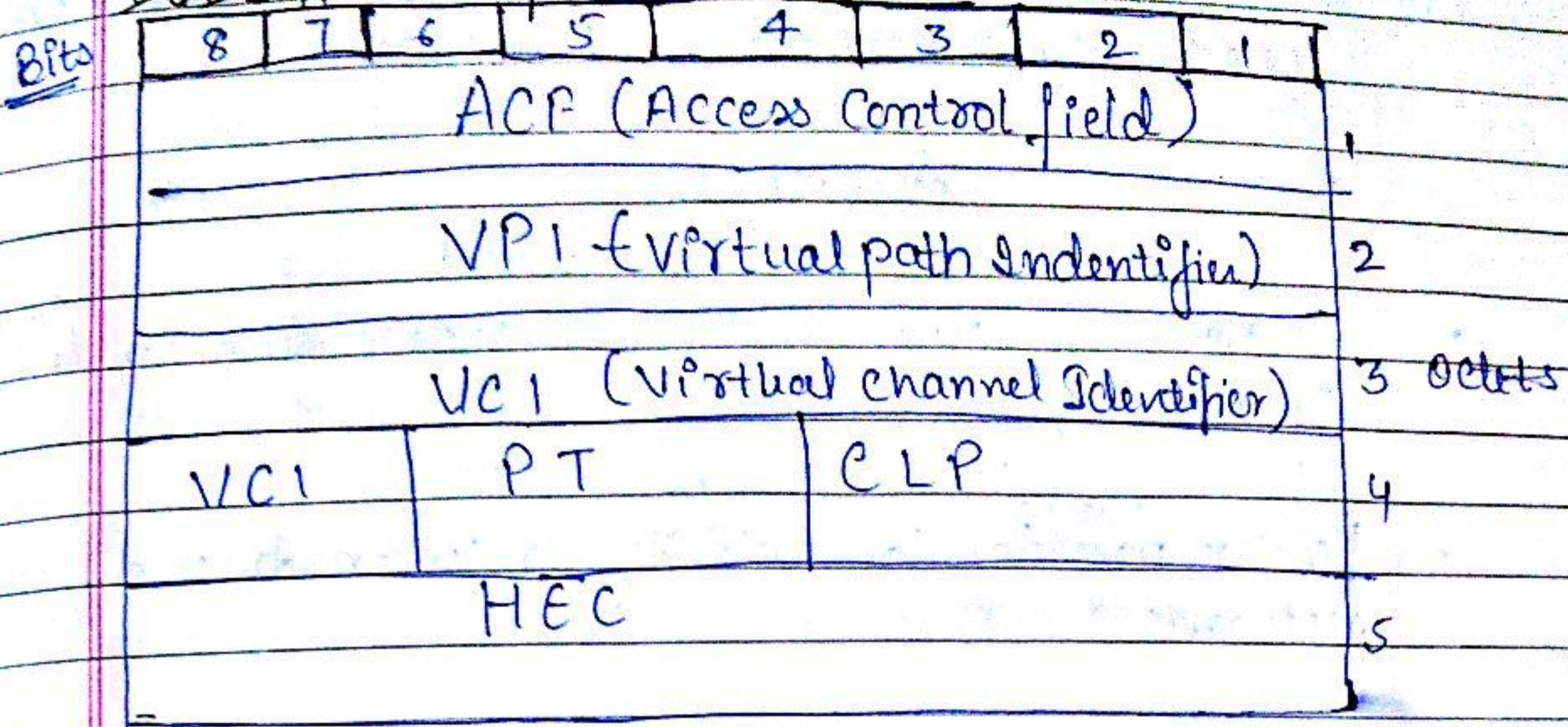
II: ATM Adaptation layer: It combine with ATM layer. This layer is responsible for isolating higher layer protocol from the detail of the ATM processes. The Adaptation layer prepare users data for conversion into cells and segments the data into 48 byte cells payload.

