

GSA (GK)

SECTION - I

Q No. 4

- (a) What are the main causes of floods? How floods of 2022 were different from super floods of 2010? Explain role of NDMA in this regard.

Main Causes Of Floods:

1- Heavy Rainfall:

Prolonged and intense rainfall can overwhelm rivers and drainage systems, leading to floods.

2- River Overflow:

When river swell due to excessive rain, melting snow, or upstream water release, they can overflow their banks, flooding nearby areas.

3- Deforestation:

Removal of trees reduces the land's ability to absorb water, increasing surface runoff and the likelihood of floods.

4- Climate Change:

The rising global temperature contribute to more extreme weather

events, including heavier rainfall and stronger storms, increasing the frequency and severity of floods.

5. Glacial Melting:

Accelerated melting of glaciers, especially in mountainous regions, can lead to sudden floods.

6. Poor Infrastructure:

Inadequate or poorly maintained drainage systems and dams can fail during heavy rainfall, contributing to floods.

Floods of 2022 were different from the Super floods of 2010:

1. Scale and Intensity:

The 2022 floods were caused by unprecedented monsoon rains, especially in southern Pakistan, leading to widespread devastation. The 2010 floods were also severe but primarily affected northern regions due to river overflows following heavy rainfall in the north.

2. Affected Regions:

The 2010 floods primarily

impacted the Indus River basin, with the floodwaters traveling from north to south, affecting a broad swath of the country. The 2022 floods, however, were concentrated more in southern provinces like Sindh and Balochistan, where the intensity of the rains was much higher than usual.

3- Climate Impact:

The 2022 floods were heavily influenced by climate change, whereas the 2010 floods were intense due to more predictable monsoon patterns.

4- Humanitarian Impact:

Both floods caused massive destruction of infrastructure and displacement, but the 2022 floods led to a larger displacement of people and more severe damage.

ROLE OF NDMA (National Disaster Management Authority)

The NDMA plays a crucial role in disaster management in Pakistan. It is responsible for coordinating and implementing disaster risk management activities at the national level.

Preparedness:

NDMA works on disaster preparedness by developing early warning systems, conducting risk assessments, and organizing training and awareness programs for communities and local authorities.

Response:

During disasters like the 2010 and 2022 floods, NDMA coordinates rescue and relief operations. This includes mobilizing resources such as food, water, medical supplies, and temporary shelters to affected areas.

Rehabilitation and Recovery:

Post-disaster, NDMA is involved in rehabilitation and recovery efforts. This includes rebuilding infrastructure, helping displaced people return to their homes and, ensuring that communities are better prepared for future disasters.

Coordination with International Agencies:

NDMA also coordinates with international organizations and NGOs to ensure that aid reaches the affected areas efficiently.

Conclusion:

In both the 2010 and 2022 floods, NDMA faced significant challenges due to the scale of disasters. However, its role in coordinating relief efforts and working towards long-term disaster preparedness and mitigation has been crucial in reducing the impact of such catastrophic events on the population.

Q4-B Differentiate star and planet. How a star becomes a black hole?

Difference between star and planet:

STAR

A star is massive, luminous sphere primarily composed of hydrogen and helium. Through nuclear fusion, it generates light and heat, making it self-luminous.

PLANET

A planet is a celestial body that orbits a star and is primarily composed of rock, metal, or gas. Planets do not produce their own light but reflect the light of the star they orbit.

Size and Mass

Stars are generally much larger and massive.

Planets are smaller and less massive than stars.

Energy Production

Stars produce energy through nuclear fusion.

Planets do not produce energy through nuclear fusion.

Life Cycle

Stars go through a life cycle that includes main sequence, red giant and potentially becoming a white dwarf etc.

Planets do not have a lifecycle, they remain stable over time.

Light Emission

Stars emit light and other electromagnetic radiations due to nuclear fusion occurring in their cores.

Planets do not emit light on their own but are visible due to the reflection of light from their parent star.

Star becoming a black hole:

1- Main sequence and stellar evolution:

A star forms from a collapsing cloud of gas and dust. In its core, nuclear fusion converts hydrogen into helium, producing energy and keeping star stable.

2- Red Giant / Super giant phase:

Once hydrogen is depleted, the star expands into a red giant, fusing

Heavier elements like helium into carbon and oxygen.

3- Core Collapse:

In stars over 20 times the sun's mass, fusion stops at iron because it consumes energy. Without fusion pressure, the core collapses rapidly under gravity.

4- Supernova:

The collapsing core triggers a supernova, a massive explosion that ejects the star's outer layers.

5- Black Hole formation:

If the core's remaining mass is above 2-3 masses, it continues to collapse into a black hole, a point where gravity is so intense that nothing, not even light, can escape.

Q1c Why atoms form Chemical Bonds? Explain structure of water.

Atoms form chemical bonds to achieve a more stable electron configuration. Most atoms are stable when they have a full outer electron shell, often following the "octet rule". By forming

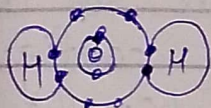
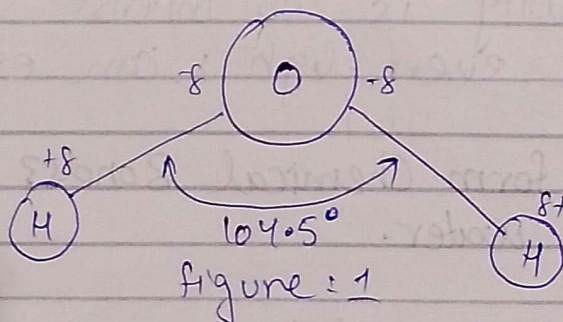
chemical bonds, atoms can share, gain or lose electrons to fill their outer shell, resulting in a more stable, lower-energy state.

