GSA Mock ~ CSS 2025

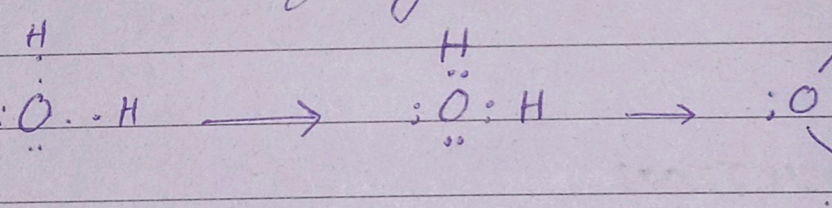
Q#3

a. WHY ATOMS FORM CHEMICAL BONDS

Atoms form Chemical bonds to achieve a more stable electronic configration, which means full outer energy level. They form different types of bonds with each other like ionic bond, covalent bond and coordinate covelent bond.

COVALENT BOND IN WATER MOLECULE

Water is formed by when atoms of hydrogen (H) and oxygen (O) link together by covalent bonding (sharing electrons). **OXYGEN** (O) has six valence electrons and **HYDROGEN** has one valence electron. In order to attain the stable electronic configration, Two ~~electrons~~ atoms of hydrogen share their electrons via covalent bonding with oxygen outer most shell containging 6 electrons. The shared electrons are attracted to the nuclei of both atoms, holding them together and forming a stable molecule. (H_2)



The covelent bond b/w hydrogen and oxygen is polar, giving slight positive charge on hydrogen and slight negative charge on oxygen.

This polarity give water many of its unique polarities and biological importance

b- **INTRODUCTION**

"Doping is intentional Introduction of impurities into a material, such as semiconductor or ceramics, to modify its electrical, optical or structural properties."

In ceramics doping can enhance their strength, toughness, conductivity or optical properties.

DIFFERENT TYPES OF CERAMICS

Ceramics are inorganic, non-metallic meterials, that are typically hard, brittle and resistant to heat, corrosion and wear. There are several types of ceramics.

1. **OXIDE CERAMICS** (e.g, alumina, zircona)
2. **CARBIDE CERAMICS** (eg. silicon carbide)
3. **NITRID CERAMICS** (eg. silicon nitride)
4. **GLASS CERAMICS** (eg pyrex)
5. **FERROELECTRIC CERAMICS** (e.g. Barium titanate)
6. **ADVANCED CERAMICS** (e.g. nano ceramic & meta-materials)

INTRODUCTION

GLOBAL WARMING refers to the long term rise in the average surface temperature of Earth due to increasing

levels of greenhouse gases such as Co_2 & CH_4 in the atmosphere. These gases trap heat from the sun and prevent it from being released back into space. It has both positive & negative impacts, although the negative impacts are more significant & far-reaching. Some of the main merits & demerits of global warming are as follow:-

MERITS :-

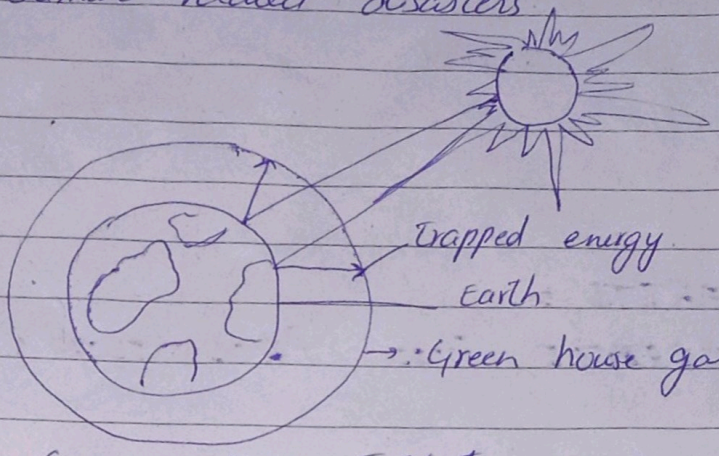
1. **INCREASED FOOD PRODUCTION :** In some areas, global warming lead to increased crop yeild & agricultural productivity.
2. **IMPROVED ENERGY EFFICIENCY :** Warmer winters can reduce energy consumption & costs associated with heat in some areas.
3. **INCREASED ACCESS TO NATURAL RESOURCES** Melting Sea Ice and glaciers can provide new opportunities for resource extraction & shipping routes.

DEMARITS:-

1. Global warming cause rising sea levels and coastal flooding.
2. It caused more frequent & severe heatwaves droughts & storms.
3. Loss of biodiversity & ecosystem has been disrupted.
4. Global warming caused negative impacts on human health, including increased mortality.