- | | ↓ IPv4 | ↓ IPv6 |
|---|---|-------------------------------------|
| ① | IPv4 addresses are 32 bit length | IPv6 addresses are 128 bit length |
| ② | Fragmentation is done by sender and forwarding Router | Fragmentation is done by Sender. |
| ③ | No packet flow identification | Packet flow identification |
| ④ | Checksum field is available | No checksum field is available |
| ⑤ | Broadcast Manages are available | Broadcast manage are not available. |

Header part consist of no of fields.

- ① Generic flow control (GFC) :- Provides local functions, such as identifying multiple stations that share a single ATM interface. This field is typically not used and is set to its default value of 0.
- ② Virtual Path Identifier :- In conjunction with the VCI, identifies multiple the next destination of cell as it passes through a series of ATM switches on the way to its destination.
- ③ Virtual Control Identifier.
- ④ Payload Type :- Indicates in the first bits whether the cell contain user data or control data the cell contain user data, the bit is set to 0.

DQDB Header format:



DQDB: IEEE defines a MAN standard. It is distributed Queue data interface & put up as IEEE 802.6 Standard.

Two parallel unidirectional buses are laid down in the area to be covered by the network. The stations are attached to both the buses in parallel. Each bus has had, which generates steady stream of 53 bytes cell. Each can travels downstream from the head end.

Each cell holds two protocol bits.

- ① Busy: Busy set to indicate the cell is occupied
- ② Request: which can be set when a station wants to make a request

To transmit a cell, a station has to know whether the destination is either Right or left side of the destination is to be right, the sender uses bus A otherwise it was bus B

In 802.6 protocol it queue up data and becomes ready to transmit in FIFO order

Section-B

Network Layer Protocol

- On Network layer Packet is responsible to ^{Carry} delivery of path information.

- Router ^{is a device which is used to} provide connectivity between two different networks

- Hop Count: It is in case of Router for delivery of packet how many router is used in between the source & destination. It is also known as Metric

- Protocol is responsible for delivery of packet

To successfully perform Routing it is divide in two part

① Routing protocol

② Routed protocol

① Routing protocol: which one is the beneficial way b/w source & destination & less no of Hop Count is used. Provide virtual physical path with low congestion.

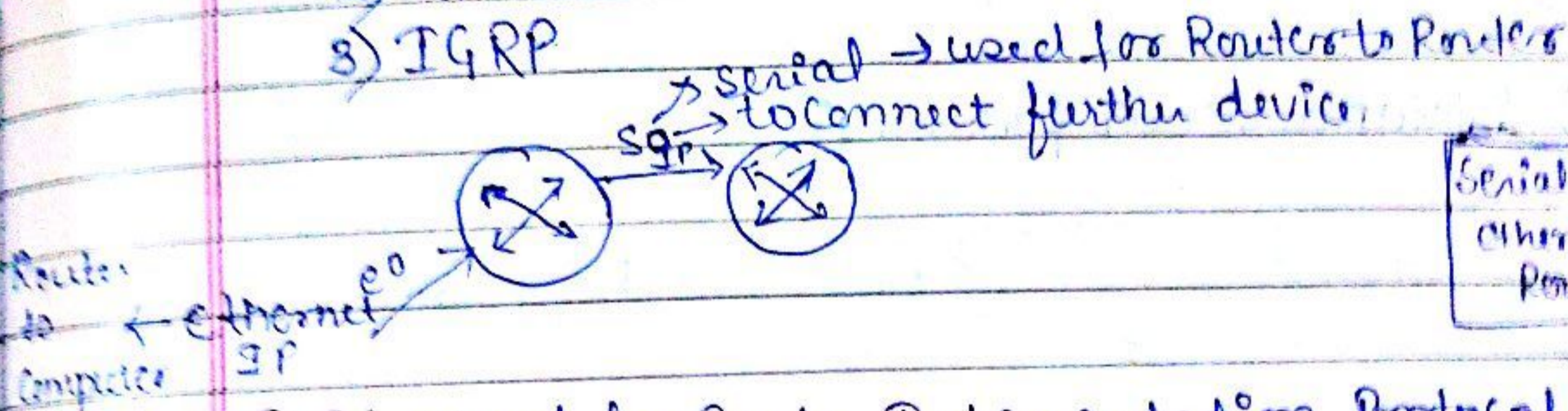
It provide a way or link.