There are three types of bonds atoms could make.

- 1- Ionic Bond
- 2- Covalent Bond
- 3- Metallic Bond

Structure of Water (H_2O):

Water is a molecule made up of two hydrogen atoms and one oxygen atom, with each hydrogen atom covalently bonded to the oxygen. The molecule has a bent, V-shaped structure due to the lone pairs of electrons on the oxygen atom, resulting in a bond angle of about 104.5° .



Q4-D What are conductors Semiconductors ---?

Conductors:

Materials that allow the easy flow of electricity due to free moving electrons are called conductors.

example:

Copper

Semiconductors:

Materials with electrical conductivity between that of conductors and insulators, often used in electronics.

example:

Silicon

Metals:

Elements that are typically shiny, malleable and good conductors of heat and electricity.

Example:

Aluminum.

Plastics:

synthetic polymers that are usually lightweight and insulating.

example: polyethylene.

Ceramics:

Non-metallic, inorganic materials that are typically hard and brittle.

often used for insulation.

Example:

Porcelain

Question No: 5

Part (a)

Radioactivity:

Radioactivity is the process by which unstable atomic nuclei release energy by emitting radiation. This emission occurs as the nucleus of an atom tries to reach a more stable state. The radiation can be in the form of alpha particles, beta particles or gamma rays.

Natural Radioactivity:

Origin:

Occurs naturally in certain elements whose atomic nuclei are unstable.

Examples:

Uranium, thorium and radon are naturally radioactive.

Occurance:

Found in the Earth's crust, atmosphere, and even within living organisms.

Artificial Radioactivity:

Origin:

Produced in laboratories or nuclear reactors through the bombardment of stable nuclei with particles like neutrons.

Examples:

Isotopes like carbon-14 or Technetium-99 are artificially created.

Purpose:

Often used in medical treatments, industrial applications, and scientific research.

Conclusion:

Natural radioactivity occurs spontaneously in nature, while artificial radioactivity is induced through human-made processes.

Q5- (B) What is Polio ---?

Polio:

Polio is a contagious viral disease caused by the polio virus, which primarily affects the nervous system and can lead to paralysis.

Symptoms:

Mild: Fever, fatigue, headache, sore throat.

Severe: Muscle weakness, paralysis, difficulty breathing.

Causes of spreading:

Transmission: Spreads through contaminated food, water, or direct contact with an infected person, especially in areas with poor sanitation.

Prevention:

Hygiene: Regular handwashing and clean water.

Vaccination:

IPV (Injection): Contains a killed virus, safe with no risk of vaccine-derived polio.

OPV (Oral): Contains a weakened virus, strong community immunity but rare risk of vaccine-derived polio.

Vaccine:

Given in multiple doses during childhood as part of routine immunization to prevent polio and support global eradication efforts.

Q #5-C

Write the steps in Solid Waste management - - - ?

Steps in Solid Waste Management:

1- Waste Generation:

1.1) Source identification: Identifying where and what types of waste are produced, such as residential, commercial, and industrial waste.

2- Waste collection:

2.1) collection system: Gathering waste from households, businesses and other sources using various collection methods and vehicles.

3- Waste Transport:

3.1) Transportation: Moving collected waste to processing or disposal facilities using trucks or other vehicles.

4- Waste Sorting:

4.1) Separation: Dividing waste into categories like recyclables, organic, and non-recyclables to facilitate proper handling.

5- Waste Processing:

Treatment: Processing waste through methods such as recycling, composting or incineration to reduce volume and convert it into usable materials or energy.

6 Waste Disposal:

6.1) Landfilling: Placing non-recyclable waste into landfills where it is safely contained and managed.

6.2) Incineration: Burning waste at high temperatures to reduce volume and sometimes generate energy.

7- Monitoring and Evaluation:

7.1) Assessment: Regularly reviewing waste management practices and systems to ensure effectiveness and compliance with regulations.

Main Issues of Solid Waste Management in Pakistan.

1- Inadequate Infrastructure:

1.1) Collection and disposal: Many areas lack proper waste collection and disposal systems, leading to inefficiencies and environmental pollution.

2- Poor Waste Segregation:

2.1) Separation issues: Lack of effective waste segregation at the source makes recycling and treatment processes difficult and less efficient.

3- Increased urbanization:
Population Growth: Rapid urbanization and population growth level have led to a surge in waste generation, straining existing waste management systems.

4- Lack of Public awareness:
Education: Limited awareness and education about waste management practices among the public contribute to improper disposal and waste generation.

Q5 - D What do you ---?

Population planning:

Population planning refers to the strategies and policies implemented to manage and control the growth of a population to ensure sustainable development and improve the quality of life.

Benefits of Population planning:

1- Economic Growth:

Resource management: Helps in optimizing resource use and distribution.

Improved Quality of life and sustainable environment that includes resource conservation and population control with enhance social services including public services and community development are the advantages of population planning

Balanced regional development including Health Benefits, family planning, reduce overpopulation are the factors that are beneficiary for a society. Poverty Alleviation and economic opportunities with resource Allocation to support low income populations are addressed by population planning.

It aims to strike a balance between population growth and the capacity of the environment and economy to sustain it, thereby promoting a healthier, more prosperous society.

Benefits of population planning: