PART - II

Q#1

(a) Polio:

Definition: Polio is an infectious viral disease. It causes inflammation in the grey matter of spinal cord, leading to paralyzed legs in severe cases.

Causes of Polio:

(1) Infection of poliomyelitis virus:
This virus that affects spinal cord transfers through various means.

(2) Virus transfer through oral or faecal route:
It transfers from an infected individual through oral rout or faecal route.

(3) Poor sanitation and infected food or water:
The water or food contaminated with virus can be transferred if used by people.

(4) Through infected intramuscular Injections:

The unsterilled syringes also transfer this virus.

Prevention of Polio:

(1) Vaccination

- Inactivated polio virus vaccine (IPV) → Injected through muscles and creates antibodies to make infected individuals immune to virus
- Live attenuated Oral polio virus vaccine (OPV) → Taken through oral route in the form of drops. Usually given to new born babies of 10-18 months.

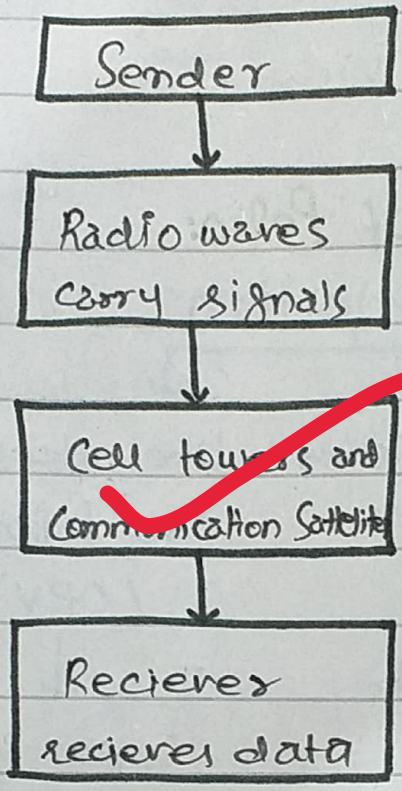
(2) Good hygiene can control spread of Poliovirus:

Clean water, food and other sanitation measures can control it.

(3) Sterilization of injections before use:

It can also prevent poliovirus

(b) Working of the cell phones as a wireless technology:



Discuss this in more detail

Explanation: A person who uses cell phone sends data, message, voice note or makes call, which is transfered by radio waves to the nearby cell towers. Moreover, communication satellites also transcend these signals from one ground station to another. Then, the signals are received by the receiver in the form of receiving data or other information.

(c) Carbohydrates:

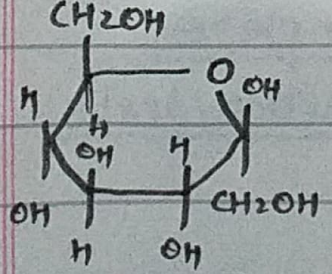
Definition: Carbohydrates are the richest source of energy in the human body. They are made up of Carbon, Hydrogen and Oxygen. These are the biological molecules.

Empiricle Formula: $C_n(H_2O)_n$

Example: Glucose, Fructose, Starch.

⇒ Types of Carbohydrates:

- **Monosaccharides**
  - Cannot be further hydrolyzed
  - Example: Glucose, Fructose, galactose
- **Oligosaccharides**
  - On hydrolysis gives 2 to 10 Monosaccharides
  - Example: Sucrose, Lactose, Maltose
- **Polysaccharides**
  - On hydrolysis gives more than 10 Monosaccharides
  - Example: Starch, cellulose



Glucose

Glucose + Fructose → Sucrose

⇒ Carbohydrates digestion in human body:

