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BATCH: 401

Question: 3

(a) What is chemical bonding?

Give its types with examples.

CHEMICAL BONDING

"Chemical bonding is the attractive force that holds atoms or ions together to form molecules and other compounds"

Why Atoms Form Chemical Bonds?

Atoms in any molecule form chemical bonds to make their outer shell electrons more stable. The type of chemical bond maximizes the stability of atoms that form it.

TYPES OF CHEMICAL BONDS:

Different types of chemical bonds are following:

- a) Ionic bond
- b) Covalent bond
- c) Metallic bond
- d) Hydrogen bond

(a) IONIC BOND:-

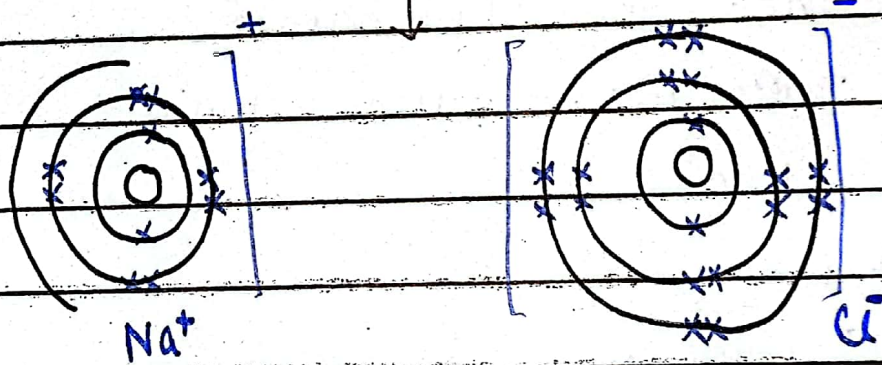
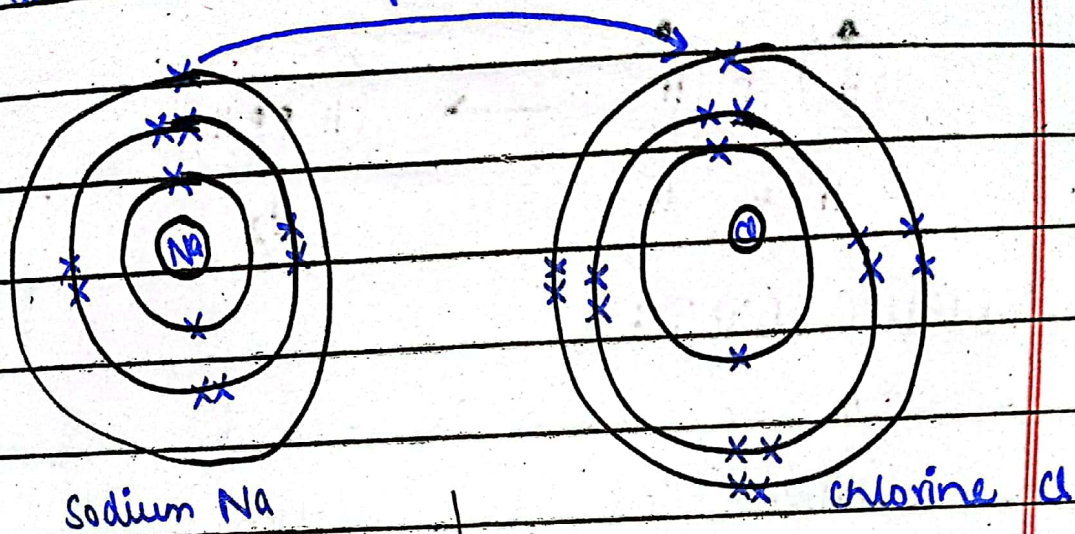
"A bond which is formed by complete transfer of electrons from one atom to another is called ionic bond".

Example:-

Formation of sodium chloride is one of the examples of ionic bond formation.

The outer most shell of Na (sodium) has one electron, while that of chlorine (Cl) has 7 electrons. Na will transfer its 1 electron to chlorine

and will gain positive charge, while
chlorine will gain negative charge.



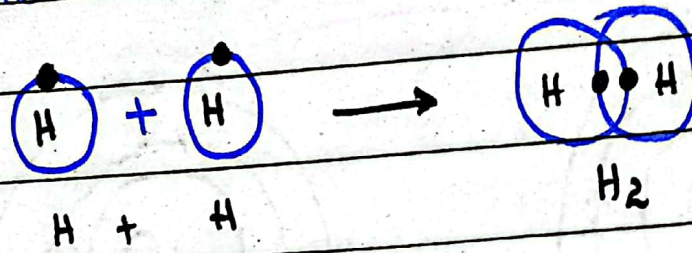
b) COVALENT BOND:

"A bond which is formed
by the mutual sharing
of electrons between
atoms is called covalent
bond"

Example:

Hydrogen gas forms the simplest

covalent bond by mutually sharing one outer electron.

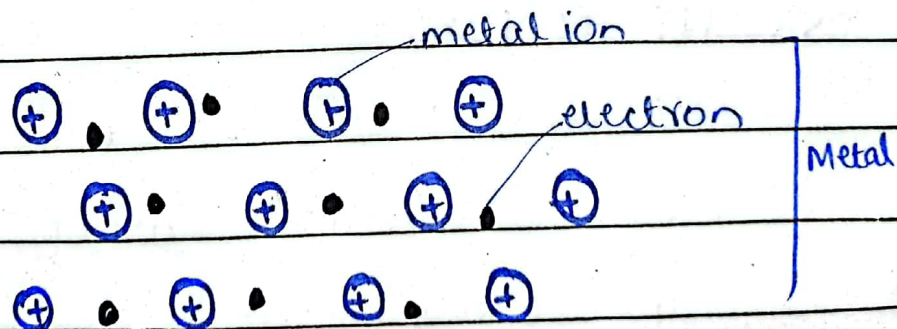


(C) METALLIC BOND:

"A bond which is formed between the free electron and positively charged metal ion is called metallic bond"

Example:-

This type of bond is formed in any metal like gold, silver, copper etc.



(C) How galaxies are formed and evolve over time?

GALAXY

"A galaxy is gravitationally bound system of stars, stellar remnants, interstellar gas, dust, and dark matter."

Formation of a Galaxy:

- After the Big Bang, the Universe was hot and dense mixture of particles.
- Gravity began to pull more matter into denser areas.
- Dense matter grew into clumps and this clump accumulated hydrogen and helium gases in it leading to formation of stars.
- The explosion of stars created more dense matter and dark matter and gravity started to make more stable structures that could sustain

stars for longer periods of time.
The stable structures were the
earliest galaxies which were small.

Evolution of Galaxies:-

- Early galaxies were small. But they continued to grow and merge into other galaxies over billions of years.

Characteristics of a Galaxy:-

- Astronomers estimate that, there are almost 100-200 billion galaxies in the observable universe.
- Galaxies range in size from dwarfs with just few thousand stars to giants with trillions of stars.
- Many galaxies have black holes at their center. Black hole is a massive object that is so dense that within a certain radius, its gravitational field does not let anything escape from it,

even light.

TYPES OF GALAXIES:

According to visual morphology, galaxies are categorized into:

- a) Elliptical galaxies
- b) Spiral galaxies
- c) Irregular galaxies
- d) Barred spiral galaxies
- e) Lenticular galaxies

Examples :-

- Milky Way galaxy is our own galaxy where solar system exists. It is a spiral galaxy formed over 13.7 billion years ago.
- Andromeda Galaxy is the nearest galaxy to Milky Way Galaxy.

(d) What is the big bang theory?
Give evidence to support the Big bang?

