QUESTION NO: 1:

a) Explain the working of human heart.

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WORKING OF HUMAN HEART:

Human heart plays significant role in Life of an individual. It pumps blood to all parts of body and supplies each cell with nutrients and oxygen. The structure of heart is unique and enables the functioning of heart.

STRUCTURE OF HUMAN HEART:

Heart is a hollow muscular organ and pumps blood to all parts of body. It is equal to the size of a closed fist. Heart has special muscles known as cardiac muscles which are involuntary in function. The heart consists of four compartments

Comprising of two ventricles and two atria. The unique structure of heart enables complete separation of oxygenated and deoxygenated blood. The pumping of deoxygenated blood inside heart and flowing out of oxygenated blood through aorta is known as double circulation mechanism. The major compartments of heart are as follows:

i. Ventricles. (left and right)
ii. Atria (left and right)
iii. Aorta (laegest artery → supplies blood to whole body)
iv. Superior and inferior Vena Cava (Laege veins collecting blood from all over body)
v. Pulmonary Vein.

WORKING MECHANISM OF HEART:

Two main mechanism of heart include:

→ Systemic Circulation.
→ Pulmonary Circulation.

1- BLOOD FLOW:

Deoxygenated blood from body is collected through different veins and reaches heart through superior and inferior venacava.

2- PULMONARY CIRCULATION:

The right ventricle contracts, sending deoxygenated blood to lungs through pulmonary artery. In lungs carbondioxide is exchanged for oxygen.

3- RETURN OF OXYGENATED BLOOD:

Oxygenated blood returns from lungs through pulmonary vein to the left atrium. The contraction of left atrium pushes blood into left ventricle.

4- SYSTEMIC CIRCULATION:

The left ventricle contracts sending oxygenated blood throughout body via aorta. This blood delivers oxygen and nutrients to cells.

5- CARDIAC CYCLE:

The heart undergoes rythmic cycle of contraction (systole) and relaxation (diastole) to pump blood.

b- How do we see? Explain.

PROCESS OF VISION:

Humans are able visualize everything by the use of their sense of sight mainly involving their eyes. The complex process of vision involves:

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- The eyes.
- The optic nerve.
- The brain.

WORKING MECHANISM OF VISION:-

ROLE OF EYE:

The part of our body which enables the manifestation of visual process and makes humans able to see.

ROLE OF OPTIC NERVE:

Optic nerve carries the signal of brain which helps in vision.

ROLE OF BRAIN:

Brain recieves the visual signals

and starts the processing of information and therefore enables vision.

THE VISUAL PROCESS:

1- LIGHT ENTERS THE EYE:

Light enters the eye from the surrounding environment. The light enters through cornea.

2- REFRACTION:

The cornea and lens inside the eye help to focus light on retina, which comprises of light sensitive cells.

3- RETINA AND PHOTORECEPTORS:

The retina contain two types of photoreceptor cell namely rods and cones. Rods are sensitive to low light and cones are responsible for color vision perceiving different other wavelengths of light.

4- IMAGE FORMATION:

The fowsed light forms an inverted image on retina. This

image is then converted into signals by the photoreceptor cells.

Optic nerve transmission:

The optic nerve transmits this electrical signal to brain for processing.

BRAIN PROCESSING:

Visual cortex of brain recieves signals from optic nerves and processes the information. The information perceived by brain is then used to create image in both eyes.

In short the process of visualization involves the interpretation of different light patterns generated by photoreceptor cells.

C) Why biofuels are important? How can they be produced?

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BIOFUELS INTRODUCTION:

Biofuel is the type of fuel generated from renewable

energy sources. These sources include plants, algae or even organic waste. The two main types of biofuel include

•) Bio ethanol.
•) Biodiesal.

SIGNIFICANCE OF BIOFUEL:

Biofuel production seen as significant aspect of growing needs. Most importantly due to the environment friendly nature of biofuels. The world is suffering from existential threat of climate change and there is much debate and need for the shifting towards use of renewable energy resources.

Renewable energy source:

Biofuels are derived from renewable energy sources such as plants and organic waste. These are an alternate to fossil fuels

which lead to environmental degradation and increased global warming.

REDUCTION OF GREEN HOUSE GASES:

The use of biofuel is in demand as it ensues mitigation of the looming existential threat of global warming. The main culprits for global warming are the green house gases which lead to the rising temprature of planet earth.

ESURE ENERGY SECURITY:

The production of biofuel ensures energy security for a state. As it reduces dependency on fossilfuel for energy production.

MITIGATION OF CLIMATE CHANGE THREAT:

The rising threat of climate change most primarily increasing due to continuous use of fossil fuels.

Mitigation of climate change can be ensured by shifting towards environment friendly renewable energy sources i-e use of biofuel.

PRODUCTION OF BIOFUELS:

Biofuels are produced by different methods depending on the type of biofuel being produced. The principle used is conversion of biological materials into usable fuel. The production of bioethanol uses the following process:

•) The use of biological source:
Often it is produced from crops rich in sugar or stauch such as sugarcane.

•) Fermentation.
The chosen material undergoes fermentation where microorganism (yeast) convert sugars to ethanol.

•) Distillation:
Ethanol is separated from the

fermentation mixture through the process of distillation.

d. Differentiate between plant, animal and microorganism cell.

Plant Cell	Animal Cell	Microorganism Cell
CELL WALL		
·) Plant cells have complex cell wall made up of primary secondary cell wall.	·) No cell wall in animal cell.	·) Bacteria and archae have cell wall for support.
·) Plant cell wall made of chitin, cellulose and lignin.	·) No cell wall	·) Mostly made of peptidoglycans and mureins.
CELL MEMBRAE		
·) Cellmembrane made of phospholipid bilayer.	·) Like plants cell membrane made of bilayer.	·) Have membrane for the purpose of regulation.
·) Not outermost layer.	·) Outmost is membrane.	

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CYTOPLASM

- Site for complex reactions of different organelles.
- Outside nucleus and site for some significant functions.
- Gel-like substance inside cell.
- Contains organelles and other structures.

NUCLEUS

- Have a proper nucleus, comprising of nuclear content like DNA.
- No centromeres for replication.
- Pushed to one side due to large central vacuole.
- Contains distinct nucleus having genetic material.
- Has centromeres to be used in replication.
- Present in middle.
- No distinct nucleus in bacteria and archae.
- Nucleoid region resembling nucleus.

DIFFERENCE OF ORGANELLES

- Have Plastids including chloroplast, large central vacuole.
- No lysosomes.
- Have lysosomes
- No chloroplast or large central vacuole.
- Have flagella, cilia or pili.
- Having locomotary and other functions.

QUESTION NO: 2:-

a- Why increasing levels of SO_2 and NO_2 are considered a threat? Explain-

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LEVELS OF SO_2 and NO_2:

The levels of SO_2 and NO_2 determine the amount of air pollution. The normal percentage of carbon and nitrogen is present in our atmosphere, but the presence of their oxides is dangerous.

INCREASED LEVEL OF NO_2 and SO_2:

The levels of NO_2 and SO_2 are increasing due to the human activities. The oxides of nitrogen and sulphur and their increasing concentration is not good news for mankind as these are the major pollutants, harming the

Life on earth.

THREAT PERCEPTION OF NO_2 and SO_2:

These are the secondary pollutants. Secondary pollutants are those which pollute the atmosphere after undergoing a chemical reaction. The levels of NO_2 and SO_2 emerge as threat because combination and chemical reaction of these oxides leads to formation of acids like nitric acid and sulphuric Acid. These acids reach the earth along with rain thereby leading to acid rain.

$$NO_x + H_2O \longrightarrow HNO_3$$

$$SO_2 + H_2O \longrightarrow H_2SO_4$$

Acid rain is harmful for the normal life as it:

- Disturbs the aquatic and marine life.
- Renders the lands ineffective

for crop cultivation.

- Causes damage to building leading to corrosion.
- Affects the normal pH of water rendering it unfit for use.

b) Explain the significance ----- GHE?

GHE :-

Green House Effect is a natural process where green house gas accumulation results in increased temprature of earth. The green house gases trap the heat of sun and therefore increase the temprature of earth.

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SIGNIFICANCE OF GHE :

→ **MAINTENANCE OF EARTH'S TEMPRATURE :**

The GHE is important natural process for the maintanence of earth's temprature. This makes earth suitable for life forms.

→ **GLOBAL WARMING :**

Due to human actinites the rise of greenhouse gases from a certain threshold leads to increased temprature.

→ **CLIMATE CHANGE :**

The resultant global warming

leads to the massive climate change which is an existential threat for mankind these days. Efforts are underway to control the emission of the gases to control the rising temprature of earth.

Enhanced GHE:

Enhanced GHE refers to the intensified warming of earth's surface due to increased concentrations of greenhouse gases, most importantly carbon dioxide, methane and nitrous oxide.

REASONS:

The main reasons for enhanced GHE are:

→ Massive deforestation.
→ Continuous use of fossil fuels for energy purpose.
→ Uncontrolled emission of Green house gases.

↳ Human activities leading to increased pollution.

EFFECTS OF enhanced GHE:

The major effects include:

- The existential threat of climate change.
- Increased Global warming.
- Massive and frequent floods.
- Rise in environmental degradation.

d) Liver is chief chemist of body- Explain.

FUNCTIONS OF LIVER:

Liver is reffered to as the chief chemist as it leads to major reactions in body.

- Processing nutrients of digestive system.
- Detoxification of harmful substances.

- Production of proteins essential for blood clotting and immune function.
- Production of major nutrients including precursor for blood cell formation.

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- Liver ^as chief chemist leads to the major detoxification of toxins that reach our body.

c) **Remote Sensing:**

Remote sensing is used for the work of locating different objects at distant places.

- It includes monitoring of ~~st~~ satellites.

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