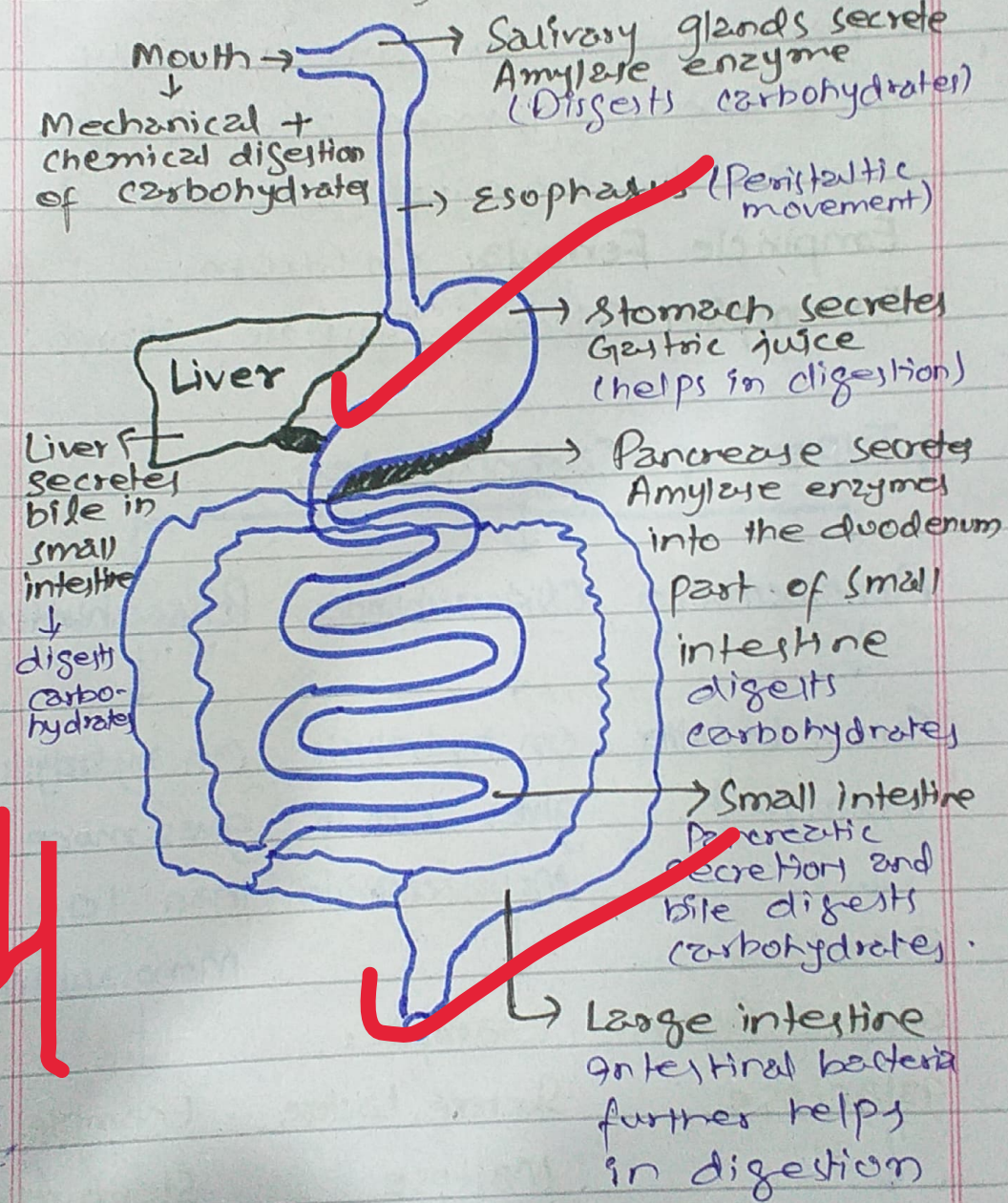


Diagram showing complete digestion process of carbohydrates

(d) Human Eye:

