

Q No 2

a)

Solar Eclipse

It occurs when the moon passes between the Sun and Earth, casting a shadow on Earth. This happens only during a new moon.

Alignment: Sun - Moon - Earth

Lunar Eclipse

It occurs when Earth passes between the Sun and moon, casting its shadow on moon. This happens only during a full Moon.

Alignment: Sun - Earth - Moon

①

Total

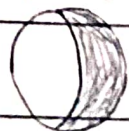
The moon completely blocks the Sun's disk.



②

Partial

The moon only partially covers the Sun.



③

Annular



The Sun appears as a bright ring of fire around the Moon as Moon is far from Earth.

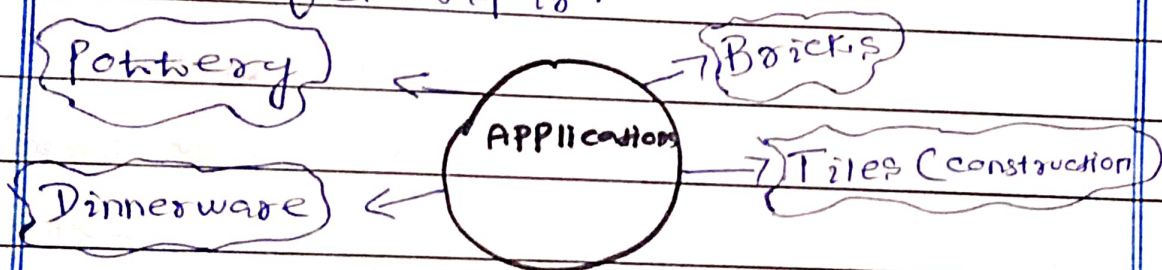
(b)

Features	Ceramics	Plastics
Origin	Inorganic and non-metallic (sand)	Organic (Carbon based)
Properties	Hard, heat resistant, chemical resistant	Lightweight, moldable, low melting point
Formation	Fired at high 'T'	Molded using heat/pressure.

Types and Applications of Ceramics

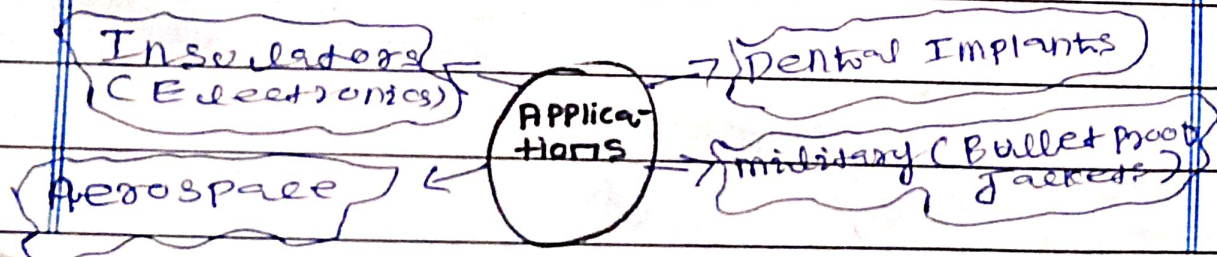
1). Traditional Ceramics

These are made from clay, sand and bed of spar.



2). Advanced Ceramics

These are made from pure, synthetic compounds (e.g.) Alumina, Silicon Carbide



C)

1) Food Contamination

It is unintentional and accidental.
It's the presence of harmful substances (like bacteria or chemicals) that made food unsafe.

2) Food Adulteration

It is intentional and deceptive.
It is the deliberate act of adding a cheaper substance to increase profit.

Food Contaminants

1. Pesticides residues
2. Heavy metals like mercury in fish.
3. Shards of glass from factory.

Food Adulterants

1. Water or starch in milk
2. Papaya seeds in black pepper.
3. Chalk powder in flour.
4. Brick powder in chili powder.

d)

Imbalanced Diet

It is a form of malnutrition where the diet lacks the proper portions of essential nutrients e.g. proteins, fats, vitamins, minerals. It includes:

① Under Nutrition

A deficiency of nutrients

② Over Nutrition

Access of nutrients e.g. fats, sugar

Major Consequences

From under Nutrition (Deficiency Diseases)

