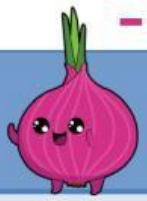
Prep 1 Science November month exam revision sheet



Positive ion (Cation)	Negative ion (Anion)
Metal atom has lost one electron or more.	Metal atom has gained one electron or more.
Protons > Electrons	Electrons > Protons
Energy levels of atom < Energy levels of the ion	Energy levels of atom = Energy levels of the ion
Similar to the inert gas that is before it.	Similar to the inert gas that is after it.
Carry positive charges equal to the lost electrons.	Carry negative charges equal to the gained electrons.

Ionic bond	Covalent bond
Metal (positive ion) **loses** electron+ Nonmetal (Negative ion) **gains** electrons	Nonmetal + Nonmetal Sharing electrons
Form: **Compound molecule** only as it occur between two different elements. (NaCl)	Form: **Compound molecule** between two different nonmetals. (HCl) **Element molecule** between two similar nonmetals. (O2)
Its compounds properties: - Most of them **dissolve** in water. - Their solutions and moltens **conduct** electricity. - **High** melting and boiling point.	**Its compounds properties:** - Most of them don't **dissolve** in water. - Their solutions and moltens don't **conduct** electricity. - **High** melting and boiling point.
For example, **Sodium chloride (NaCl)** - Solid - Doesn't react with caustic soda.	For example, **Hydrogen chloride (HCl)** - Gas - React with caustic soda.

Electric force	Magnetic force	Gravitational force
Electric field: The region of space surrounding an electric charge where its effect appears.	**Magnetic field:** The region of space surrounding the magnet where its effect appears.	**Gravitational field:** The region of space surrounding the Earth where its effect appears.
Electric field lines: - Imaginary lines. - Don't intersect each other. - Start from positive charge\plate. - End at negative charge\ plate. - End at the surface of metallic charged plate.	**Magnetic field lines:** - Imaginary lines. - Don't intersect each other. - Start from north pole (N). - End at south pole (S). - Increase at poles and decrease at the middle of the magnet.	**Gravitational field lines:** - Imaginary lines. - Points toward the Earth's center.
Attraction or repulsion.	Attraction or repulsion between magnets. Attraction only between magnet and magnetic materials.	Attraction only.
Depend on: The position of the matter in the electrostatic series.	**Depend on:** - Type of matter : magnetic or nonmagnetic. - The magnetic poles: Like poles repel and similar poles attract.	**Depend on:** - Mass: gravity increases as mass increases. - Distance: Gravity decreases as distance increases.
Importance: -Lightning rod (Discharge) - Metal chain in fuel tanks. (Discharge) - Electrostatic plating. (Attraction)		**Importance:** - Black holes. - Orbital motion. - Tides. - Stability of objects

Device/Object	Function\ Importance
Electrostatic coating\ Electrostatic plating	1- Reduce waste of paint. 2- Make the paint layer uniform.
Metal chain hanged from the fuel truck	Discharging the accumulated electrons, so preventing burning of fuel.
Lightning rod	Protect buildings by discharging accumulated charges in the clouds.
Electroscope (Electric detector)	- It detects the electric state of objects. - It determines the type of the charge. - It compares the magnitude of charges.
Coulombmeter	It measures the weak electrical charges (Its amount)
Newton meter (Spring balance)	Measuring weight\ Measure the Earth's gravitational force affecting on an object.
Magnetic brush	It is used to reveal unclear fingerprints.
Compass	It determines the four geographical directions of Earth.
Tides	- Generate electricity. - Cleaning water naturally.
Black holes	Have massive gravity attract all things even light can't escape from it.

❖ Mention an example\ the name of:

1- **The simplest molecule of an organic compound** Methane CH_4
2- **A molecule containing a single covalent bond** Hydrogen H_2 or Water
3- **A molecule containing a double covalent bond** Oxygen O_2
4- **A molecule containing a triple covalent bond.** Nitrogen N_2
5- **A molecule containing an ionic bond.** Sodium chloride $NaCl$
6- **An element that has the ability to bond with each other in organic compounds in cyclic, straight or branched structures.** Carbon atom
7- **The natural magnet.** Lodestone

Give reason for:

1- The stability of noble (inert) gases atoms based on their electron configuration.