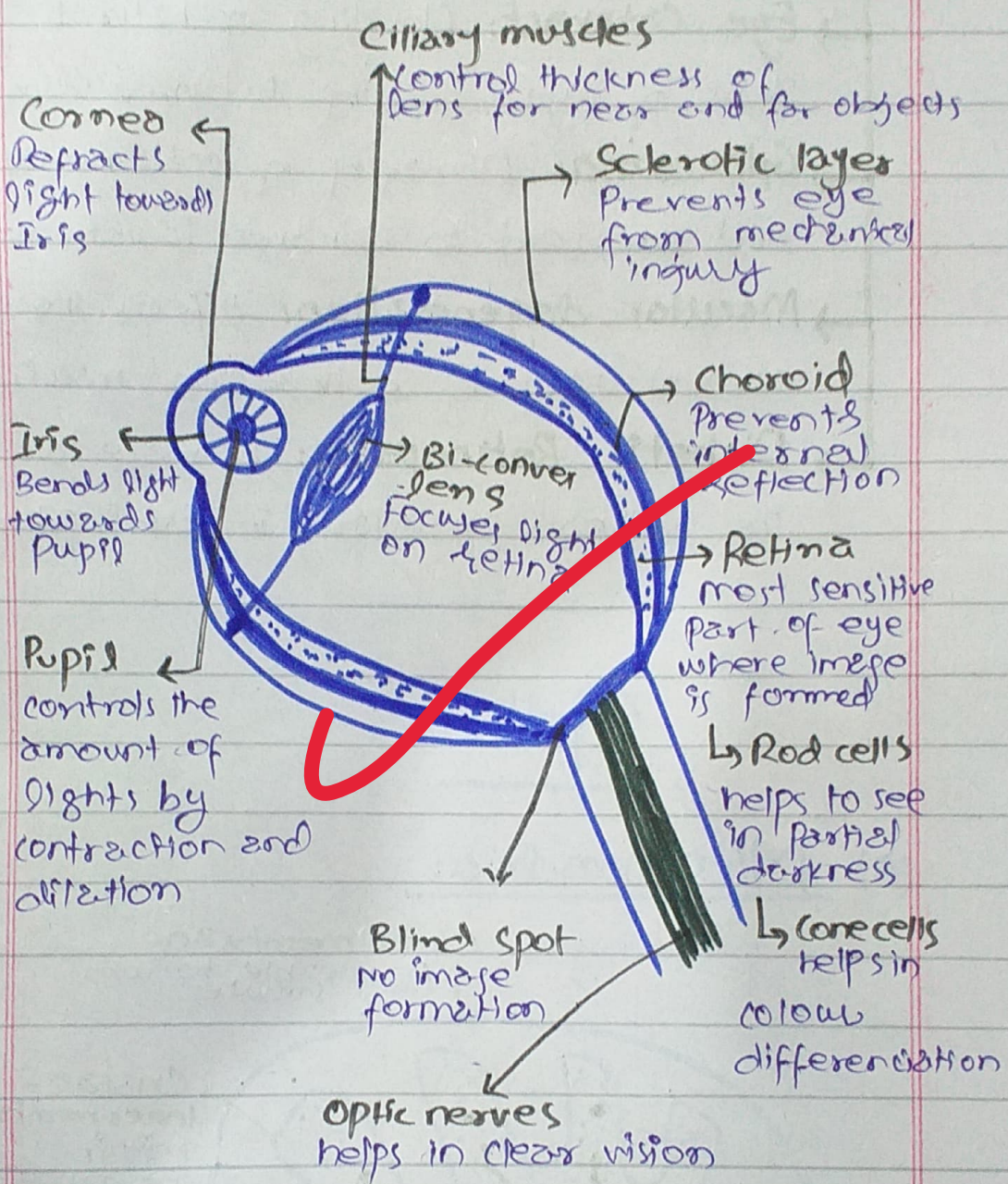


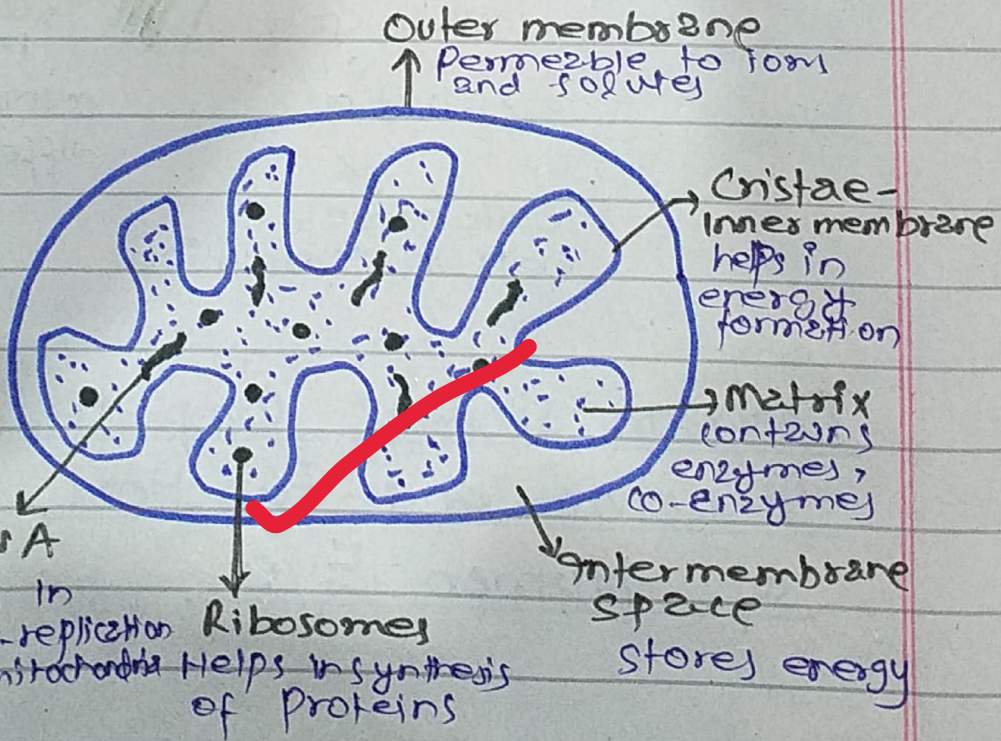
Diagram showing Complete Structure and Function of Human Eye

→ Diseases of Human Eye:

- Eye Cataract: Clouding of natural lens of eye, leading to blurred vision
- Glaucoma: Damaging of optic nerve and can lead to blindness if untreated
- Macular degeneration: Affects the central part of retina called macula
- Diabetic Retinopathy: Damage to the retina, particularly in diabetic patients

Q#2

(a) Mitochondria:



Structure

Functions of Mictochondria:

1- Energy formation: Power house of the cell:

Mictochondria produces energy through metabolic processes such as cellular respiration, Kreb cycle and fatty acid metabolism.

2- Regulation of metabolism:

Helps to regulate metabolic process to generate ATP through Kreb cycle.

3- Help in calcium storage:

Maintains calcium levels in the cell.

4- Involves in Apoptosis:

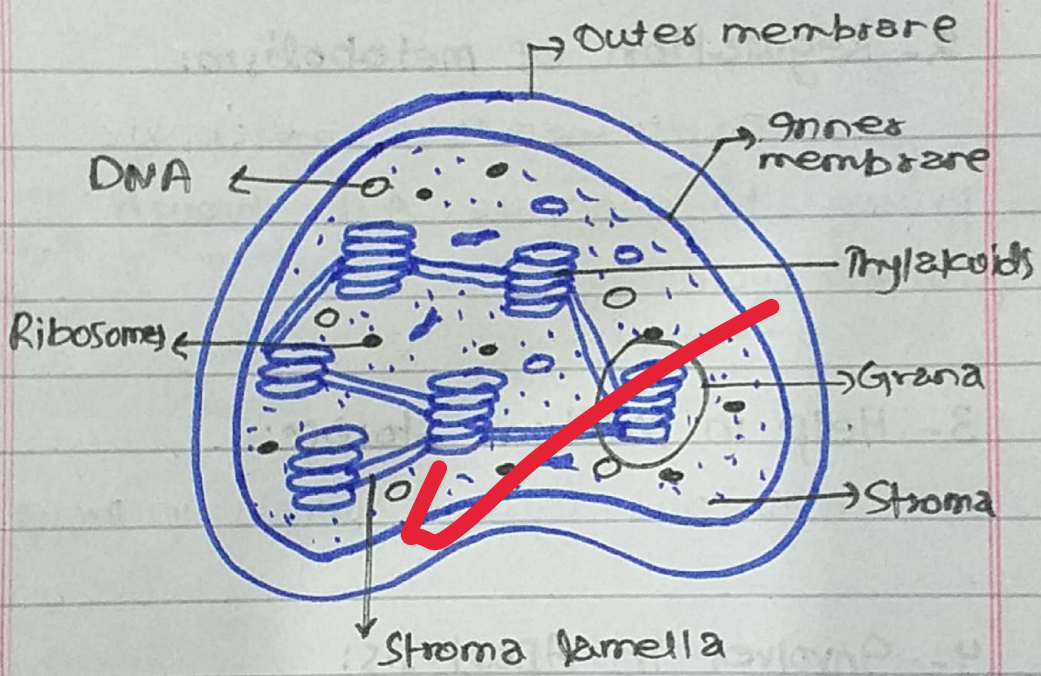
Mitochondria also assists cell in programmed cell death called apoptosis.

3.5

Plastids:

Plastids are membranous bound organelles in plant cell, which contain pigments to carry out photosynthesis.