② Routed protocol: It provide connectivity b/w source & destination eg of Routed protocol is IP, Apple talk

Q1) Routing protocol is divided into three categories.



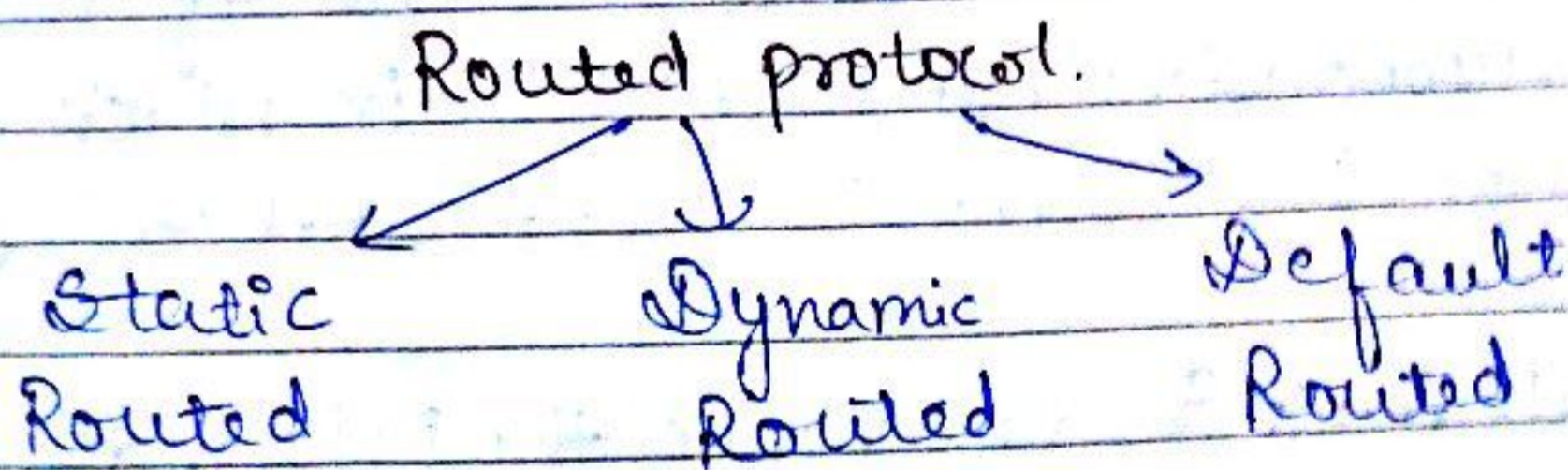
- Protocols used:
- 1) RIP
 - 2) RIPV2
 - 3) IGRP
- 1) OSPF
 - 1) EIGRP



Serial IP or
 Ethernet IP for
 Router

- RIP: Stand for Router Interrelation Protocol
- IGRP: Interior gateway Routing protocol.
- OSPF: Open Shortest path first
- EIGRP: Enhanced interior gateway Routing protocol

Q2) Routed protocol is divide in three category:



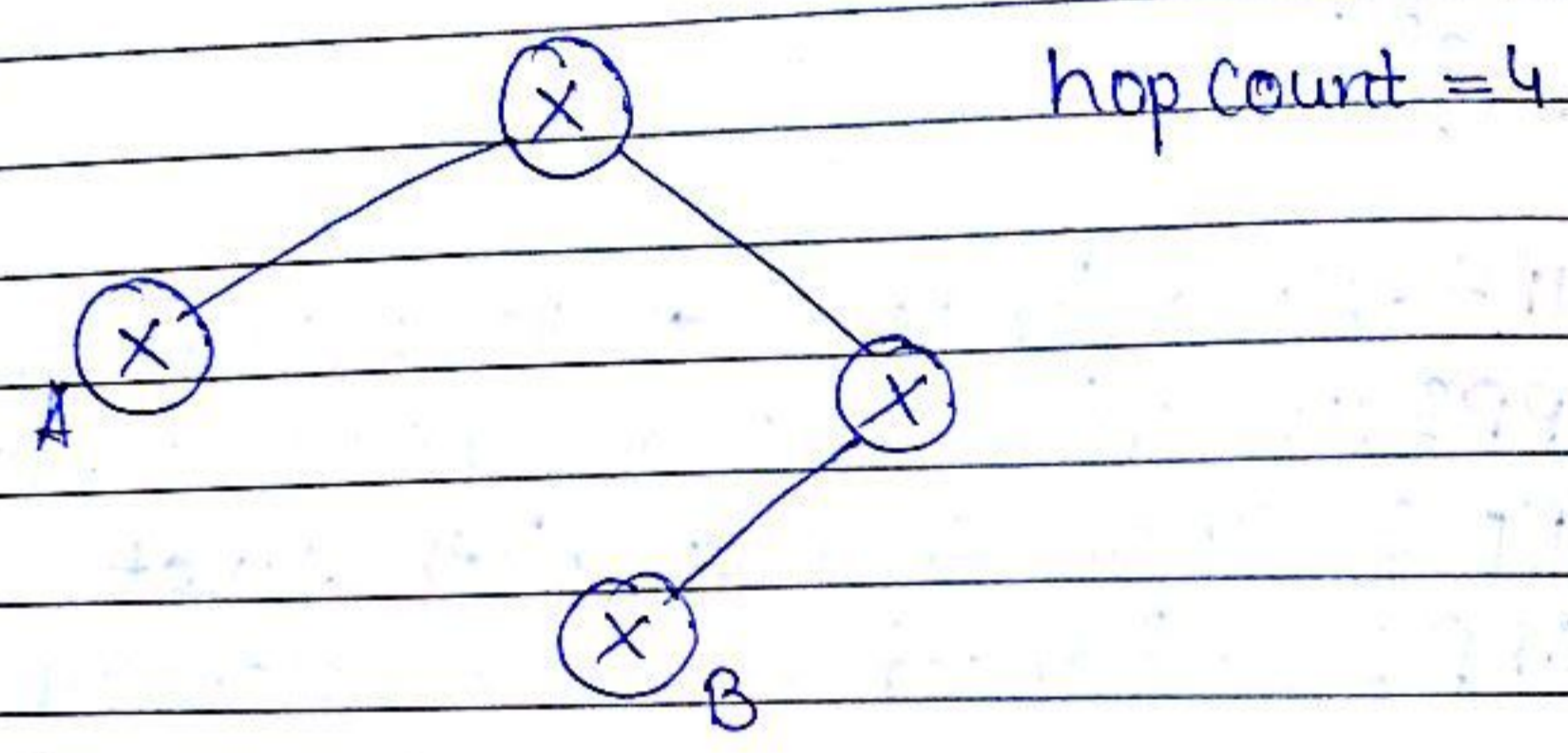
- A Router is a type of inter networking device that passes data packets between network based upon layer three address.
- The purpose of Router is to examine incoming packet, choose the best path for them through the network and then

Switch them to the proper outgoing port

Gateway: It operates on all the layers of OSI model.

- ② It is a protocol converter.
- ③ It can accept a packet for a one protocol and convert it into a packet format for other one protocol.