5- Economic costs and damage to infrastructure and property seen by global warming.

6- Displacement and migration of populations due to climate related disasters.



Green House Effect

d. **INTRODUCTION:**

Polio (also known as poliomyelitis) is highly infectious disease that caused by virus that attack the central nervous system. It has no cure but can be prevented by safe and effective vaccination. Polio is primarily spread through the fecal-oral route, whe the virus is ingested through contaminated food or water.

CHALLENGES IN ERADICATION OF POLIO IN PAKISTAN:

In Pakistan, despite significant progress in reducing polio cases, challenges persist in eradicating the disease. One major obstacle is **inaccessibility to certain areas** due to conflict & insecurity, making

difficult for health workers to reach & vaccinate children. Addionally **misinformation & misconceptions** about the vaccine have led to resistance & refusal by some communities, hindering effort to achieve full coverage. Furthermore, the country's **vast & mobile population**, as well as inadequate health infrastructure in some areas pose significant logistical challenges.
Addressing these challenges is crucial to complete eradication of polio in Pakistan & achieving global polio eradication.

Q#4

a- **BILE**, Also known as liver juice, is a vital digestive fluid produced by the liver and stored in gallbladder. It plays a crucial role in the breakdown & absorption of fats & fat-soluble vitamins in the small intestine.

COMPOSITION:-
Bile is composed of Bile salts (bile acids and bile alcohols), cholesterol, Bilirubin, phospholipids &, electrolytes (such as sodium, potassium & chloride) and water.

Bile plays a crucial role in the breakdown of fats & fat soluble vitamins in small intestine. It aids in absorption of Vitamin A, D, E & K. Bile also helps maintain the optimal pH for enzyme activity & eliminates waste products like bilirubin from the liver. Overall, bile is essential for proper nutrient absorption & a healthy digestive system.

b- INTRODUCTION

The Kidneys are two bean-shaped organs located in the lower back of human body. They are responsible for filtering waste & excess substances from the blood.

ROLE OF KIDNEY IN EXCRETION

As vital part of urinary system, the Kidney plays a crucial role in excretion, removing harmful substances from the body to maintain homeostasis & overall health. The Kidney filters approximately 200 quarts of blood daily, regulating electrolyte levels, and eliminating waste products like urea, creatinin & other toxins.

They also reabsorb essential nutrients like glucose, amino acids & water, back into bloodstream. Kidney also help maintain acid-base balance, regulate blood pressure & produce hormones that aid the RBCs

production & bone health

HOW KIDNEY ACHIEVE THESE PROCESS

Kidney achieve these process via:

1- **Glomerular filteration:**
Blood is filtered through tiny capillaries in glomeruli.

2- **Tubular Reabsorption:**
Essential substance are reabsorbed back into bloodstream.

3- **Tubular Secretion:-**
Waste substance are secreted into urine.

4- **Urine Formation:-**
The filtered waste & excess substances form urine, which is excreted from the body.

C- **INTRODUCTION:-**

Solid waste management is the process of collecting, treating and disposing of solid waste in a manner that minimizes the impact on the environment, public health & aesthetics. Solid waste include household trash, commercial, industrial & institutional wastes.

METHODS OF SWM:

Different methods of SWM Include:

1- **Landfilling:** Burial of waste in a controlled environment, often with linear system to prevent leakage.

2. **Incineration**: Burning of waste to produce energy, such as electricity or heat.
3. **Recycling**: processing of waste materials into new products, reducing the need for raw material.
4. **Composiling**: Biological decomposition of organic waste into nutrient rich fertilizer.
5. **Waste to Energy (WtE)**: Converting waste into energy using various technologies like gasification, pyrolysis or plasma arc treatement.

D. ANEMIA:

A medical condition where the body has lower the normal number of RBCs or RBCs have lower hemoglobin, leading to inadequate oxygen delivery to the body tissues.

APPENDICITIS:

Inflamation of the appendix, a small organ attached to the large intestine, which can cause severe abdominal pain, nausea & fever. It often require surgical treatement to remove appendix.

SPLEEN:

An organ located in the upper left side of the abdomen, responsible for filtering the blood, storing RBCs & helpi to fight infections.

MYOPIA:-

A vision condition, also known as nearsightedness, where close objects appear clear but distant objects a blury due to shape of cornea or lense of eye.

ISOTONES:-

Isotones refers to ato nuclei, that have same number but different number of protons istry & physics, Isotones are use describe properties of elements.