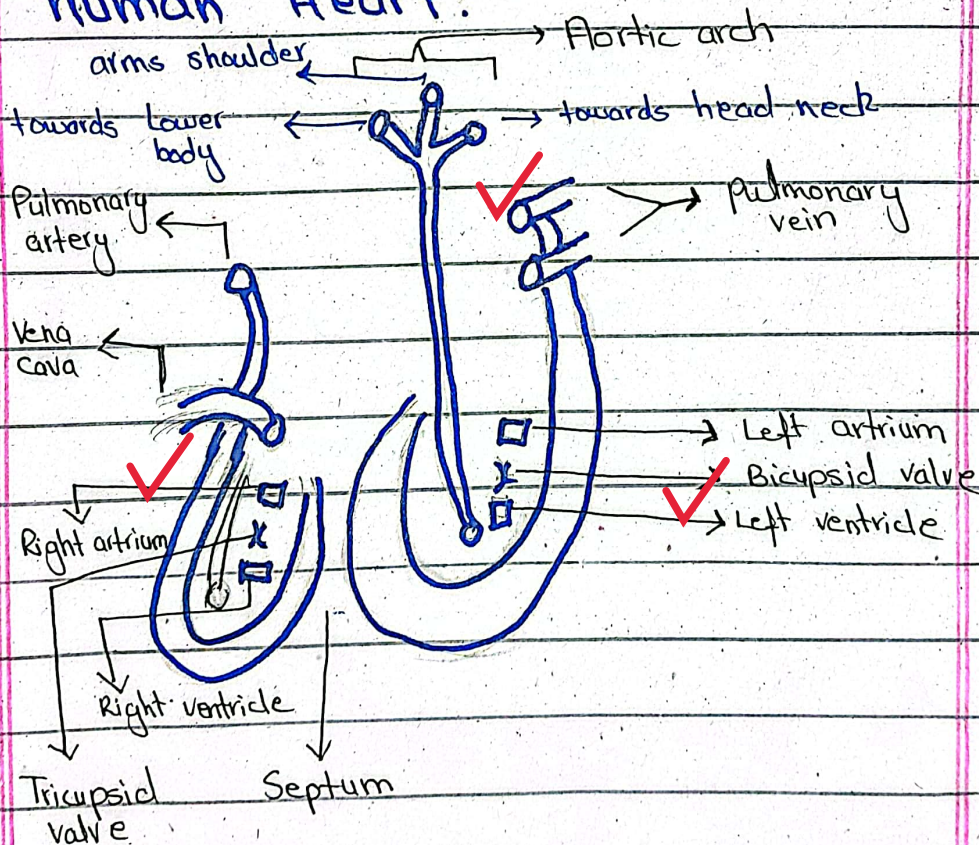


(A)

# Human Heart:

Human heart is a sac like pumping organ. It is enclosed in a double membrane sac called pericardial cavity. Heart is composed of special muscles called cardiac muscles.

## Diagrammatic Representation of Human Heart:



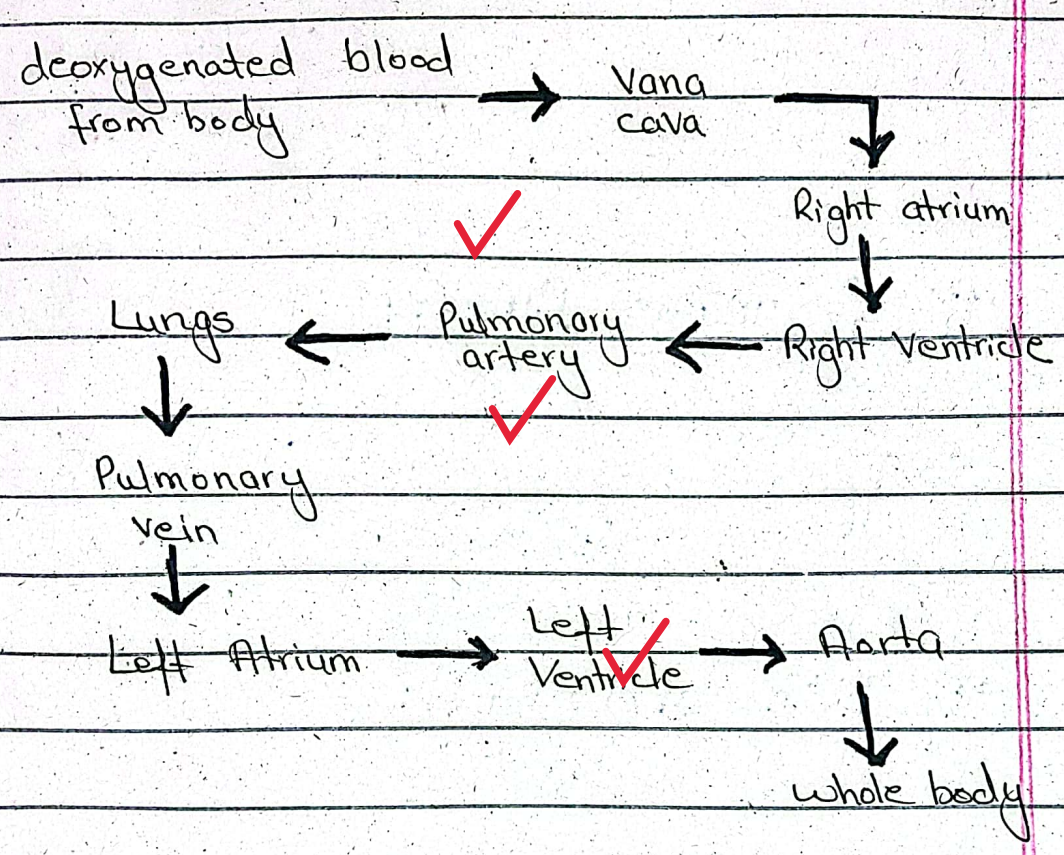
## Working of Human Heart:

There are four chambers of heart right atrium, right ventricle,

left atrium, left ventricle. All the deoxygenated blood is collected from the body through veins. All the veins ✓ from body open into a large vein called vana cava. Vana cava pours the deoxygenated blood into right atrium of heart. Then right atrium contracts and blood enters into right ventricle through valve. From ✓ right ventricle there arises a pulmonary trunk which bifurcates into right and left lungs. Then right ventricle contracts and blood through pulmonary ✓ arteries enters into lungs.

In lungs oxygenation of blood takes place. From each lung there arise pulmonary veins which enter into ✓ left atrium. After oxygenation blood enters into left atrium through pulmonary veins. Then left atrium contracts and oxygenated blood ✓ enters into the left ventricle through a valve. From left ventricle there arises a main

artery called aorta. When left ventricle contracts blood enters into the aorta, from where oxygenated blood is distributed into the whole body.



(B)  
How do we see?

3/5

Eye is a sensory organ which helps us to see. Eye gives or provides sensory information in the form of images and visuals. To

understand how the eye sees, it is necessary to know the eye structure and function.

## Eye Structure and Function

(i) **Cornea:** Light enter through cornea, the transparent outer covering of the eye. It act as a lens. It bend or refracts light.

(ii) **Aqueous Humor:** The fluid beneath the cornea has a composition similar to that of blood plasma. It provides nourishment to the eye.

(iii) **Iris and Pupil:** Light passes through cornea and aqueous humor through an opening called the pupil. It control the movement of pupil.

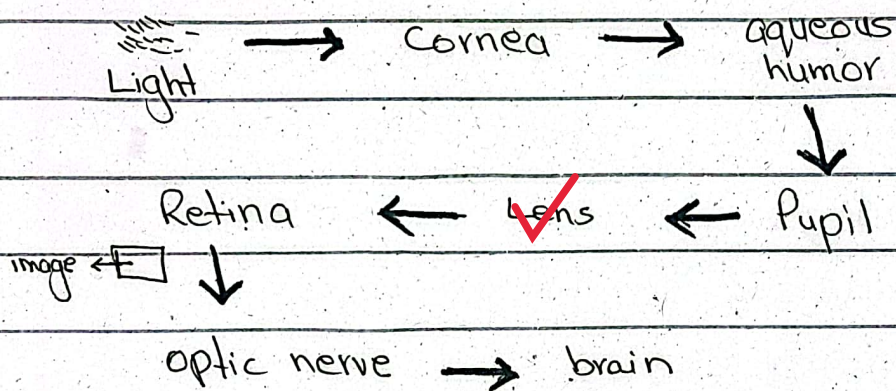
(iv) **Lens:** While most of the focusing of light is done by the cornea, the lens allows the eye to focus on either near or distant objects.

(v) **Retina:** It is the most sensitive layer of an eye.

It contains cones and rods.

Retina converts the light / light waves into an action potential image.

(vi) Optic Nerve: It collect the image and transmit it towards brain.

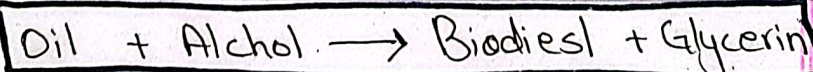


(C)

4/5

Biofuels:

Biofuel is defined as liquid, solid or gaseous fuel produced by conversion of biomass such as bioethanol from sugarcane or corn through the process of biological carbon fixation.



Importance of Biofuels:

Following are the importance

of biofuels.

(i)

(i) Biofuels are less expensive than gasoline and other fossil fuels

(ii) When biofuels are burned, they produce significantly less carbon output. As world is moving towards decarbonization because of climate crisis so, they are better options

(ii)

(iii) Biofuels can be produced locally, which decreases the nation's dependency on foreign energy

(iv) Biofuels helps making the most of scarce resources. They have potential to reduce the amount of waste as can be produced from waste

(iii)

## How biofuels can be produced?

Biofuels are renewable energy sources, derived from organic material. They can be produced through various processes, each depending on the organic material used.

(iv)

### (i) Biodiesel: transesterification

Biodiesel can be produced from vegetable oil or animal fat, by reacting the oil or fat with an alcohol through the process called trans-esterification.

### (ii) Ethanol: by fermentation

Ethanol, a most common biofuel can be produced through the fermentation of sugars and starches from crops like wheat or corn. Yeast is used to convert sugars into ethanol.

### (iii) Cellulosic ethanol: enzymatic hydrolysis

It can be produced from non-food crops. It contains cellulose which can be broken down into sugars and these sugars are then fermented to produce ethanol.

### (iv) Algal Biofuels:

Biofuels can also be produced from algae which can accumulate lipids that can be converted

into biodiesel or other biofuels.

### (v) Advanced processes:

Biofuels can also be produced through advanced genetic engineering techniques to ~~pro~~ create micro-organisms capable of producing specific fuels such as bio-jet fuels.

### (D)

Difference between plant, animal and micro-organisms cell:

Plant cell~~s~~, Animal cell and micro-organism cells differ in structure, function and some of the organelles they contain. Here are the key differences between these cells.

PLANT CELL	ANIMAL CELL	MICRO-ORGANISM CELL
Plant cells have a rigid cell wall.	Animal cell lacks cell wall	They have cell wall but differ in composition

1.:



	PLANT CELL	ANIMAL CELL	Micro-organism CELL
2. ✓	It contain plastids, having chlorophyll.	It does not contain plastids	They also <del>lack</del> lack plastids.
3. =	It has large vacuole present in the centre of cell.	It has small vacuoles, which are distributed throughout the cell.	It contain different kind of vacuoles like gas vacuoles
4. =	It has no centriole	It has a pair of centrioles present in nucleus	It lack centrioles
5. :-	Nucleus is not present in the centre of cell	Nucleus is present in the centre of cell.	They also lack nucleus

Q. 2

3.5/5

(A)

Increasing level of NO<sub>x</sub> :

The oxide of Nitrogen gas; NO and NO<sub>2</sub> are represented as NO<sub>x</sub>. They can be produced through bacterial activity mainly by nitrogen fixing bacteria. They can also be produced by the burning of coal, oil and natural gas, as well as, burning of fuel in internal combustion engine also produces NO<sub>x</sub>.

Why threat?

Increasing level of NO<sub>x</sub> in the atmosphere is a threat as, Residence time of NO and NO<sub>2</sub> are respectively two and four days, where it converted into HNO<sub>3</sub>.

In atmosphere :



1.

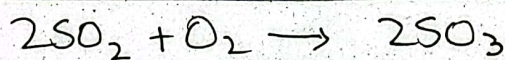
HNO<sub>3</sub> form acid rain and high exposure to it can make people cough and feel short of breath.

2. Nitrogen oxides in the soil at high level damages the plants health. It also decreases the soil productivity.

3. Excess nitrogen can also cause toxic algal blooms, fish deaths and loss of plant and animal diversity.

### Increasing level of $\text{SO}_2$

$\text{SO}_2$  can be produced mainly (67%) through volcanic eruption and also from combustion of fuel.



Sulphur dioxide is most common gas among oxides of sulphur.

### Why Threat?

1. Sulphur dioxide is highly poisonous gas for living organisms.

2. It is major source of acid deposition in the atmosphere.

3:- Animals exposed to high concentration of  $\text{SO}_2$  showed inflammation of airways and destruction of areas of lungs.

4:-  $\text{SO}_2$  irritates the respiratory tract of human and causes asthma and chronic bronchitis.

### Conclusion:

Above mentioned threats caused by  $\text{NO}_x$  and  $\text{SO}_2$  shows that they are highly harmful for plants, animals, humans and atmosphere. Increasing level of  $\text{SO}_2$  and  $\text{NO}_x$  can destroy the whole ecosystem.

(C)

### Remote Sensing:

4/5

Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object. It refers to the activities of recording / observing / perceiving objects or events.

at far away places

Why it is important in environmental science?

1. Remote Sensing plays a crucial role in environmental sciences due to its ability to gather information about the Earth's surface and atmosphere from distance.

2. It is particularly valuable in sensing or studying remote or inaccessible areas such as deserts, forests, oceans and polar regions where data collection on-site is challenging.

3. It helps in identifying and monitoring environmental hazards such as wildfires, floods, volcanic eruptions, tsunamis etc.

4. Remote sensing data can be used to assess air and water quality by detecting pollutants, algal blooms and other environmental indicators.

S:- Ozone - monitoring sensors have been launched to study global climate cycles. This helps in studying and monitoring the climate crisis.

### Conclusion:

Remote sensing in environmental sciences enhances our understanding of the Earth dynamics and supports sustainable resource management.

(D)

Liver : the chief chemist of the body