① Distance Vector protocols:



- It is responsible to provide shortest path
- Shortest path means less no of hop count
- It responsible to find out in which way less no of hop count is used with low congestion

② Link State: It provide the information about the neighbourhood router

Information related to logical address is state by link state

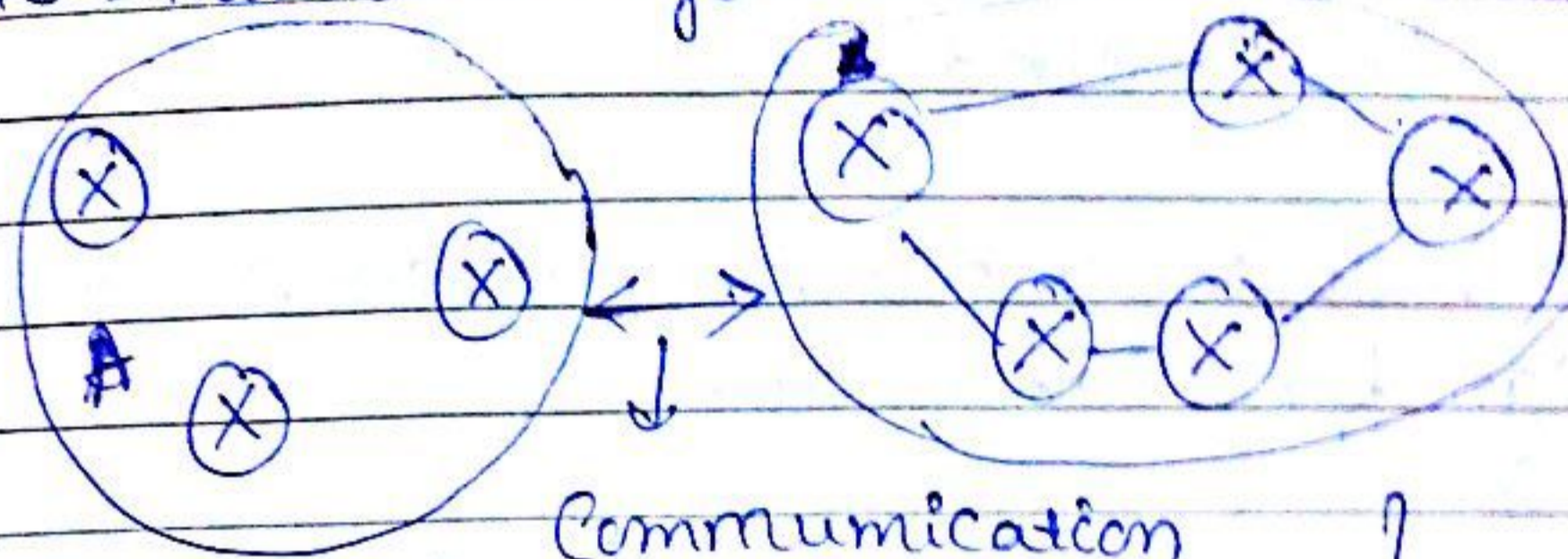
Routing information update update.

③ Hybrid protocol: It is combination of Distance Vector & Link State

According to region router are count in Hybrid protocol

Region to Region information stored.

AS → Autonomous System → Outside no router interface



Communication provide AD is responsible. } → Trust

Information stored in two way:

Autonomous System: It is a collection of group of router under a common administration i.e. about Autonomous system

AD/A

In case of region layout the packet is delivered with accurate information.

→ **Administrative Distance:** It is a value either 0 or 1

0-255 numeric value is assign if value assign

is 0 then trust is full value increase trust decrease

• it is used for trustworthiness of packet

→ **RIP:** It is responsible to provide the about No of hops.

② It is a protocol which is responsible to update the information about every 30 second

③ for single It provide information about 15 Hops

- Page _____
- It provide 15 max # 15 hops of information
 - RIPV₁ provides the connectivity for class ~~less~~ ^{full} Routing
 - RIPV₂ is responsible to provide the connectivity Class less Routing

3. > IGRP: It is a protocol which is basically Design for Cisco Router

- It is responsible for 255 hops of information
 - It is used for long distance
 - It is a protocol which is responsible to update the information after 90 seconds
- Timer are used:

- (1) update timer
- (2) Invalid timer
- (3) Hold down timer

Que 1) A Computer circuit board, install on a ~~com~~ Computer so that it can be connected to a network

- (1) NIC (2) Ethernet Switch (3) RJ45 (4) HUB

Que 2) A NIC card can be used for

- (1) FTTH (2) Ethernet (3) Microwave (4) Wi-fi

Que 3) which of the following is unbound transmission media.

