

GISA (Test 3)

Q3)

A. what is solar and lunar eclipses? Give the types of solar eclipse

A. Solar Eclipse:

Eclipse is the obscuring of one heavenly / celestial body by another, particularly of the sun or moon.

Solar eclipse occurs when moon comes between the earth and the sun and its shadow obscures the face of the Earth from the light of the sun.

Types of Solar Eclipses

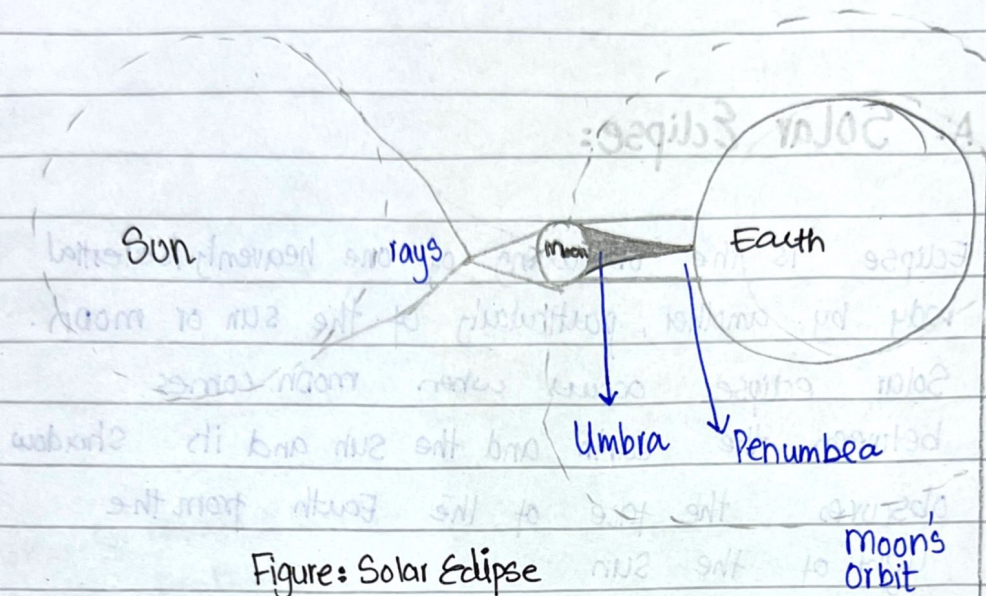
1. Total Eclipse

The umbra is a shadow's dark core. Imagine a light source and an object casting a shadow. If you are standing within the umbra, you will not be able to see any part of light source as the object blocks all direct light rays.

2. Partial Eclipse

The penumbra is a half shadow that occurs when a light source is only

partly covered by an object. For example, when the ~~moon~~ moon obscures part of the Sun's disk



B. Lunar Eclipse

Lunar Eclipse occurs when the Earth comes in between the moon and the sun and its shadow darkens the moon. There are three types of lunar eclipses that occur: penumbral lunar eclipse, partial lunar eclipse, total lunar eclipse. All these types of eclipse of moon depends on its phases.

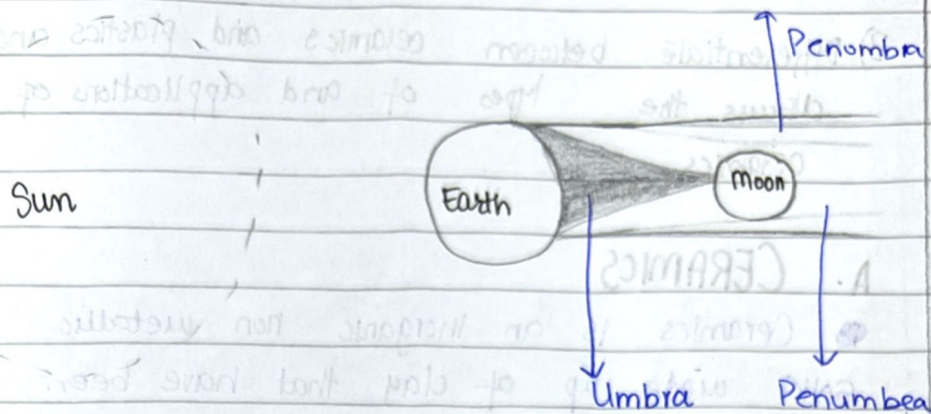


Figure: Lunar Eclipse

Solar Eclipse

Lunar Eclipse

Meaning

Solar Eclipse is the one in which Sun is blocked by the moon

Lunar eclipse refers to the eclipse in which moon appears dim as it passes into earth's shadow

Position

Moon lies between sun and earth

Earth lies between sun and moon

Frequency

Once in every eighteen months

Twice a year

Phase

New moon

Full moon

Duration

5-7 minutes

An hour

Appearance

Appears in some places only

Appears in many places

Fig : Table Showing differences between Lunar and Solar Eclipse.

B) Differentiate between ceramics and plastics and discuss the types of and applications of ceramics

A. CERAMICS

Ceramics is an inorganic non metallic solid made up of clay that have been shaped and then hardened by heating to high temperature. It includes materials like bricks, plates, glasses.

→ How ceramics are made :

A traditional method involved in making ceramics are the firing method. The first step is digging the ground for clay then mixing it with water. Then the material is forced into shape with the help of extrusion machine.

Materials are laid in an automatic rotating mold called jiggering.

Powdered ceramic material is then heated and pressed to fuse the material into shape, this step is called Hot pressing.

→ General Characteristics of Ceramics

1. Ceramics are hard, strong and water resistant
2. Durable
3. They are refractory materials and can tolerate high temperatures
4. Corrosion resistant
5. Ceramics are brittle.

B. Types of Ceramics

1. Traditional Ceramics

Traditional ceramics are made from natural raw materials like clay, silica, and feldspar.

Examples of traditional ceramics include bricks, porcelain, tiles, earthenware.

2. Advanced Ceramics

Advanced Ceramics are made from refined and pure materials; used in high performance application. Examples include Alumina, silicon nitride, Zirconia.

C. Applications of Ceramics

1. Construction

Ceramics like bricks, tiles, sanitary ware are used in building houses and buildings.

2. Electronics

Ceramics are also used as insulators, capacitors and electronic devices in electrical fields.

3. Medical

Ceramics in medical are used for making dental implants, bone substitutes and artificial joints.

4. Aerospace and Automotive :

Used in making of heat shields, engine parts, turbine blades in aerospace fields.

5. Household items .

Ceramics are also used in household items like crockery, decorative items, glassware.

D. Plastics

Plastics are synthetic organic materials that can be shaped into variety of products under heat. In general, they are made up of long chain like molecules called polymers.

→ General Properties of Plastics

1. Plastics are lighter than many materials of comparable strength.
2. Plastics do not rust like iron.
3. Corrosion resistant and can be produced in many colours.
4. Plastics have lower ~~weight~~ density than metals.
5. Plastics can withstand heavy temperatures.

Ceramics	Plastics
Composition	Composition
Made from inorganic materials	Made from organic polymers
Origin	Origin
Naturally occurring or synthetic	Synthesized from petrochemicals
Resistance to heat	Resistance to heat
High	Low
Corrosion Resistance	Corrosion Resistance
Excellent resistance to corrosion	Moderate; can degrade under UV or chemical exposure.
Examples	Examples
Porcelain, glass, alumin	Polyethylene, PVC, nylon.

Figure: Table showing difference between ceramics and plastics.

C) Differentiate between food contamination and food adulteration. Name the food contaminants and food adulterants.

A. Food Contamination

The unintended presence of harmful biological, chemical, or physical agents in food that make it unsafe or unfit to eat. Usually accidental but can be due to poor handling, environment, or pollution.

B. Food Adulteration:

The intended addition, substitution, or removal of substances in food for economic gain or to disguise poor quality. Food adulteration is fraudulent and illegal.

C. Key Differences Between Food Contamination and Adulteration

Food Contamination	Food Adulteration
Intent	
Usually accidental due to low care	Intentional to hide inferior quality.
Common Cause	
Poor hygiene, contaminated water, pests and environmental pollution	Economic gains for selling cheaper substances
Health Risks	
Can cause foodborne illness outbreaks	Can cause poisoning, chronic illness, long term toxic effects.
Preventive Focus	
Hygiene, sanitation, refrigeration	Supply chain control, authentication

D. Food Contaminants

1. Biological contaminants

Biological contaminants can be bacteria, viruses, parasites and fungal toxins causing diseases if consumed. Diseases can be hepatitis A, Salmonella and neurological effects in some cases.

2. Chemical contaminants

Chemical contaminants include pesticide residues, heavy metals and industrial pollutants. Pesticide residues can cause food poisoning while presence of metals can cause organ damage and cancer.

3. Physical contaminants

Physical contaminants include glass shards, metal fragments, stones etc. These contaminants can cause choking and injury to mouth and throats.

E. Food Adulterants

1. Water Added to Milk

Water addition in milk lowers its quality and increases weight for sale so that sellers can ask for higher price for less amount of milk.

