

TEST #02

31/40

DATE: / / Name: Hudda Hayat

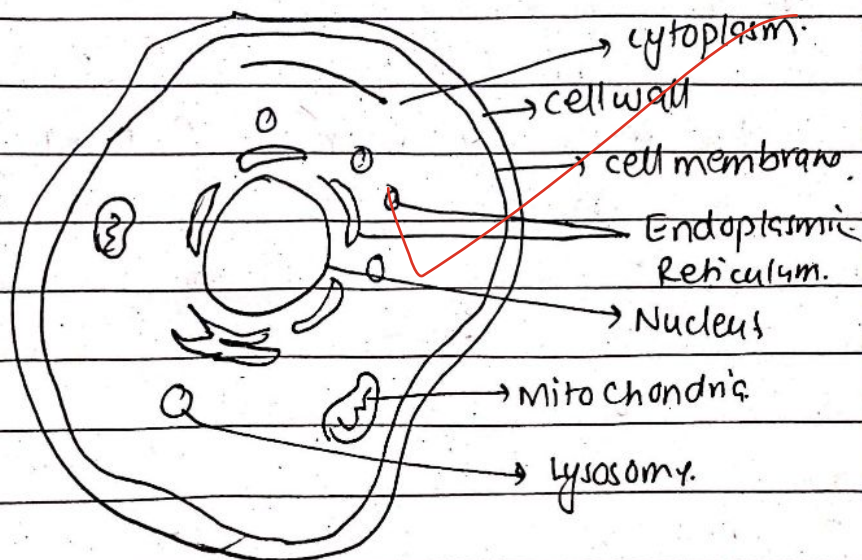
QUESTION #01

PART # A

1- CELL = BASIC UNIT OF LIFE:

All living beings are made up of cells. It is the structural and functional unit of life. Cell is microscopic in nature and cannot be seen with naked eye. Cells combine to form tissue, which in turn group to form organs. Cells can be divided either into prokaryotic and eukaryotic based on the presence of cell membrane and membraned organelles. Cell is a microscopic entity consisting of organelles in it. Some of the organelles found in a cell are:

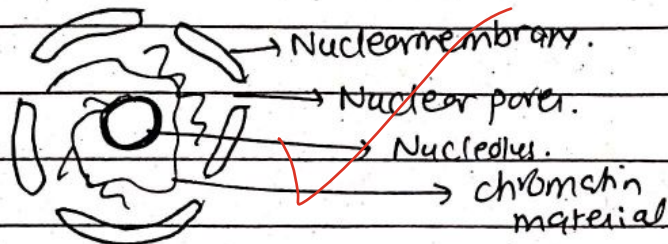
- i - Nucleus
- ii - Cytoplasm
- iii - Golgi apparatus
- iv - Endoplasmic reticulum
- v - Mitochondria
- vi - Centrioles or plastids



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2- NUCLEUS:

Nucleus is the most important organelle in any cell. It is enclosed by nuclear membrane, that is porous. It contains chromatin material (hereditary), nucleolus and nucleoplasm.



a- Functions:

Nucleus is the main organelle containing hereditary material in form of chromatin.

Moreover, the nucleolus of nucleus is responsible for manufacturing and transportation of ribosomes through ribosomal RNA. Ribosomes are important for protein synthesis. Lastly, nucleus controls all the activities of cell including transportation of materials, phagocytosis, protein formulation etc.

3- CYTOPLASM:

The jelly-like material present between cell-membrane and nuclear membrane is cytoplasm. The ^{water} soluble part of cytoplasm is called cytosol. Also,

$\text{Nucleus} + \text{Cytoplasm} = \text{Protoplasm}$.

The composition of cytoplasm is 90% of water, 8% of inorganic elements like calcium, sodium, potassium, zinc, phosphorus etc. and 2% of dissolved gases like oxygen and carbon dioxide.

a- Functions:

Cytoplasm is important for.

- i- Biochemical reactions happening in cell
- ii- Being a medium where organelles exist.
- iii- Giving cell its structure and form.
- iv- Transportation of materials from nucleus to the cell and finally to cell membrane
- v- Being a store house of fats, proteins, lipids, and other useful organic and inorganic elements.

3- PLASTIDS:

Plastids are an organelle found only in plants and algae. It is like mitochondria and is responsible for manufacturing and storage of important compounds. Plastids have their own DNA like mitochondria. Plastids are further divided into following types.

- a- Chloroplasts: Chloroplast contains a pigment named chlorophyll, thus, giving it color green. It is mostly found leaves and green stem. It is responsible for photosynthesis that is production of energy using sunlight and carbon dioxide.
- b- Chromoplasts: Chromoplasts are storehouse of pigments other than green. They are found mostly in petals and flowers.
- c- Leucoplasts: Leucoplasts have store food in them and are present in underground stem and roots.

Thus, cell is highly important for functioning of life and its continual. Cell alongwith its organelles carry out basic

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activities of life.

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PART B

1- **KIDNEY 2 EXCRETORY ORGAN:**

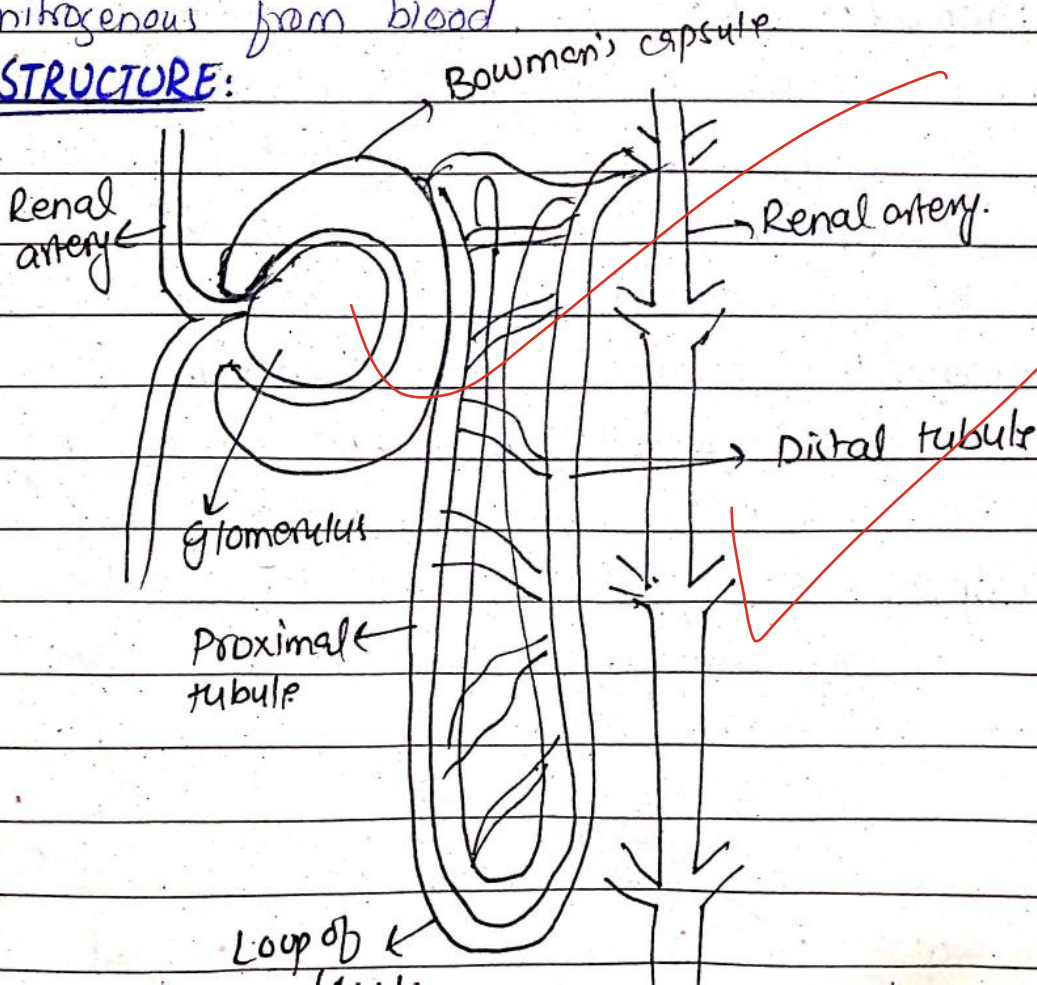
Kidneys play an important role in excretion of nitrogenous wastes outside the body. A human body has 2 kidneys, each consisting of one million nephrons in its cortex and medulla region.

The ureter connects kidney to ~~urethra~~ ~~also~~ known as urinary bladder, which in turn excrete out urine through urinary opening. ^{called urethra} Nephron

2- **NEPHRON:**

Nephron is the structural and functional unit of kidney. It carries out the filtration, reabsorption and excretion of nitrogenous from blood.

A- **STRUCTURE:**



Nephron composed of following parts.

- 1- Glomerulus: Glomerulus is a ball like structure of capillaries which filters the blood and into a 'glomerulus filtrate'. Glomerulus filtrate contain many useful compounds like amino acids, carbohydrates, sugar etc. It differ from blood only in terms that the filtrate doesn't contain red blood cells or white blood cells. The process of pressure filtration occurs in glomerulus where the pressure in arteries diffuses the filtrate in glomerulus.
- 2- Bowman's capsule: The capillaries surrounding glomerulus are termed 'Bowman's capsule'. It performs two function
 - i- It surrounds glomerulus.
 - ii- It collect the 'glomerular filtrate'.
- 3- Proximal Tubule and Distal tubule:

The descending and ascending tubules are called Proximal and Distal tubule respectively. Both perform the function of selective reabsorption. Proximal tubule reabsorb the useful compounds of filtrate like sugars, amino acids etc. The distal tubule reabsorbs excess of water present in the urine.
- 4- Loop of Henle:

Loop of Henle maintains the pH of urine by adding H^+ ions into urine, in case it turns basic. Loop of Henle consist of the network of capillaries present

proximal tubule and distal tubule.

B- FUNCTION:

Nephron performs the function of removal of nitrogenous waste from the blood. The end product of this excretion is urine. Moreover, nephron carries out excretion through.

- i- Selective reabsorption: reabsorption of useful material out of glomerular filtrate.
- ii- Pressure filtration: The pressure of artery push the filter the blood through glomerulus
- iii- Tubular secretion: The secretion of certain ^{ions} ~~out~~ to maintain pH of urine under normal level.

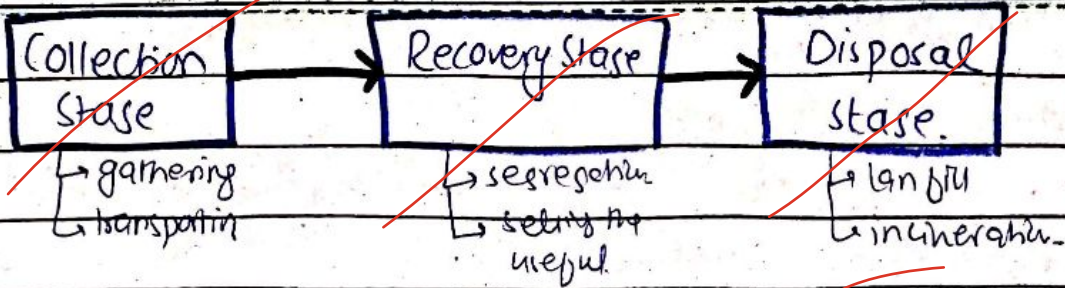
The urine is ~~set~~ then collected and sent to ureter which empties out in urinary bladder and the filtered blood is sent back to body.

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PART - D

I- SOLID WASTE MANAGEMENT: (SWM)

Solid waste management or simply SWM, is a process of collection, transportation and managing the solid waste in a given place. Solid waste can be in form of organic waste, industrial waste, food waste, e-waste or medical waste etc. SWM aims at reducing and managing the solid waste and reducing land pollution. It also contribute to recycling of useable materials from waste. SWM process includes:



2- WEAKNESS OF SWM in PAKISTAN:

Land pollution is a grave concern for Pakistan. Rapid urbanization has reduced the available space on land and ^{solid waste} land pollution can further lessen in ratio. So, proper SWM is a need of hour. But Pakistan's SWM has many weaknesses and they are:

- i- It lacks a proper waste collection system and it is quite poor. The collection is only limited to influential areas. The ~~to~~ few number of bins, vehicles and containers further aggravate the collection scenario.
- ii- Open dumping is still practiced in Pakistan. Waste is dumped in open places which poses great threat to public health and environment.
- iii- Improper disposal of waste can lead to air pollution, leaching and spoiling of underground water. In Pakistan, waste is usually disposed off in trenches.
- iv- There is lack of resources, funding and manpower in this sector.
- v- Political will seems to be ignorant about solid waste management.
- vi- Segregation of hazardous and non-hazardous waste is not properly observed in Pakistan.

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It puts the workers of municipalities at a grave health risk.

vii- Pakistan also faces challenges in enforcement of waste management laws and regulation.

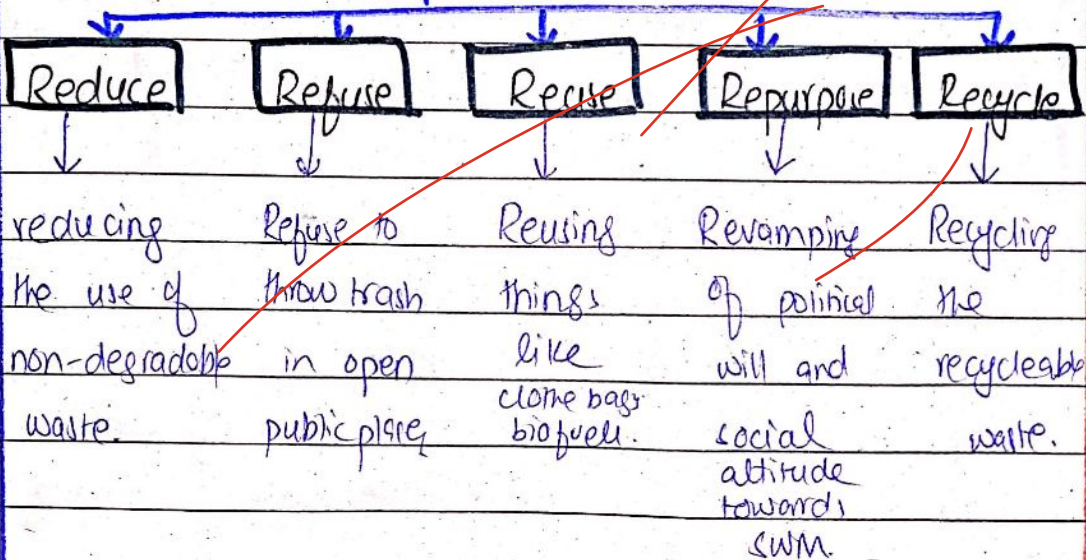
viii- Lack of proper infrastructure is also a contributor to the weakness of SWM.

ix- Lastly, the social stigma associated with being part of SWM department hinders the public people to choose it as a profession and work.

3- WAY FORWARD:

Lacking or weakness shows a room of improvement available. Pakistan can make its solid waste management better by working on four Rs.

Four Rs



Moreover, by intensifier providing decent incentives and resource allocation, the SWM of Pakistan can be further institutionalized properly.

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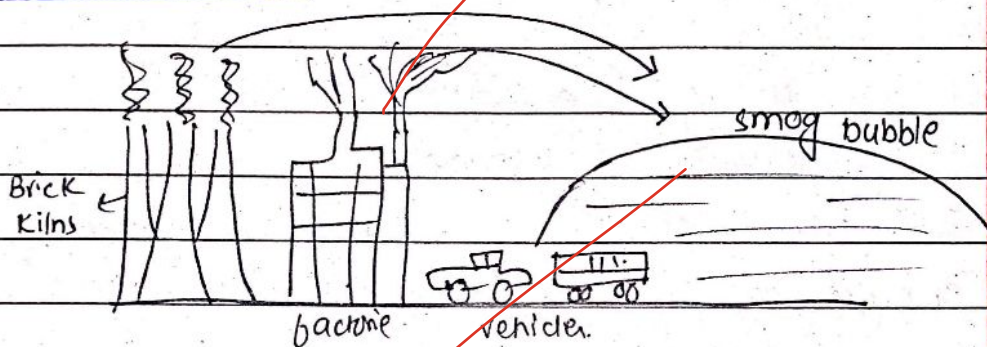
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PART-C

1- SMOG:

Smog is a combination of smoke and fog. It is a type of environmental and air pollution. Smog is a type of visible air pollution that results due to suspension of nitrogen oxides, sulphur oxides, carbon dioxide and other particulates.

2- CAUSES OF SMOG:



Smog is caused by reaction of sunlight with nitrogen oxides and sulphur oxide. It can only be caused by suspension of particulates in air.

The factors that contribute to formation of smog envelope are,

- i- Fossil fuel burning.
- ii- Automobiles
- iii- Brick kilns
- iv- Industries releasing air pollutants.
- v- Burning of crop residue.
- vi- Atmospheric conditions like no wind, air etc.

3- IMPACTS OF SMOG:

Smog not only reduces the

visibility of air causing road accidents but it is also detrimental to human health. It can cause respiratory disorders, skin allergies and eye infection.

4- PREVENTION OF SMOG:

A number of alternative strategies can help prevent formation of smog. Few of these are discussed below:

- i- Reducing and phasing out fossil fuel combustion can be the first step. Use of alternative energy source can reduce accumulation of air pollutants in atmosphere.
- ii- Transitioning energy to clean and green energy. Use of renewable sources of energy like solar, wind and hydel rather than coal based projects can prevent smog.
- iii- Banning burning of crop residue after harvesting season.
- iv- Use of wet scrubbers in places of construction to reduce air pollution.
- v- Use of public transport over private.
- vi- Replacing fossil-fuel and oil burning vehicle with electric vehicles.
- vii- Proper monitoring and risk assessment of air quality.
- viii- Placing brick kiln in a zigzag fashion across the city or area.

Smog is the grave environmental challenge of the 20th century. It is hazardous

to environment and human health. Along with mitigation efforts, preventive measures should be ensured to cope with this threat.