- (1) UTP (2) Co-axial (3) Microwave (4) fiber optic

Que 4) Which of the following memory needs to be refreshed
(1) SRAM (2) D-RAM (3) ROM (4) All of the above

Que 5) Which is the reserved address for private Network
(1) 10.0.0.0 to 10.255.255.255
(2) 128.0.0.0 to 191.255.255.255
(3) 150.0.0.0 to 150.255.255.255
(4) 202.40.55.0 to 202.40.55.255

Que 6) Which one is the least expensive device typically work at ^{physical layer} OSI model.
(1) Router (2) Bridges (3) Repeater (4) Gateway

Que 7) Frames from one LAN can be transmitted to another LAN with the device
(1) Router (2) Bridge (3) Repeater (4) Modem

Que 8) Which of the following condition is used to transmit two packet over a medium at the same time.
(1) Contension (2) Collision (3) Synchronous (4) Asynchronous (5) None of the above

Que 9) Which answer correctly list the OSI, PDU in order
(1) Data, Packet, Frame, Segment, Bit
(2) Bit, Data, Packet, Segement, Frame
(3) Data, Segment, Packet, Frame, Bit
(4) Bit, Frame, Segment, Packet, Data

Que 10) Which transport layer protocol provide connection oriented, reliable transport.
(1) TFTP (2) UDP (3) Ethernet (4) TCP (5) Secure Shell

Ques Diff b/w TCP & OSPF reference mode
Ques Design Self formant for UNI or NNI

Link State Routing Protocol.

→ OSPF

Link State:

To get information regarding the neighbours & on which topology it is based

OSPF layer is responsible for info regarding the neighbour

Each Router generate Routing table it include Current id, Destination id, Neighbourhood Router

(1) Advertisement → it is also known as Link State Advertisement (LSA) → To a particular network what IP is assign, on which topology it depend, need Router for established for Particular network.

R₁

R₂

R₃ → Destination.

Features of OSPF: (1) It is a protocol which is based on class less network

(2) It is Scalable & extendable

(3) It is faster than distance vector protocol

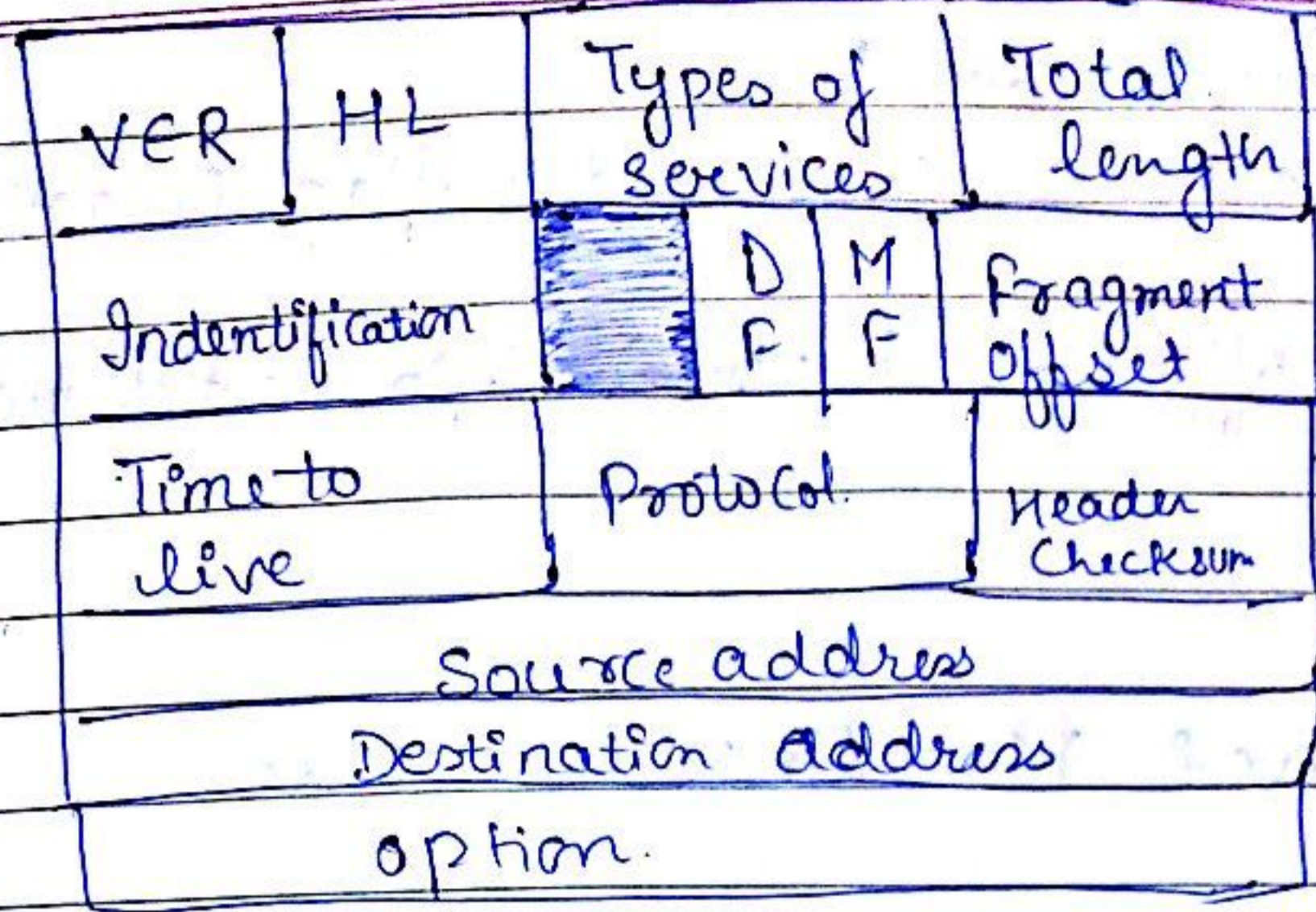
- EIGRP: ① It is upgradation of IGRP & RIP protocol
- ② It is a protocol which is used for class full routing.
- ③ It uses hello packet to get neighbour routing information
- ④ It has a capability to support multiple protocol.

Routed protocols:

- Static → Responsibility on Administrator.
- Dynamic → # Set of ^{Routing} protocols are being used
- Default.

① On which mode router is configure

- Source id
- Destination id
- Subnet Mask.
- Syntax to provide path:
Source id Destination id Subnet Mask



IPv4 header is of 32 bits.
Header is divided into no of field

- ① VER → Version
- ② HL → IP Header length ④ Total length header & total length of information.
- ③ Type of Services:
 - Simple text
 - Composite text, image
 - ~~Video~~ Video
 - 1) Which type of data is require using
 - 2) Which type of Connection we are using either Connection oriented & Connectionless.
- ④ Total length + ① Total length of header & total length of information.
- ⑤ Identification:

DF: Donot Fragment
If DF is 1 then it is actual data
If 0 the fragment is Consider.

MF $\frac{0}{1}$ More Fragment
0-fragment is considered, flag is activated MF

Fragment offset $\frac{0}{1}$ it provide info about the current
Segment

Time to live $\frac{0}{255}$ Max limit is 255 Sec.

Protocol $\frac{0}{255}$

Header Checksum: It depend upon security level
Here

Option $\frac{0}{255}$ It is for security, ^{strict} Routing, loose
routing.