Structure of Plastids:



Chloroplast

Functions of Plastids:

1- Carry out photosynthesis in Plants:

Chloroplast is the type of plastid that contain chlorophyll

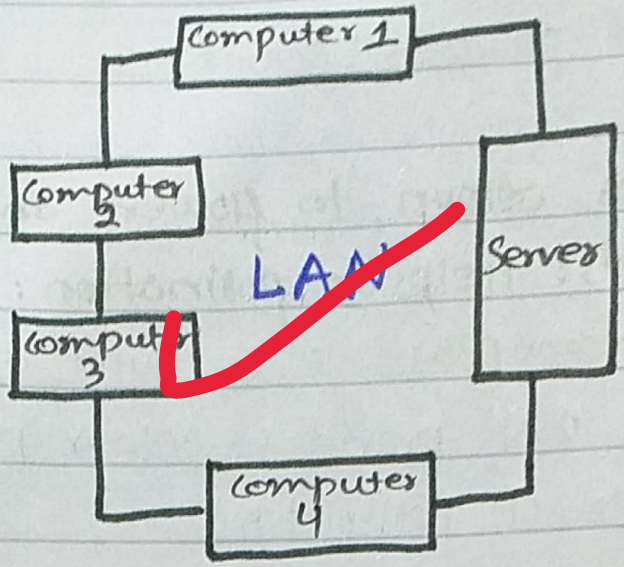
pigment that absorbs sunlight and helps in photosynthesis.

2- Gives colour to flowers and fruits: Helps in pollination:
Chromoplast is the type of plastid that provides colour pigment to attract pollinators

3- Helps in storage of starch and proteins:
Leucoplast helps in storage of starch, oils and proteins.

(b) Difference between LAN, MAN and WAN:

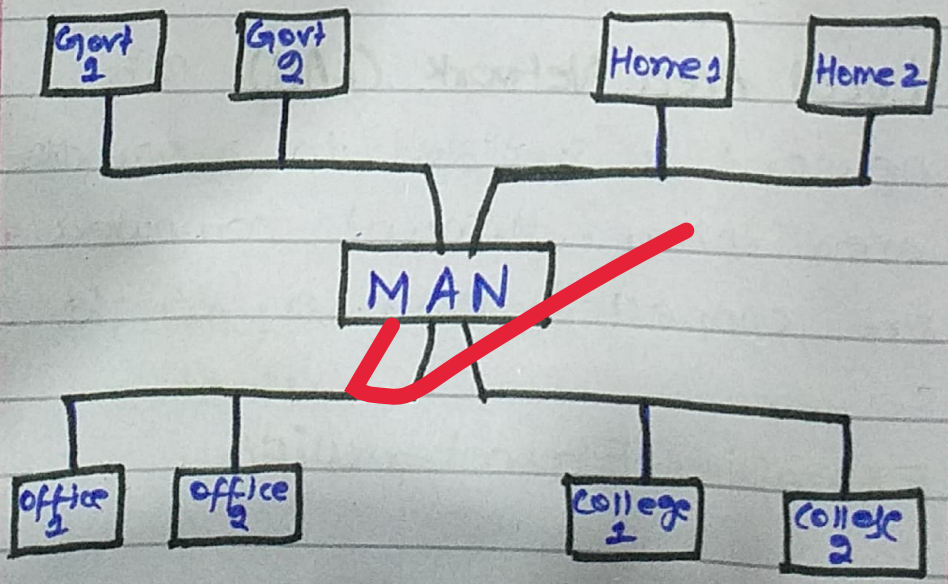
Local Area Network (LAN): This network is specipied to a particular area where different computers are connected over a single server.
Example: Ethernet, WiFi



Metropolitan Area Network (MAN):

It is a type of computer network that covers a larger city, region, community or metropolitan area through wider distribution of wireless routers.

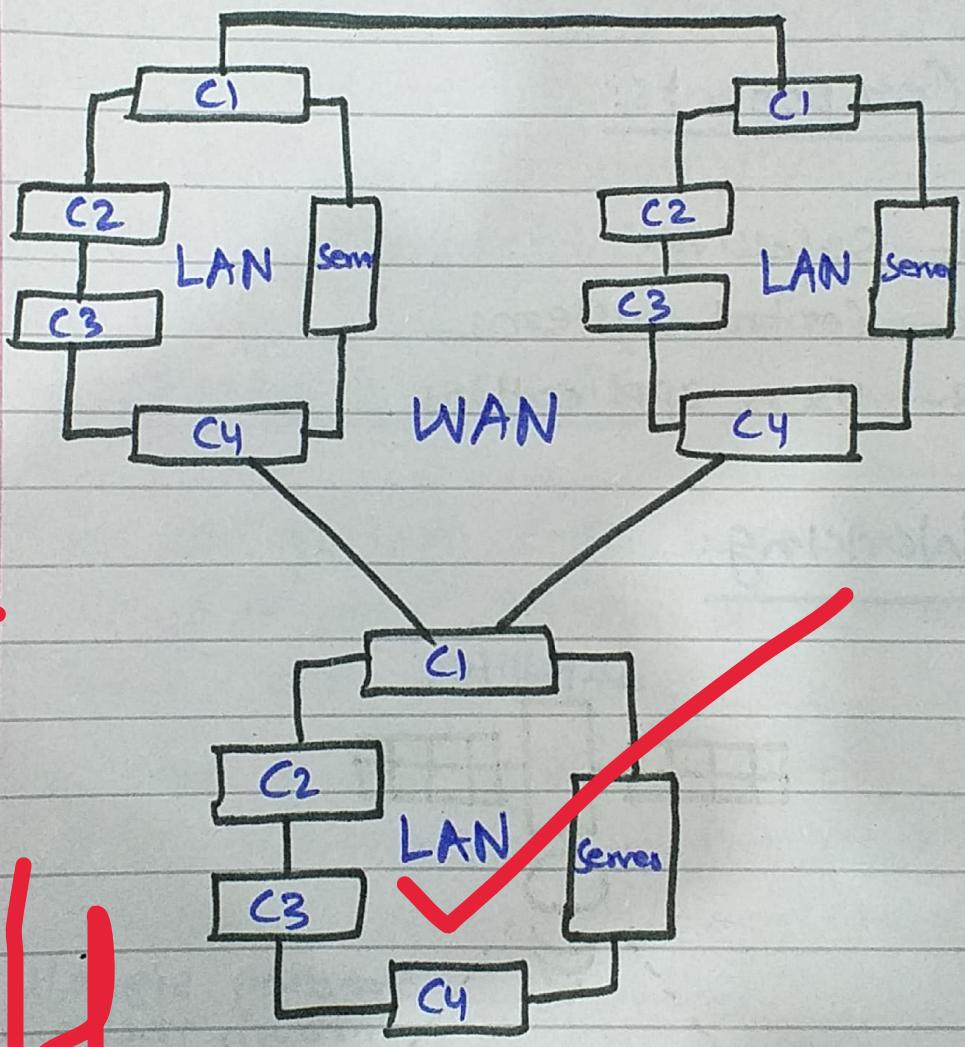
Example: Wireless routers network in cities.