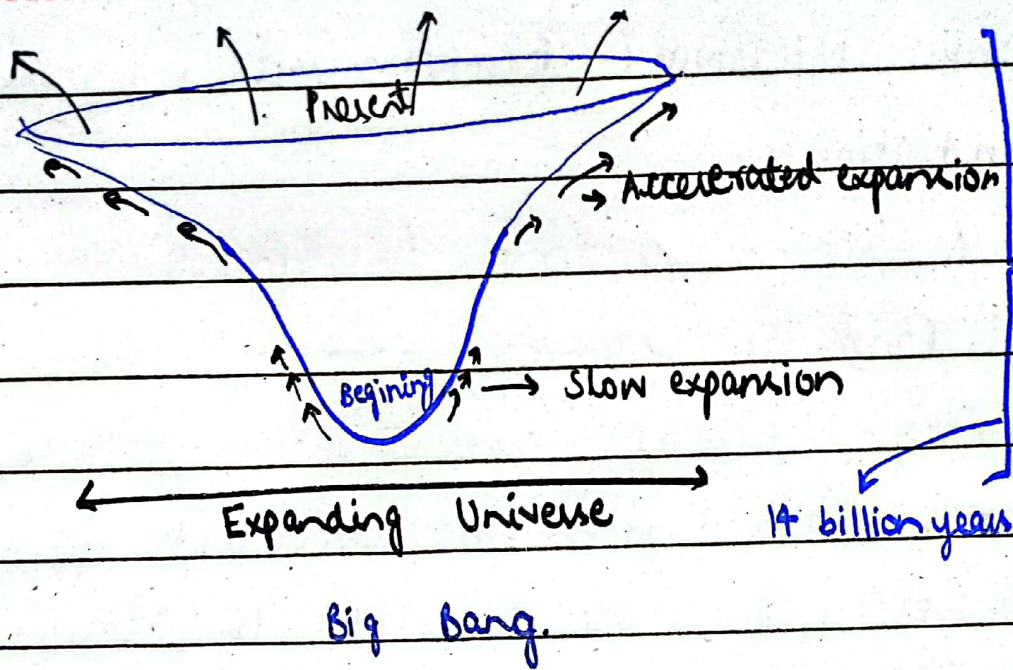
BIG BANG THEORY

"Big Bang is a theory that is scientific explanation of origin and evolution of the Universe."

Singularity to Universe:-

Astronomers believe that Universe began in a Big Bang about 13.7 billion years ago. At that time, the whole Universe was inside a bubble which was named as singularity. It was hotter and denser than anything.

This singularity exploded creating the Universe. In a fraction of second a single atom converted to a structure bigger than a galaxy giving rise to time, space, and matter. Universe is expanding since that time.



Evidence for the Big Bang:-

a) From Spectrum of Light:-

By analyzing the spectrum of light from a star or galaxy, one can tell if it is moving towards or away from Earth.

Red Shift:- Object moving away from earth give redder wavelength.

All the galaxies give red shift, supporting big bang theory.

Blue Shift:- Object moving towards the earth give shorter wavelength known as blue shift.

b) Cosmic Microwave Background

Radiation:-

A second evidence to support Big Bang is cosmic microwave background radiation. These radiations are received from all parts of Universe and are thought to be the heat left over from the original expansion or big bang.

(b) What are the causes of floods in Pakistan? Propose reliable suggestions to cope?

Cause of Floods in Pakistan

1) Monsoon Rainfall:

Intense and prolonged monsoon rains in the months of July to September cause flashfloods in Pakistan. Mostly river basins like

Indus and its tributaries are affected.

2. Glacial Melting:-

Glaciers are melting at accelerated rate due to global warming as per NASA in Pakistan.

3. Poor Infrastructure and Urban Drainage:-

Encroachment on river beds and poor drainage systems in cities like Karachi and Lahore lead to urban flooding.

4. Deforestation:-

Large scale cutting of forest in northern and hilly regions reduces soil absorption capacity and increases surface runoff.

5. Mismanagement of Water

Resources:-

Lack of dams, embankments and flood forecasting systems results in unregulated river flow and overflow during heavy rains.

Reliable Suggestions to Prevent Floods:

- 1- Construction of large and small dams can store excess rainwater and regulate riverflow.
- 2- Improved flood forecasting system can be used for early warning systems for timely evacuation and preparedness.
- 3- Afforestation and Watershed management is necessary for increasing soil absorption and reduce runoff.
4. Urban planning and drainage
Improving improvement is necessary to prevent urban flooding.

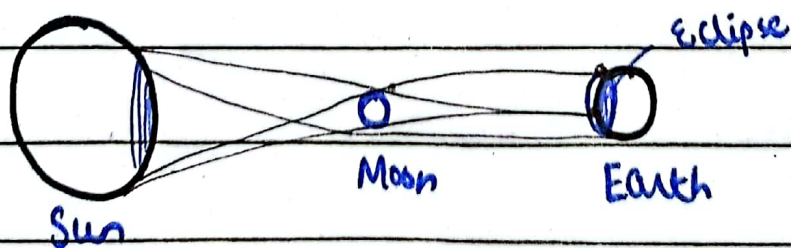
5- Public awareness and community training is needed for emergency response and preparedness.

Question - 1

(a) What is Solar and Lunar Eclipse?
Give the types of solar eclipse?

