Q.No 2

a. Pakistan suffered a loss of $40bn due to heavy floods of 2022; in this context climate finance is central question for developing countries. Discuss in the light of COP-28 going to start in UAE.

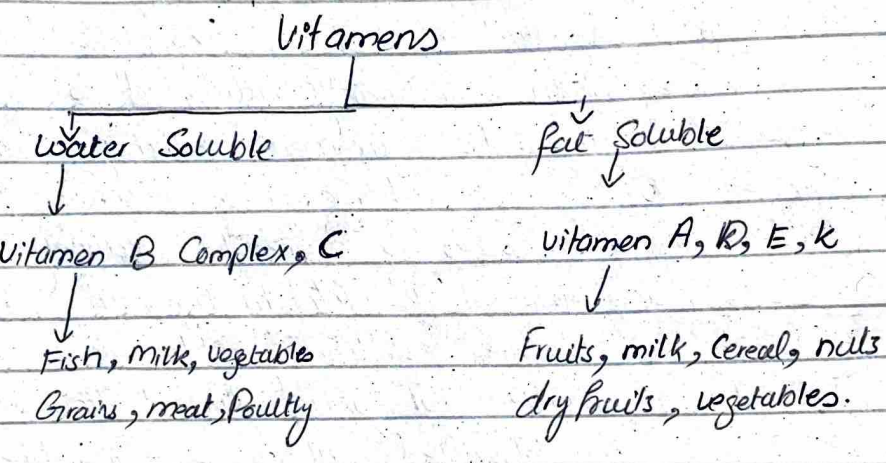
The devastating floods of 2022 that inflicted a $40bn loss on Pakistan have brought the issues of climate finance to the forefront for developing countries, particularly in the context of the upcoming COP-28 in UAE.

Developing countries like Pakistan bear the brunt of climate change despite contributing the least to its causes. This is exemplified by the floods, which were partly attributed to the glacial melt and extreme weather patterns linked to climate change. These countries often lack the resources to respond effectively to such disasters, rebuild infrastructure, and adapt to changing climate conditions. Addressing these challenges requires substantial ~~support~~ financial support from developed nations, a commitment outlined in the Paris Agreement through its "common but differentiated responsibilities" principle. However developed nations, under the Paris Agreement, committed to provide $100 billion annualy in climate finance to developed countries by 2020, ~~how~~ only $89.6 billion was mobalized in 2021. Therefore in COP-28 measures should be taken to fill the gap.

b. Distinguish water-soluble and fat-soluble vitamins. Give examples of diets containing different vitamins.

1 Introduction

Vitamins are organic compounds necessary for the normal growth, reproduction and working of the body. As the body itself cannot produce these vitamans ~~they~~ they needed to be taken from different diet sources. The vitamins are divided in two main catagories of water-soluble and fat-soluble each having different characteristics and sources.



2. Water Soluble Vitamens.

The water soluble vitamens dissolve in water and be easily absorbed from the digestive tract. The excess amount of these vitamins are excreted in urine

a. Vitamen C.

Vitame C, plays a vital role in the body by combating radicals and strengthens the immune system. The excess of vitamen C causes diarrhea, nausea and head ache, where as deficiency leads to dry skin and hair, weakened immune system and slow wound healing. Vitame C can be obtained from potatoes, tomatoes tropical fruits and berries along citrus fruits.

b. Vitamen B. Complex

Vitamen B complex is a group of eight water-Soluble vitamens that performs various fonctions in the body for instance, energy metabolism, nervous system health, red blood cell production and DNA synthesis. The excess of vitamen B's can lead to nerve damage, numbness, skin rash and digestive problems whereas, deficiency can cause muscle weakness, skin problems, diarrhea, ~~birth~~ birth defects in women. Vitamen B can be obtained from Animal products, leafy green vegetables, Avocados, bannans, potatoes and whole grain.

2. Fat-Soluble vitamins.

The fat-Soluble vitamens require fat for proper absorption, they are stored in liver and fatty tissues for longer periods.

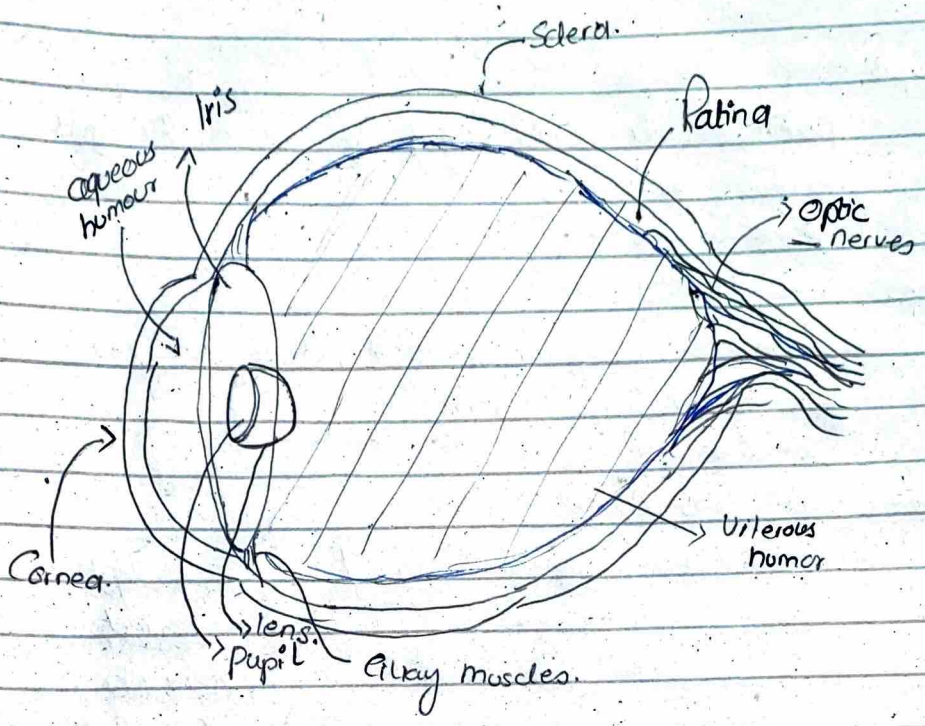
a. Vitamin A

Vitamin A mainly fonctions in vision, immune system health and cell growth. This vitamin can be sourced from meat, fish, eggs, red and yellow fruits and Spinach. Excess of Vitamen A can cause dry skin, bone pain, liver damage and muscle weakness while its deficiency results in night blindness, weakend immune system and slowed growth in children

b. Vitamin D.

Vitamin D also known as Sonchin vitamin is important for the bone health, immune fonctions and ~~etc~~ overall well-being. It can be sourced from Sun exposure, ~~dietary sources~~ fatty fish, egg yolks and mushrooms. The excess of vitamen D, leads to loss of appetite and weight loss, hypercalcemia and high blood pressure while its excess causes rickets, muscle ~~and~~ weakness and Depression along mood swings.

c. Explain the structure of eye.



Human eye is a sensory organ that provides us with sensory information and helps us see things. The human eye is divided into the following parts each having its specific function.

a. Sclera.

Sclera is the outermost layer of the eye that protects the eye and gives it its shape

b. Cornea.

Cornea is the transparent part on the frontal side of the eye that interacts with light rays ~~and protects the eye from dust and other particles~~

c. Aqueous humor.

Aqueous humor is a liquid in between the frontal side of the eye that protects from dust particals entering eyes

c. Iris.
Iris is the pigmented musle which controls the movement of pupil.

d. Pupil
Pupil is the exact point from where the light enters the eyes.

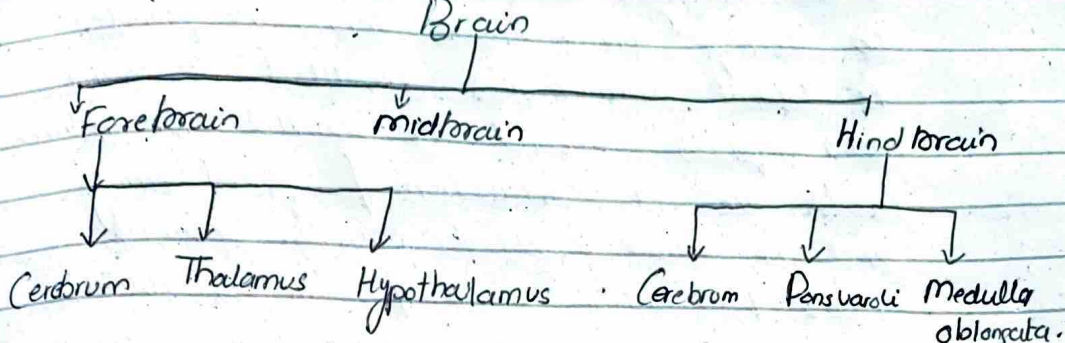
e. lens
lens causes reception of light, it is also responsible for focusing of light on ratina

f. Ratina
is the most sensitive layer of the human eye from where small black projections emerge called cones and rods which contain photoreceptor in them. These photo receptors convert light energy into image.

g. Optic nerves.
Optic neves carries the formed image into the brain that recognises the image.

h. vitrous humor.
Vitrous humor is a fluid filling in the region between lens and ratina, it helps in the supply of nutrients and gases in those areas which do not have access to the capillaries.

d. Draw a flow chart of diffent parts of Brain



Q3. a. Global warming is a wild beast and we are poking at it with sticks, justify.

Global warming is a wild beast and we are poking at it with sticks, is a a powerfull metapher that captures the dangers of climate Global warming and the human actions contributing to it.

1. Global warming.

Global warming in the increase in average global temperature since the pre industrial period. This warming primarily results from human activities that environmental polution that realeases greenhouse gases into the atmosphere. These gases most notable Carbon dioxide, trap heat, causing the planet's average temperatures to rise. As the CO_2 emissions have increased by over 30% since 1990 (IPCC, 2023) reaching a record high in 2023. This has resaulted in increase in global temperature as the seven-on hottest years on record have all been since 2015 (NASA, 2022) This rising temperature causes climate change and disrupting the world's enviornment.

2 How Global warming is a wild beasts.

a. Destructive Potential of Global warming like a wild beast.

Global warming, like a wild beast has potential to ~~destroy~~ wreak havoc across the planet. As Global warming has resulted in many catastrophies around the world for instance floods are a contribution of global warming and the 2022 floods in pakistan caused around $40 billion worth of damages (NDMA). furthermore global warming have been causing heat waves, rising sea levels and wild fires all which are causing damage and displacing millions.

b. Unpredictability of global warming like a wild beast.

Just like a wild beast's behavior that can not be predicted, similarly the exact peace and consequences of global warming are complex and multifaceted. This interplay of different factors like ocean current, land-use changes, and greenhouse gas concentration can lead to unexpected effects, like intense heatwaves, as in Pakistan that nearly killed 500 people last year, and sudden glacial melt as the unprecedented level of glacial melt going on in Himalayas.

3 The ways Human are pooling ~~it with~~, global warming with sticks.

a. Burning of fossil fuels.

The humans ~~f~~ are further evoking global warming and increasing its ~~Catrasp~~ catastrophic effects but increasingly burning fossil fuels. Our reliance on coal, oil, and gases releases greenhouse gases, especially carbon dioxide,

trapping heat in the athmosphere. According to IPCC, Co_2 concentrations have reached 420PPm in 2023

B. deforestration

Humans continuelly take deforestration measures to support their wood needs and land required. The deforests works as a natural carbon absorbers as we continue deforestration more and more carbon is emitted into the atmosphere, According to the forest watch 20% of the Amazon rainforest, a crucial carbon sink, has lost over 20% of its tree cover since 1970's due to deforesteration. This shows how defrestration has been contributing to Global warming

C. Unsustainable agriculture.

The agriculture practice that are going on are highly unsustainable. As the agriculture practice that are going on are highly releasing nitrous oxide and methane that are greenhouse gases. As per IPCC, agriculture contributes roughly 14% of global greenhouse gas emissions.

Q. Ways to tame the wild beast.

a. Renewable Energy.

In order to reduce our carbon footprint we can switch from fossil fuel bit energy to renewable energy practices. As by shifting from fossil fuels to renewable energy sources like solar wind and, hydral and Geothermal, it is essential for reduces green house gas emission. According to WAPDA pakistan has a potential of producing 47000 MW electricity.

from hydra. Thus it would reduce reliance on fossil fuels.

b. Collective Actions.

Global cooperation through agreements like the paris agreement is crucial to set emission reduction targets and implement effective policies. For instance the Paris Agreement has led the most Carbon emitting countries to pay a total $100 bn to so to Earth climate change vulnarable countries so that they can evolve themselves and contribute towards sustainability.

3b. What is origin of univers, how age of univers can be calculated.

1. Introduction.

Universe is the vast expanse that includes all of space, time, matter, and energy. It encompasses galaxies, stars, planets, dark matter, dark energy, and all cosmic structures. Understanding the origin and the age of the universe is a fundamental question in Cosmology, the branch of astrophysics that studies the large-scale properties of the Cosmos.

2. Theories about the Creation of the Universe

a. Old theory - Steady state theory:

The steady state theory posisted that universe had no specific beginning or end and has always existed in constant state. This idea, advocated by scientists such

as Hermann Bondi, Thomas Gold, and Fred Hoyle, was popular in mid- 20th Century. However, the discovery of the cosmic microwave background radiation in 1965 challenged this theory.

b. ~~Steven Weinberg~~ Big bang Theory.

The big band theory is the prevailing cosmological model that describes the observable universe's origin. According to this theory, the universe began as an extremely hot and dense ~~sig~~ singularity around 13.8 billion years ago from a huge explosion. This theory was proposed by George Lemaitre, and the evidence supporting this theory includes the cosmic microwave background radiation, the abundance of light elements, and the large-scale structure of the cosmos.

3. Methods to estimate the age of the universe:

a. By looking for the oldest stars:

Astronomers study Population II stars, which are among the oldest stars in the universe. These stars have low metallicity, indicating they formed early in cosmic history. By analyzing their composition and estimating their ages, scientists can place a lower limit on the age of the universe.

b. By measuring the rate of expansion of the universe.

The Hubble constant, a measure of the rate of expansion of the universe, is a crucial parameter for estimating the age of universe. Observation of distant galaxies provide their redshift, a measure of how much the universe has expanded since the light was emitted. By extrapolating this expansion backward in time, astronomers can estimate when the expansion began, providing an age for the universe.

Q3 c. Write a short note on Semiconductors.

Semiconductors are essential materials in modern electronics, serving as the foundation for transistors, diodes, and integrated circuits. These are those materials that only partially allow electricity to pass through them.

These materials, typically are made from elements like silicon or germanium, possess unique electrical properties. Their conductivity lies between that of conductors and insulators and can be altered by introducing impurities or by applying electrical fields.

Applications of Semiconductors.

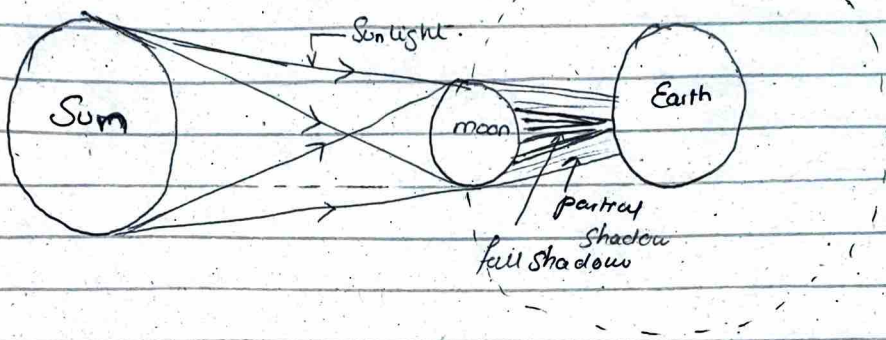
Semiconductors form the backbone of modern electronics. Transistors, the building blocks of electronic devices, rely on semiconductor properties to amplify or switch electrical signals. Integrated circuits, made of numerous semiconductor components, power everything from computers and smartphones to medical devices and satellites.

In essence, semiconductors are the backbone of modern electronics, enabling the creation of smaller, faster, and more efficient devices that power our interconnected world.

Q3 d. What is eclipse? Distinguish between Solar and Lunar eclipse

Answer. An eclipse occur when one celestial body moves into the shadow of another celestial body, resulting in temporary obscuration of light. On earth, we commonly observe two types of eclipe: Solar and Lunar.

1. Solar Eclipse.



A solar eclipse happen when the moon passes between the sun and Earth, blocking some or all of the sun's light.

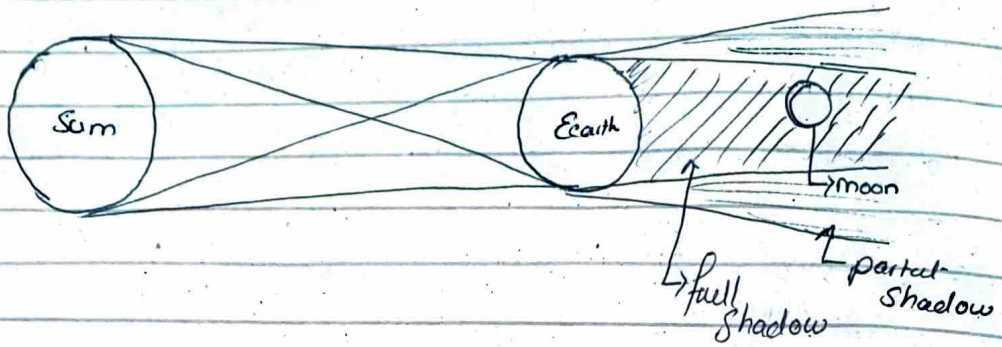
a. Total Solar Eclipe

Total Solar eclipse occurs when the moon completely covers the sun, a narrow path on earth experiances darkness during the day, known as totality.

b. Partial Solar Eclipse.

Partial Solar eclipse occers when the moon is ~~further~~ only covers a portion of the sunlight, observeers outside the path of totality see the sun partially obscured.

2. Lunar Eclipse



Lunar eclipse occur when earth passes between the Sun and the moon, causing Earth's shadow to fall on the moon.

a. Total Lunar Eclipse

when the earth completely blocks direct Sunlight from reaching the moon, the moon can turn a reddish hue due to indirect sunlight refracted by earth's atmosphere, often called a "blood moon"

b. Partial Lunar Eclipse

Happens when only a portion of the moon enters Earth's shadow, causing a partial darkening.

c. Penumbral Lunar Eclipse

This occurs when the moon passes through the faint, outer part of Earth's shadow (penumbra), resulting in a subtle dimming of the moon's brightness.

Qy a. Define the following.

1. Pesticides.

Pesticides are chemical substances or mixtures used to control, repel, or kill pests that damages crops, cause harm to humans or animals, or interfere with the proper growth of plants. They en encompass various types of chemicals, including insenticides, herbicides, fungicides and rodenticides

2. Herbicides:

Herbicides are chemicals specifically designed to control or eliminate unwanted plants or inhibit their growth, helping the management of vegetation in agricultural settings, gardens, lawns, and other areas.

3. Insenticides

Ans: Insecticides are chemicals formulated to combat, repel, or kill insects. They are used to control insect population that damage crops, spread diseases, or pose threats to humans and animals. Insecticides come in various forms such as sprays, powders, and baits.

4. Ceramics:

Ceramics refer to non-metallic, inorganic materials that are usually made from clay and other natural substances. They are shaped and hardened through heating or firing at high temperatures. Ceramics have diverse applications, from pottery, tils, and tonics to advanced materials used in engineering, electronics, and aerospace industries.

5. Green house effect

The Green house effect is a natural phenomenon crucial for maintaing Earth's temperature. Certain gases in the atmosphere, such as Carbon dioxide 'CO_2', methane (CH4) and water vapor, allow sunlight to enter the Earth's atmosphere. The Earth absorbs this sunlight and emits heat. Greenhouses gases trap some of this heat in the atmosphere, preventing it from escaping into space. While essential for maintaing suitable temperature for life, human activities have intensified the greenhouse effect by increasing the concentration of these gases, leading to global warming and climate change.

Q4 b. Explain the bonding in water molecule

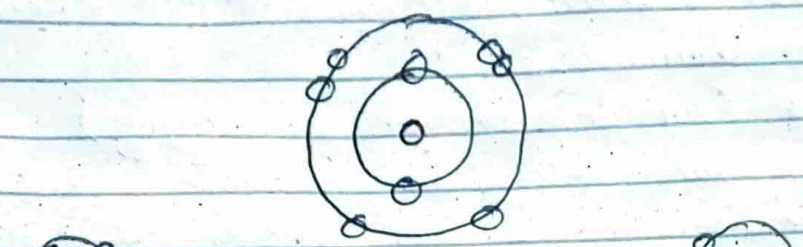
The water molecule is formed on the bases of Covalent bond. where each hydrogen atom shares an electron with the outermost its shell of oxygen.

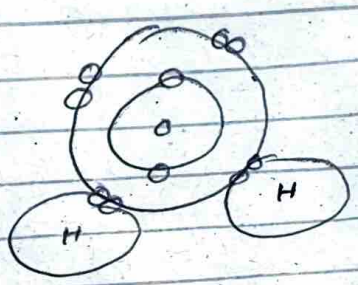
Covalent Bond

A covalent bond is a type of chemical bond that is formed between the two or more atoms by sharing of electrons. In this bond, atoms come together to share one or more pairs of electrons to achieve a stable electronic configuration, typically resembling the noble gas configuration.

B.

Water Molecule bonding.





The oxygen molecule has 6 electrons in its outer most shell and for attaining stability it needs 8 electrons. On the other hand hydrogen atoms have a single electron in its outermost sell and for stability it needs 2, therefore it pairs up with the oxygen atoms as a result both hydrogens and oxygen attains stability and form H_2O molecule.

Q4 c. What types of waves are used in RADAR, SONAR, LIDAR, Mobile Phones and thermisters.

1. RADAR (Radio Detection and Ranging)

Radar relies on radio waves from electromagnetic spectrum. Radio waves are used because they have longer wavelengths, allowing them to travel long distances and penetrate various atmospheric conditions making them suitable for detecting objects, measuring distances, and monitoring weather conditions.

2. SONAR (Sound Navigation and Ranging)

SONAR system utilize sound waves, particularly in the ultrasonic frequency range. This is done because in underwater environments, sound waves propagate efficiently and can travel long distances. Ultrasonic frequencies provide better resolution for mapping underwater surfaces and detecting objects.

3. LIDAR (Light Detection and Ranging).

LIDAR system rely on laser pulses from the optical spectrum, often near-infrared or visible light. Laser pulses provide high-resolution imaging and accurate distance measurement. Light waves travel at high speeds and offer precise mapping capabilities, making LIDAR effective for creating detailed 3D representation of surfaces, terrains, and objects.

4. Mobile Phones:

Mobile phones uses electromagnetic waves in the form of micro waves, falling within the radio frequency range. This is done because micro waves can carry information over long distances and easily pass through obstacles like buildings. They are suitable for wireless communication due to their ability to transmit data reliably.

5. Thermistors. (Thermal Resistors)

Thermistors dont use waves directly but respond to temperature changes in circuits that might involve electrical signals.

4d. What are the Advantages and disadvantages of AI.

1. ~~Auto~~ Advantages
   a. automation
   b. Data Analysis
   c. Accuracy
   d. 24/7 availability

disadvantages
- Job displacement
- Ethical Concerns
- Dependency & Reliability
- Cost and Accessibility