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QUESTION # 3

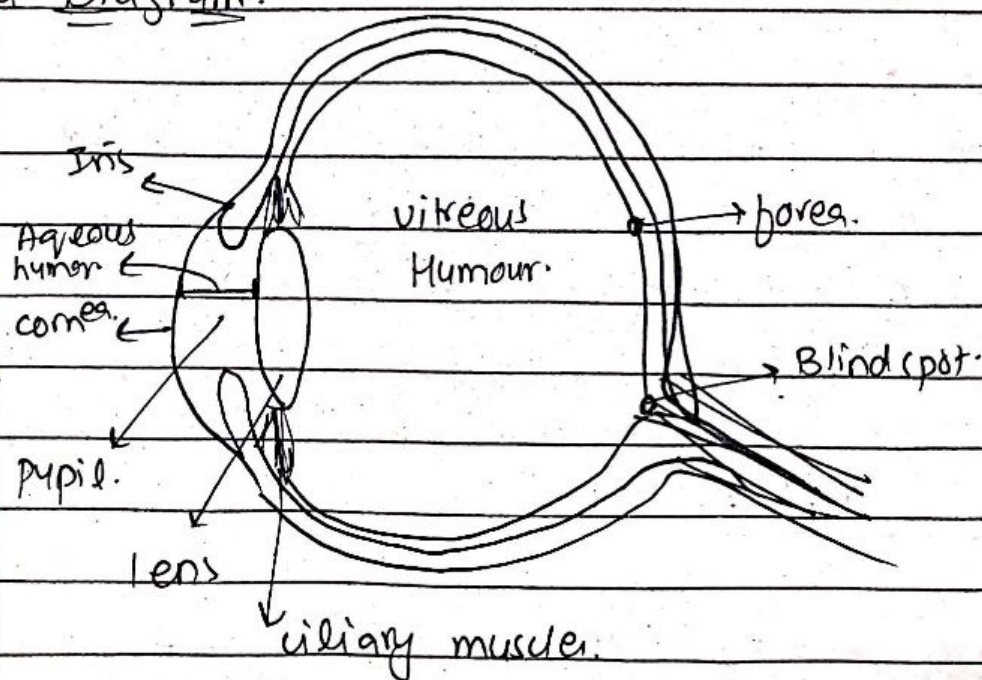
PART - A

1- HUMAN EYE:

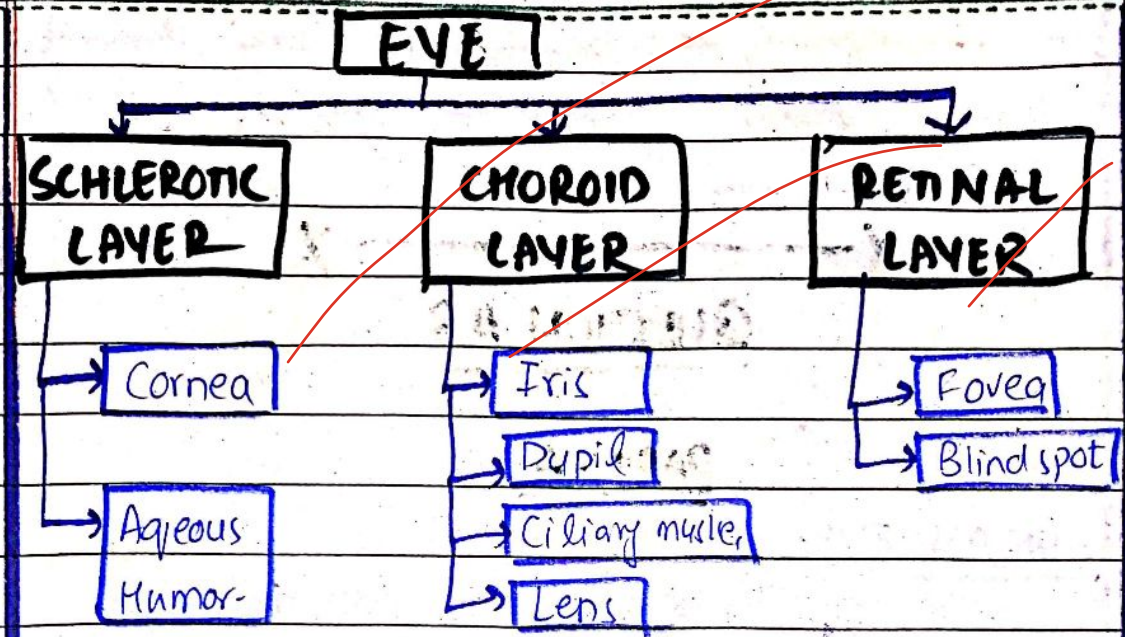
Human eye is an organ that is sensitive to stimulus of light. It is used for sight. Humans have two eyes separated by a small distance. The human eye can perceive light of wavelength ranging from 350m - 780 millimicron. About eighty percent of information about environment comes through eyes.

2- STRUCTURE AND FUNCTION OF HUMAN EYE:

a- Diagram:



b- Structure:



Eye consists of 3 layers.

- i- Sclerotic coat.
- ii- Choroid coat.
- iii- Retinal coat.

1- SCHLEROTIC LAYER:

It is the outer most layer that is transparent and it provides protection to eye.

- a- Cornea: Sclerotic coat has a buldge in front. This buldge is called cornea. Cornea is responsible for collecting and transmitting light to pupil.
- b- Aqueous humor: Between cornea and lens, a transparent fluid is present called aqueous humor. It nourishes the eye and keeps it wet.