Wider Area Network: WAN:

This network connects computers over a larger geographical area with shared connections and communications. It covers countries, region and societies.

Example: Internet



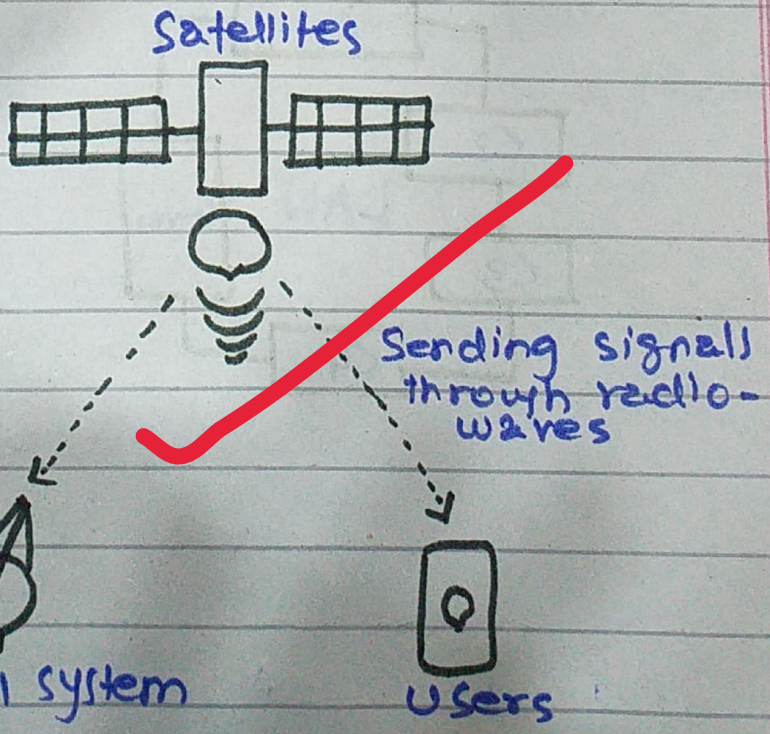
(c) Global Positioning System (GPS):

GPS is a space-based navigation system that pinpoints exact location everywhere on the earth with ultra accuracy. It uses radio waves to send signals on earth.

Components:

1- Satellites
2- Control systems
3- Users applications

Working:



On GPS, almost 31 satellites have been launched that orbit around the earth. During orbit these satellites collect data from all over the earth and send signals on earth. On approaching these signals, devices can locate their position on earth. Moreover, control systems help in tracking, controlling and communicating with these satellites.

Applications of GPS:

1- **Navigation:** GPS helps to navigate exact location of vehicles, ships and individuals.

2- **Use in industries:** Industries use it to monitor and control machineries such as to regulate, temperature, pressure of machineries.

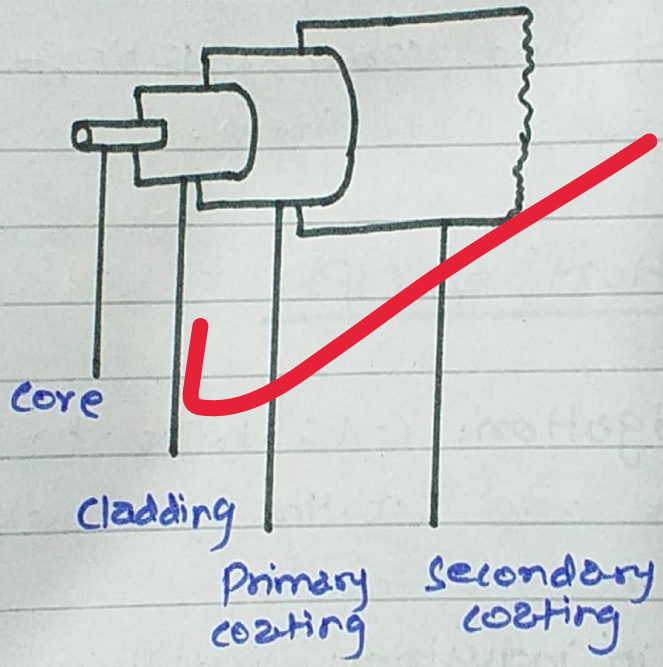
3- **Defense system:** It helps in guiding advanced weaponry.

4- **Disaster management:** Use emergency ambulances to find location of disasters.

(d) Optical Fibers:

Optical fibers are strands of bundles of fibres that uses light signals to transmit signals.

Structure of optical fibers:

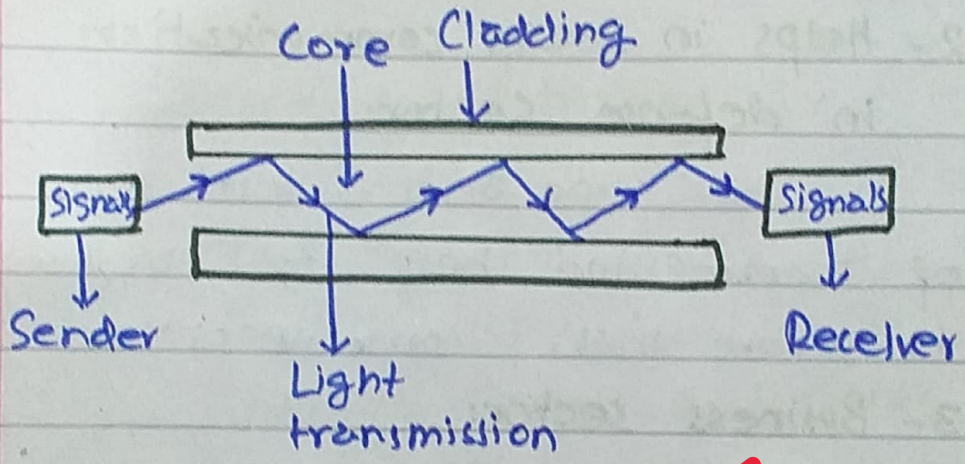


Working mechanism:

1- Total internal reflection
2- Continuous refraction

The parts of optical fibers

are made up of glass or plastic. To transmit signals through light requires two processes: total internal reflection and continuous refraction to prevent light from escaping during transmission.



Signals transmit in the form of light that travels these signals through optic fibers. While passing through core, it helps in total internal reflection of light. Similarly, cladding assists in continuous refraction of light and prevents it from escaping during transmission. Then, signals are received by the receiver in the end of the optical fibers.

Applications :

1- Transmission of signals in the form of light:

Optic fibers transmit signals with higher speed than other copper and metallic wires.

2- Helps in secure communication in defense sector:

The safe and fastest speed of transmission helps military to secure their communication.

3- Business sector:

They are highly used in business sector for speedily working.

4.5

Q#3

(a) Methods of food preservation:

Food preservation is the protection of food from spoilage, poisoning and microorganisms.

Methods of food preservation

- **Freezing:** It is a cold storage of food at cold temperature hampers growth of microbes
  Example: Cold storage of fish in kanchi to tranfer it to other regions.

- **Canning and bottling:** The already cooked food is stored in cans after sterilizing them with sterling agents.
  Example: Cereals and pulses storage after partially cooking them.

- **Salting:** Salt sprinkle on food, particularly meat hampers growth of bacteria.
  Example: Salting of meat to preserve it, especially in far-flung areas where no light and refrigerators.

→ **Vacuum packaging:** The removal of O_2 and CO_2, which enhances growth of bacteria helps to store food with protection
Example: Storage of dry fruits in packaging

→ **Buried underground:** Foods can also be preserved by burying them underground as there is no light, O_2 and CO_2. It helps to prevent microorganisms.
Example: Potatoes are stored from this method.

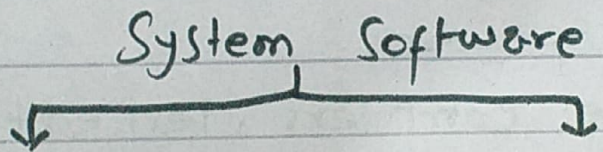
(b) Computer Software:

Computer software refers to set of instructions, programmes and data that tells computer how to perform specific tasks. These are intangible. Moreover,

they help hardware to function properly.
Example: Windows, Microsoft office.

Types of Computer Software:

1- System Software: This type of computer software manages and controls computer hardware. It also handles resources for proper functioning of computer.



Operational System
It manages operational resources of computer
Example: Window, Linux

Utility programs
It assists users to maintain and protect computers.
Example: Anti-viruy programe

2- Application Software: Designed for end users to perform specific tasks such as managing files and

documents.

Application Software

Programming tools	Entertainment Applications
They help in managing files	They are already installed in computer
Example: Microsoft office, Google docs	Example: VLC media

3.5

2. Programming Software: These are used by developers to regulate other softwares.
Example: Compilers, Text editors

(c) Difference between ROM and RAM:

	Random Access Memory (RAM)	Read Only Memory (ROM)
1-	Definition: RAM is a computer memory that temporarily stores in a computer while programmes are running	Definition: ROM is a permanent memory that stores information permanently in a computer and cannot be deleted.

2-	Volatility: It is a volatile memory that is deleted when power is turned off.	Volatility: It is a non-volatile memory and cannot be deleted when power is turned off.
3-	Speed: It is easily accessible and fast	Speed: It is not fast and cannot be easily accessed.
4-	Upgradability: It can be modified while using.	Upgradability: It cannot be modified while using.
5-	Capacity: It stores large amount of data e.g; in 8GB and 16GB which is easily available	Capacity: It stores less data than RAM. Permanently installed software in a computer.

(d) Pancreas:

It is an organ in human body that functions both as an exocrine gland and an endocrine gland.

Pancreas As A Double Gland System

Endocrine Gland

Secretions without ducts into the blood directly

↓

Islets of Langerhans

secretes insulin and glucagon into the blood

↓

Insulin

Regulates blood glucose level by uptaking it into the cell

↓

Glucagon

increases blood glucose level by breaking glycogen into glucose in liver

Exocrine Gland

Secretions using ducts into other organs

↓

Acinar cells

secretes digestive enzymes into the small intestine

↓

Digestive Enzymes:

Amylase, protease, and Lipases

for the digestion of carbohydrates, proteins and lipids in the duodenum part of small intestine

Q#4

(a) Balanced Diet:

Balanced diet consists of all the essential nutrients required for the proper growth and function of the human body.

Example: Proteins, Carbohydrates, Minerals, Vitamins, Lipids and Dietary fibers.