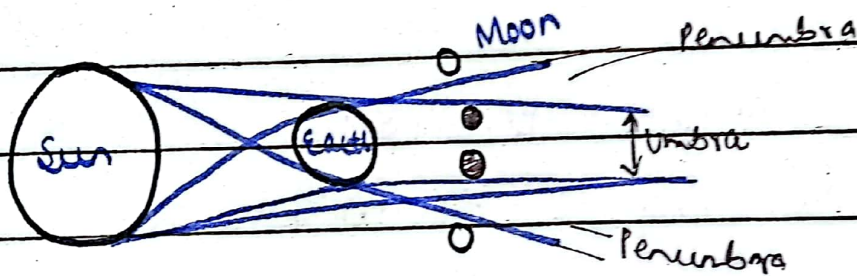
SOLAR ECLIPSE

"Phenomena where Moon comes in between Sun and Earth blocking the sunlight to reach the earth completely or partially is called solar eclipse"



LUNAR ECLIPSE

"A phenomena where Earth comes in between Sun and Moon blocking sunlight to reach moon completely or partially is called lunar eclipse."



TYPES OF SOLAR ECLIPSE:

1- Total Solar Eclipse:-

When the moon is aligned exactly on the same line joining the centre of Earth and sun. Such an eclipse is called total solar eclipse.

2- Partial Solar Eclipse:-

When the moon is above or below the central line joining the earth and sun, such an event is called partial solar eclipse.

3- Annular Solar Eclipse:-

It is due to smaller size of the moon that some of the light from sun escape sideways of the moon and falls on the surface of the earth making bands like pattern called Bailey beads or lovely diamond ring effect. This phenomenon is known as annular solar eclipse.

(b) Differentiate ceramics?

Feature	Ceramics	Plastics
• Composition	Inorganic, non-metallic compounds like silica, alumina	Organic polymers, which are long chains of carbon based molecules
• Hardness	Very hard	Softer
• Temperature resistance	High resistance	Low resistance
• Mechanical properties	Brittle, strong and water resistant	Flexible, tough, easier to mold.
• Examples	Pottery, bricks, glass, tiles.	Polythene, polystyrene, etc.

TYPES OF CERAMICS

Based on applications, ceramics are divided into:

a) Traditional Ceramics:

These are clay products, cement, bricks and tiles.

• Advanced Ceramics:

→ Electroceramics:-

These are magnetic, optical, or conductive ceramics etc.

→ Advanced Structural Ceramics:-

These are nuclear ceramics, bioceramics, automotive ceramics etc.

Applications of Ceramics:-

- Ceramics are used in aerospace for the formation of parts of space shuttle.
- Bio ceramics are used in medical field especially in dental and bone filling or transplants.
- Part of computers like insulators, resistors, capacitors etc. are made of ceramics.
- Used in building and construction materials.
- Also used in automotive industry.

(C) Differentiate 5 each?

FOOD ADULTERATION

"Food adulteration is a deliberate addition of inferior or cheaper substances to a food product to increase its quantity or make it seem more valuable"

Examples:-

- 1- Sugar → chalk powder and washing soda.
- 2- Whole spices → Dirt, dust, straw, insects etc.
- 3- Honey → Sugar solution.
- 4- Milk → Water and starch, removal of fat.
- 5- oils and Fats → Mineral oil, castor oil etc.

FOOD CONTAMINATION

"Food contamination is the unintentional presence of harmful substances like bacteria or pesticides"

Examples:-

- 1- Meat → Microbes such as E. coli.
- 2- Dairy products → Bacteria like Salmonella.
- 3- Eggs → Salmonella bacteria.
- 4- Bread → Fungus.
- 5- Nuts → Fungus.

(d) What is imbalanced diet?

IMBALANCED DIET

"Imbalanced diets lack of adequate proportion of nutrients like proteins, carbohydrates, fats, vitamins, and ^{minerals} vitamins leading to deficiencies or excesses"

CONSEQUENCES OF IMBALANCED

DIET:-

1- Carbohydrates:-

Deficiency:- Disturbance of energy supply.

Excess:- Obesity.

2- Proteins :-

Deficiency:- Muscle weakening, weak immunity.

Excess :- Heart problems.

3- Lipids:-

Deficiency:- Transport of vitamins disturbed.

Excess - Obesity.

4- Vitamins

Deficiency:- ~~Transport of vitamins disturbed~~

Excess:- Dizziness, nausea, digestive issues.

Deficiency:- Night blindness, rickets, etc.

5- Water:-

Deficiency:- Dehydration.

Excess:- Excessive removal of
micronutrients from body.