2- CHOROID LAYER:

Choroid layer is colored due to presence of pigment. This pigment shows the color of one's eye.

- a- Iris: Choroid coat extends at front and forms Iris. Iris gives the characteristic

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color to eye - It also controls amount of light entering eye by contracting and expanding. i.e.

Iris \longrightarrow contracts \longrightarrow more light

Iris \longrightarrow expands \longrightarrow cover pupil and less light.

b- Pupil: Pupil is the small opening in front of lens which controls the light entering the eye.

Pupil \longrightarrow narrow \longrightarrow low light \longrightarrow because

Iris contracts
expands

Pupil \longrightarrow widens \longrightarrow more light \longrightarrow because

Iris contracts

c- Lens: Human eye contains biconvex lens.

Just like pupil, lens also changes its form for near and far object. This is called adaptation. The function of lens is to focus the incoming rays of light on retina so that image can be formed.

d- Vitreous Humor: A viscous, non-transparent fluid is present between lens and retina. It is called vitreous humor. Vitreous humor maintains the structure of eye intact.

3- RETINAL COAT:

It is the layer that is lined with rods and cones. Light falling on this layer will only constitute image.

a- Retina: It is the point that contains rods and cones for better vision.

b- Fovea: Fovea or yellow spot is a point on retina that has high concentration of cones.

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If light falls on it, a clear image will form.

c- Blind spot: The point where the optic nerve leaves the eye is called blind spot. If lens focuses the light on blind spot, no image will form.

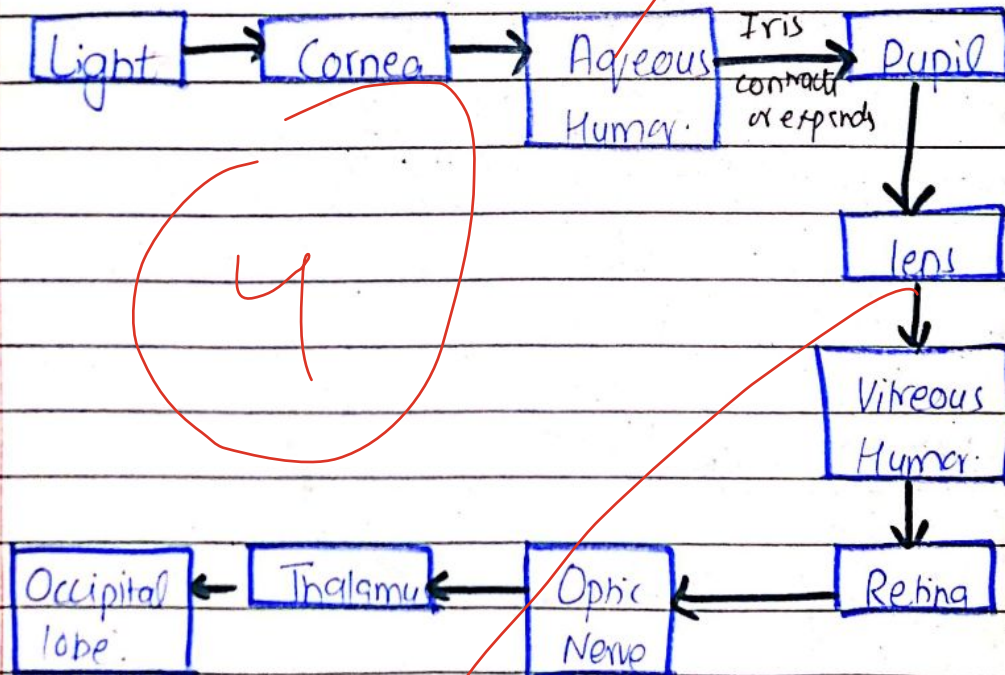
4- PHOTORECEPTORS:

Photoreceptors are of two types:

a- Rods: Rods are rod-shaped and work under low intensity of light. They give us vision in dark.

b- Cones: Cones are cone-shaped and work best under large amount of light. Cones help in distinguishing colors.

5 WORKING PATHWAY OF EYE:



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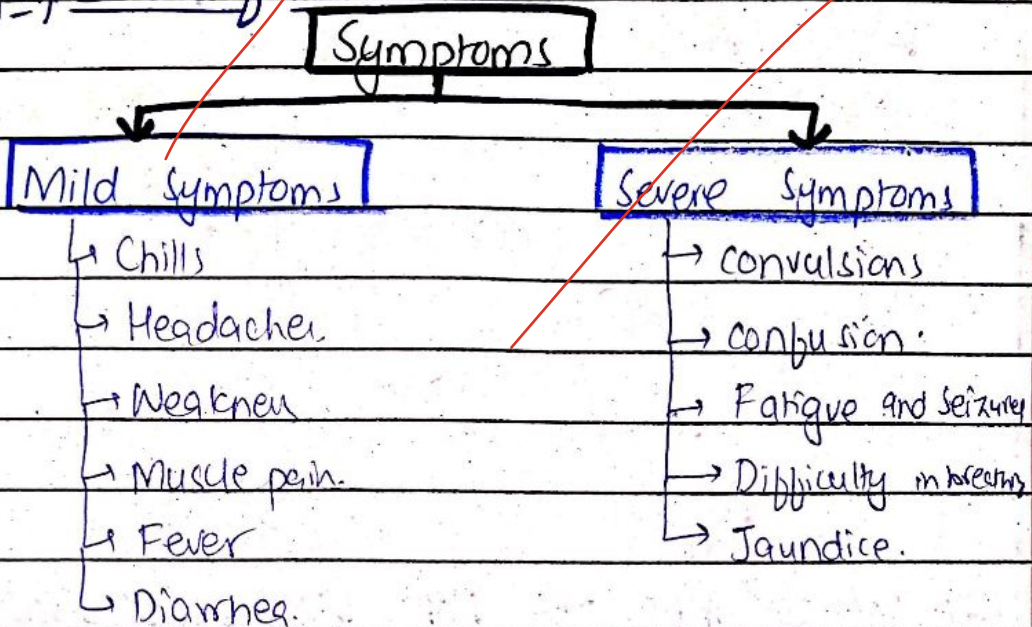
PART - B

1- MALARIA:

Malaria is a disease caused by a

female mosquito *Anopheles*^{bite} causes high fever and disruption in spleen functionality. The parasitic virus of Malaria is called caused by Plasmodium.

i- Symptoms of Malaria:



Mild symptoms of malaria can be less detrimental than severe. Severe malaria can even result in fatality or death of person.

2- DENGUE:

Dengue is also a vector-borne disease. It is caused by a ^{biting of} mosquito that has white spots on it - belonging to *Aedes* species. Dengue is caused by a virus named DEN-V. It is a disease in which platelet level drops to low levels in blood.

ii- Symptoms of Dengue:

In early stages dengue can be asymptomatic. Normally, it takes from four to ten days to show symptoms of dengue. Mild symptoms are tolerable while severe symptoms can prove fatal.

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Symptoms

Mild Symptoms

- High fever (40°C)
- Severe headache
- Pain behind eyes
- Muscle and joints pain
- Nausea and vomiting
- Swollen glands
- rash

Severe Symptoms

- Rapid breathin
- Severe abdominal pain
- Persistent vomiting
- Bleeding gums or nose
- Pale and cold skin
- Blood in vomiting or stool
- Fatigue and restlessness

3- PREVENTIVE MEASURES FOR DENGUE AND MALARIA

As both diseases are caused by mosquito bite, following preventive measures must be taken to avoid catching any one of them

- Wearing clothes that cover whole body.
- Use of mosquito repellents
- Window screen installation
- Use of mosquito nets
- Use of coils and vaporizer.

These are some general preventive measures.

Specific measures aim at destroying the already established and preventing creating new breeding sites for mosquito. Both for malaria and dengue, breeding site of mosquito is water so ~~it is~~ this preventive measure will focus at

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- i- Disposing solid waste properly.
- ii- Covering, emptying and cleaning water storage.
- iii- Conducting outdoor insecticide sprays.

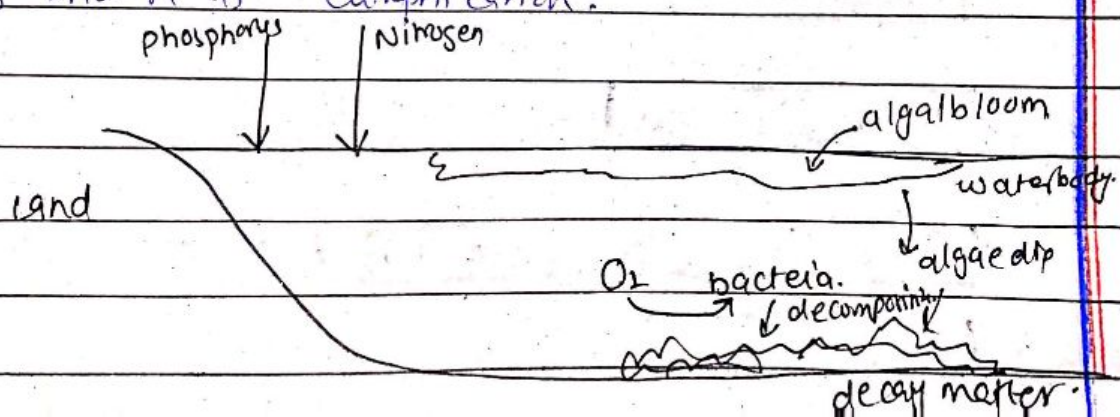
By focusing on these measures, Malaria and dengue can be prevented.

PART-C

1- EUTROPHICATION:

Eutrophication is a process when nutrients of a water body enrich the environment. It is caused by the excessive algal growth resulting in depletion of oxygen levels (dissolved) in a water body instigated by human activity. In Eutrophication, algal bloom is visible on the surface of water. This algal blooms block the sunlight entering the water.

Algal bloom is accelerated by increasing concentration of Nitrogen and Phosphorus in water. Algal bloom and no sunlight with results in death of phytoplankton and submersed algae. Bacteria use oxygen to break down the decay matter. This results in high concentration of organic matter and low levels of dissolved oxygen in water. This process is known as eutrophication.

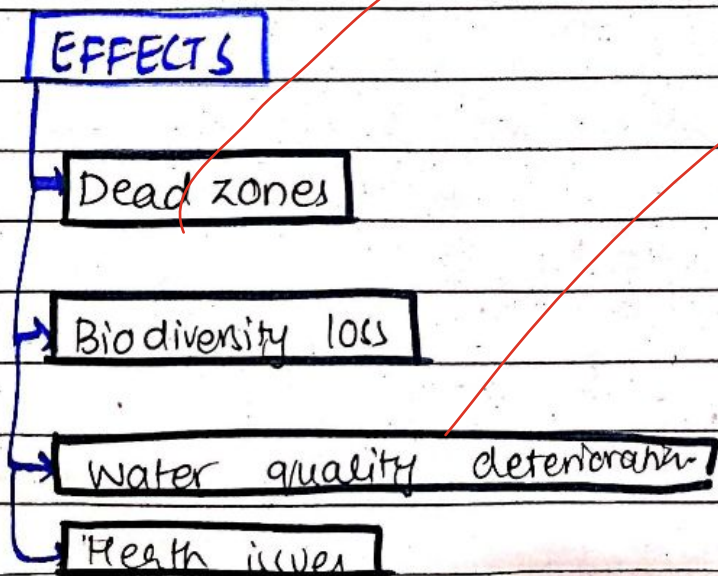


2- CAUSES OF ALGAL BLOOM: (EUTROPHICATION)

Eutrophication is caused by human activity that speed up the excessive growth of already present algae in water body. These human activities include:

- i- Excessive Use of Fertilizer: Excessive use of fertilizers rich in nitrogen and phosphorus can contribute to accelerated algal growth hence resulting in eutrophication.
- ii- Sewage: Sewage and solid waste thrown into water bodies can provide it with nitrogenous compounds on decomposition that can instigate eutrophication.
- iii- Industrial waste products: Directly releasing the industrial waste into the water also contribute to algal bloom.
- iv- Livestock waste: Livestock waste and industry waste also results in eutrophication as its waste is an organic compound and upon decomposition result in nitrogen.

4- EFFECTS OF EUTROPHICATION:



- i- Dead zones: Eutrophication can result in dead zones. Dead zone is an area of a water body where oxygen levels are too low for plants and animals to survive.
- ii- Loss of biodiversity: Low oxygen levels and algae blocking the sunlight cause loss of biodiversity. Animals and plants of that water body die. Moreover, contamination rate and the ~~have~~ for disrupt ecosystem.
- iii- Water quality deteriorates: The water quality of that water body deteriorates. Its color changes to green or pale green. A pungent smell is categorized. Moreover, it reduces the levels of dissolved oxygen in water making it unfit for use and drinking.
- iv- Health Problems: Water, if consumed or used, far from algal bloom causes rashes, stomach or liver illness. So, it becomes hazardous to health and is home to various bacteria, parasites and viruses.
- v- Contributes to water pollution. It also contributes to water pollution by chemically, biologically and physically altering the water body. Contamination of water results in a polluted water body.

5- PREVENTION:

Eutrophication and algal bloom are reversible processes and they can be prevented by.

- 1- Reducing the use of fertilizers

- ii- Improving sewage treatment process.
- iii- Implementing better agricultural practices.
- iv- Restoring wet lands.

A proper check and balance on human activities regarding agriculture, sewage management and livestock near water bodies, can prevent algal blooms.

PART-D

GIS

- 1- GIS stands for Geographical Information system.
- 2- It is a system that stores, analyzes and visualizes geographic data.
- 3- It analyzes and processes data from GPS.
- 4- It helps people and businesses to understand the patterns and relationships in the world.
- 5- Even it can handle a wide range of geospatial data.
- 6- GIS is used in telecommunication industry, Mining and Land interrelation management.

GPS

- GPS stands for Global Positioning System.
- It is a satellite-based navigation system that determines the geographical coordinates of a location.
- It collects data from different satellites.
- It gives precise timing and location information to receiver on ground.
- It gives information about latitude, longitude and altitude of a point.
- GPS is used in car navigation, fitness tracker and smartphone.

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7- GIS tells information about
maps of Earth and its
surface.

GPS tells about location
of a person.