1- Proteins: These are essential biomolecules that forms various structures of body and help in maintaining body parts.
Example: Keratin, antibiotics

2- Carbohydrates: Rich source of energy that helps in the formation of cell structures as well
Example: Monosaccharides, oligosaccharides and polysaccharides

3- Lipids: Lipids also maintain

body parts and provide energy.
Example: Fats, fatty acids, cholesterol

4- Vitamins: Two types of vitamins are essential that is taken from food and non essential that body makes by itself.
Example: Vitamin C, A, B, E, K.

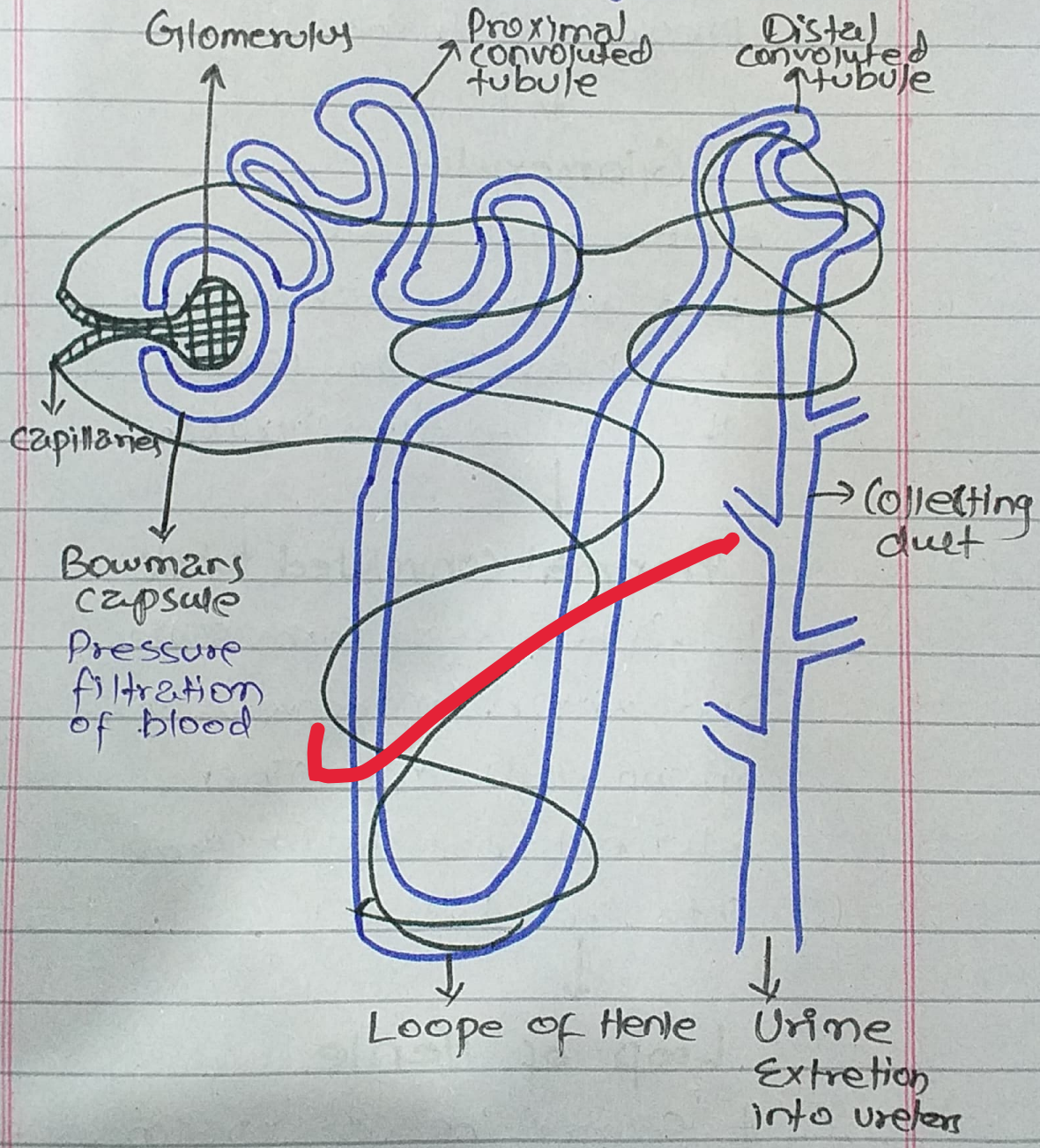
5- Minerals: Minerals are required in small amount for the proper functioning of body.

6- Dietary fibers: They help in the digestive system.

⇒ Requirement of balanced diet varies on the basis of age, gender, weight, height and job:
A child requires less amount of calories such as almost 1200 calories. Similarly, women who do not work require 2900 calorie while those who work require 3000 calorie. On the same manner,

men who do not work require 3500 calorie while who work require 4000 calorie.

(b) Structure of Nephron And Urine Formation By Kidneys:



Structure of Nephron

Nephron: It is the functional unit of kidney that helps in urine formation.

Bowman's Capsule

It filters blood through pressure filtration

↓

Glomerulus

Almost 70% solutes and water is reabsorbed by blood in this part

It leads to ultrafiltration

↓

Proximal convoluted tubule

It further reabsorbs solutes and water. Moreover, ions, amino acids and other elements are reabsorbed into the blood.

↓

Loop of Henle

It carries the concentration of urine with salt

↓

Distal convoluted tubule

It further reabsorbs water and ions

↓

Collecting duct

The remaining reabsorption of water occurs in this duct. It finally excretes Urine in urinary tract and then enters in bladder for final excretion.

(c) **Biofuels:**

Biofuels are the reneweble form of energy that produced by organic matter and biomass. This energy is environment friendly as it releases 65% less CO_2 than fossil fuels awording to US Energy security report.

Example: Animal manure, crops, Starch, soybeans, grains etc.

Generation of Biofuels: Food vs fuel debate:

1st Generation: This generation uses food crops to produce biofuels. Therefore, it poses threat to food production as scarcity of food leads to high inflation and food crisis.

2nd Generation: Biofuels are produced by lignocellulosic material in this generation such as hard, woody material. Therefore, this generation overcomes the drawbacks of previous generation

3rd Generation: It uses algae to form algal oil. According to US Energy Agency report, it produces 30 times more energy than food crops oil.

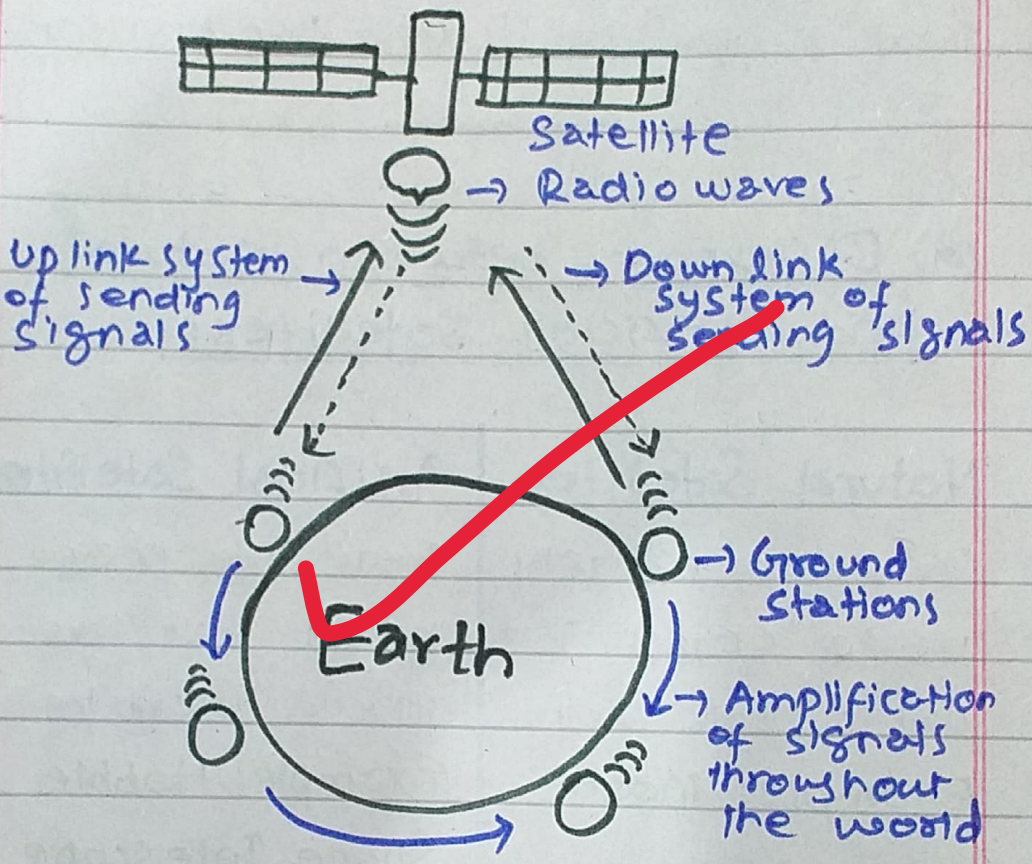
4rth Generation: This generation uses those crops that consume

more CO_2 than production of O_2 while combustion. Therefore, 4th generation has less risk to food crops and its production.

(d) Difference between natural and artificial Satellites:

Natural Satellites	Artificial Satellites
These are naturally made objects that orbit the Earth.	These are man-made that are placed to orib the Earth
Example: Moon	Example: Hubble Space Telescope
Purpose: They have no specific purpose, naturally orbit the Earth by gravitational pull.	Purpose: They are designed for communication, navigation, weather forecasting etc.
Composition: Made from ice, rock or gases	Composition: made from metals and other electrical components.
Speed: Its speed is constant	Speed: It can be modified by control system.

Working of Communication Satellites:



Communication satellites: These satellites are artificial satellites that sends and receives radio signals from Earth. Then, amplify these signals that are taken from ground stations on Earth. These signals are then sent to other ground stations on other parts of the earth. In this way, it helps

in communication on earth.

Applications of Communication Satellites:

1- Helps in communication through wireless system of network
2- Helps in weather forecasting
3- Prevents disastrous impacts through previous prediction
4- Television transmissions and broadcasting occur through communication satellites.

4.5

Good answers, overall

any part of the attempted question will not be considered.

PART-II

Q.1 **(a)** Describe different causes and preventions of 'Polio' **(05)**

(b) Briefly explain the working of the cell phones as a wireless technology. **(05)**

(c) Define carbohydrates give its types and how carbohydrates digest in human body? **(05)**

(d) Write a brief note on Human eye; enlist few of its diseases. **(05)**

Q.2 **(a)** Explain structure and function of Mitochondria and Plastids. **(05)**

(b) What is the difference between LAN, MAN and WAN? **(05)**

(c) How GPS is important with respect to its widespread applications? Explain its working principle and various components. **(05)**

(d) Describe the structure and working mechanism of optical fibers. What are the applications of optical fibers? **(05)**

Q.3 **(a)** Explain different methods of food preservation. **(05)**

(b) What is meant by computer Software? Explain its types. **(05)**

(c) Differentiate between ROM and RAM. **(05)**

(d) Elaborate the Pancreas is a double gland system. **(05)**

Q.4 **(a)** Write a comprehensive note on Balanced Diet. **(05)**

(b) Label structure of nephron, how urine is formed in kidneys? **(05)**

(c) Define Biofuels. Enlist their generations; indulge in food vs. fuel debate. **(05)**

(d) Differentiate between natural and artificial satellites. Briefly describe the working of Communication satellites with some applications. **(05)**

****