2. Melamine in milk / Powdered milk:

Added to fake higher protein content in tests and can cause kidney stone and renal failures in infants

3. Artificial Flavors and dyes

Artificial flavors and dyes used to enhance colour and flavor are carcinogenic and toxic. Sellers use red artificial colouring in ~~ketchup~~ ketchup to attain a red colour without adding tomatoes.

D) What is Imbalanced diet? What are major consequences of unbalanced diet?

A. Imbalanced Diet

An imbalanced diet is a diet that does not provide the right proportions of nutrients. Carbohydrates, proteins, fats and minerals all are needed for body to function properly

→ Imbalanced Diet Occurs when:

1. Some nutrients are in excess. For example too much sugar in diet can cause high blood sugar levels and eventually diabetes

a. In other cases, diet can have deficiency of proteins, vitamins or other nutrients important for functioning. For example a person eating fast food and avoiding vegetable can suffer from imbalanced diet.

B. Major Consequences of Unbalanced Diet

1. Nutritional Deficiencies

Nutritional deficiencies occur when proteins, vitamin A, vitamin C and other nutrients are not present in the consumed food. Such weaknesses in body can lead to chronic illnesses.

a. Obesity and overnutrition

Excess intake of calories, fats, and sugars can lead to obesity. It increases the risk of lifestyle diseases such as diabetes, hypertension and heart disease.

3. Weak Immunity

Lack of vitamins and minerals weakens the immune system and body becomes prone to infections and delayed wound healing.

4. Poor Physical and Mental Development

In children, balanced diet leads to stunted growth and delayed brain development. This can hinder mental capabilities and result in poor academic performance.

5. Digestive Problems :

Fiber is important for digestive system and our intestines. Lack of fiber can cause constipation and bloating.

Question No 2

A) What are the main traditional and modern food preservation methods. Give possible advantages and disadvantages.

A. Food Preservation

Food Preservation means preventing food spoilage and extending shelf life by controlling the growth of microorganisms (bacteria, yeast, molds) and slowing down chemical changes.

B. Traditional Food Preservation Methods:

1. Drying / Dehydration Method:

This method involves removing moisture from food. It is easy, inexpensive and prevents microbial growth. This may cause loss of flavor and nutrients.

2. Salting / Curing :

The method involves salt, that draws out water. This is mainly used for meat, fish and pickles. It is simple and enhances tastes.

3. Smoking

Food (like fish or meat) is exposed to smoke from burning wood. It adds flavor and preserves food by drying and adding antimicrobial chemicals.

4. Fermentation

Beneficial microbes convert sugars to acids. This method is used for yogurt, cheese and pickles. It improves flavor and digestibility by adding beneficial bacteria.

C. Modern Food Preservation Methods

1. Refrigeration and Freezing

Food is kept at low temperature to stop bacterial growth. It maintains flavor and freshness.

2. Canning / Bottling:

Food is heated, sealed in airtight containers to kill microorganisms. It extends shelf life and retains flavor.

3. Irradiation

Food is exposed to controlled ionizing radiation to kill pathogens and insects. It is highly effective but needs special equipments.

4. Chemical Preservation:

Addition of approved chemicals to inhibit microbes.

These preservatives can be sodium benzoate, citric acid. It is easy and cost effective for large scale production.

B) Explain the internal structure of Earth.

A. Internal Structure of Earth:

Earth is made up of three main layers: crust, mantle, and core. Each having different compositions, densities and physical properties.

1. Crust (Outer layer)

This is the outermost and thinnest layer of Earth. It forms the Earth's surface, where we live. There are two types of crust: continental crust and oceanic crusts. Main elements found in crust are oxygen, silicon, aluminium, calcium, sodium.

2. Mantle (Middle layer)

The mantle layer lies below the crust and extends up to 2,900 km depth. It is divided into upper mantle and lower mantle. The upper mantle forms the lithosphere that is rigid and solid while the lower mantle goes deep as 2900 km depth.

3. Core (Innermost layer)

The central part of the Earth, from 2900 km to 6371 km deep. It is made mostly of iron and nickel. It is also divided into the outer core and inner core.

C) Explain electromagnetic radiation ...

A. Electromagnetic Radiations

Electromagnetic radiations are waves of energy that travel through space or a medium in the form of oscillating electric and magnetic fields that are perpendicular to each other and to the direction of wave propagation.

They do not require any medium meaning they can travel through a vacuum.

B. Types of Electromagnetic Radiations

1. Radiowaves

Radiowaves are produced by antennas of radio, TV, mobile and for communication.

2. Microwaves

microwaves are produced by magnetrons and radar systems used in microwave ovens and radar satellite communication.

3 - Ultraviolet rays

Ultraviolet rays come from sun and mercury lamps. People use sunscreen to gain protection from UV rays as it can cause aging and cancer.