- i) Scurvy (Vitamin C deficiency)
- ii) Rickets (Vitamin D deficiency)
- iii) Anemia (Iron deficiency)
- iv) Goiter (Iodine deficiency)

From over - Nutrition (Lifestyle diseases)

- i) Obesity
- ii) Type 2 diabetes
- iii) Hypertension
- iv) Heart diseases
(Heart attacks, strokes)

Q No 3

a)

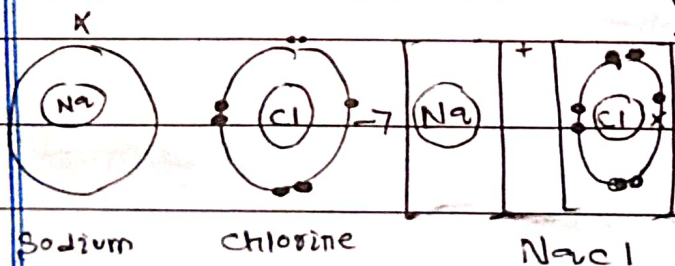
Chemical Bonding

It is the force holding atoms or ions together to form stable molecules. Atoms bond by gaining, losing, or sharing electrons to complete their outermost electron shell.

Types of Chemical Bonding

① Ionic Bonding

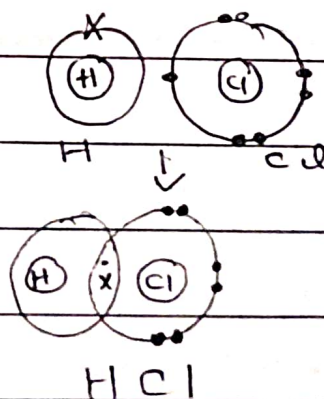
Transfer of electron from a metal to non-metal, creates positive (cation) and negative (anion) ions that are held by electrostatic attraction. Example



② Covalent Bonding

Sharing of electron pairs between two non-metals. Atoms are held together by mutual attraction for the shared electrons.

Example



b)

Causes of Floods in Pakistan

(A) Natural Causes

1. Meteorological

Intense monsoon rainfall and cloudbursts, worsened by climate change.

2. Glacial Melt

Accelerated melting of northern glaciers leads to Glacial Lake Outburst Floods.

(B) Man-made Causes

1. Deforestation

It causes rapid soil erosion, which splits up riverbeds and reduces their capacity.

2. Encroachment

Illegal construction on natural flood plains blocks the river paths.

Reliable Suggestions

1. Dams and Reservoirs

Construct large and small dams to store excess floodwater.

3. Remove Encroachments

Strictly ban and remove all construction from river flood plains.

2. Afforestation

Implement a nationwide tree-planting campaign to control erosion.

4. Early Warning system

Invest in modern weather radar and GLOF monitoring for timely evacuations.

Galaxies' Formation

Galaxies form from the gravitational collapse of matter left over from the Big Bang.

1. Vast clouds of gas (H , He) and dark matter (which provides most of the gravity) exist in early universe.

2. Gravity pulls this material together.

3. The gas cools, fragments, and collapses to begin forming the first stars - A galaxy is born when it has large, gravitationally bound system of stars.

Evolution of Galaxies over the Time

Galaxies change over billions of years.

1) Primary Way: A merger of two spiral galaxies often creates a large elliptical galaxy.

^{a.a} Spiral Galaxies

These (like Milkyway) are active and full of gas, constantly forming new stars.

^{a.a} Elliptical Galaxies

These are retired, have little gas, and mostly stopped forming new stars.

d. The Big Bang Theory

It is the leading cosmological model stating that the universe began ~13.8 billion years ago from an infinitely hot, dense state.

It was not explosion in space, but the expansion of space itself. As space expanded, it cooled, allowing matter to form.

≈ Evidence to Support Big Bang

1. Universal Expansion (Red Shift)

First observed by Hubble, all distant galaxies are moving away from earth, their light is red shifted, proving that fabric of space is stretching.

2. Cosmic Microwave Background

This is the faint, uniform afterglow of heat left over from the initial hot bang, now cooled to microwave temperature. It is visible in all directions.

3. A abundance of Light Elements

The theory perfectly predicts the observed ratio of elements in the universe 74% Hydrogen, 25% Helium, which were the first elements created in Big Bang.