Because the outermost energy level of their atoms is complete with electrons.

2- When a sodium atom loses an electron, it becomes a positive ion.

Because number of positive protons inside nucleus greater than number of negative electrons outside nucleus

3- Nonmetal atoms tend to gain or share electrons to form chemical bonds.

- Metallic element atoms tend to lose their valence electrons.

To reach the stable electron configuration of the nearest noble gas in the atomic number.

4- The number of electrons in the ion of each of fluorine, 9F and sodium 11Na in sodium fluoride molecule is equal.

Because the fluorine atom tends to gain an electron and turns into a negative ion, while the sodium atom tends to lose its valence electron and turns into a positive ion so, the number of electrons in each of them is equal (10 electrons).

5- The ionic compound is electrically neutral.

Because in the ionic compound, the number of positive charges is equal to the number of negative charges.

6- Sodium and magnesium cannot combine together to form a compound molecule.

Because both are metals, whose atoms tend to lose their valence electrons and form positive ion, so there is no electrostatic attraction occurs between them.

7- Ionic bonding results in formation of compound molecules only, while covalent bonding results in formation of compound molecules or element molecules.

Because the **ionic bonding** occurs between atoms of different elements as a result of the electrostatic attraction between a cation of a metal element and an anion of a nonmetal element.

while **covalent bonding** can occur between two atoms of the same nonmetal element forming an element molecule or between two atoms of different nonmetal elements forming a compound molecule

8- When rubbing a copper rod it must be insulated with a wooden handle.

To prevent the leakage of electric charges, as copper is one of the electrically conducting materials.

9- When an ebonite rod is rubbed with a piece of cotton, the cotton gains a positive charge, while the ebonite acquires a negative charge.

Because cotton precedes the ebonite in the electrostatic series, so it tends to lose electrons and becomes positively charged, while the ebonite gains these electrons and becomes negatively charged.

10- The same material can be charged with either a positive or negative charge.

This depends on the type of rubbing material and its position in the electrostatic series. If it is rubbed with a material that precedes it in the series, it will be charged negatively. and if it is rubbed with a material that follows it, it will be charged positively.

11- Touching the disk of the electroscope with your hand before starting using it.

To ensure it is free of any electric charge.

12- The divergence of the leaves of the positively charged electroscope increases when a glass rod rubbed with a piece of silk is brought near the electroscope's disk.

Because rubbing glass with silk causes the glass rod to gain a positive electric charge which is similar to that of the charged electroscope, so the divergence of its leaves increases.

13- Not all metals are magnetic materials.

Because some metals, such as aluminum and silver are not attracted to magnet.

14- Electric field lines and magnetic field lines are similar in some properties.

Because both are imaginary lines that do not intersect with each other.

15- The mutual force between two like charges is similar to the mutual force between two like magnetic poles.

Because both represent a force of repulsion.

16- There is a field in the magnetic forces, but there is no field in the collision forces.

Because magnetic forces are forces that act on objects at a distance without touching, while collision forces are considered contact forces.

17- The state of the seas differs when the Moon is in the crescent phase compared to its state during the new moon and full moon phases.

Because tides are at their peak when the Moon is full moon or new moon.
zinc sulphate solution $ZnSO_4$.

18- An object has no weight in outer space.

Due to the absence of gravity in the outer space

19- The weight of an object on the Earth surface is greater than its weight on the moon surface.

Because the Earth's gravitational field is much stronger than the Moon's.

❖ **What happens:**

1- Two oxygen atoms bond together.

Each oxygen atom shares its two unpaired valence electrons to form two pairs of electrons forming one double covalent bond between them.

2- Effervescence occurs when sodium bicarbonate is added to acetic acid.

A chlorine atom 17Cl bonds to a hydrogen atom 1H

3- Adding caustic soda solution to each of sodium chloride solution and hydrogen chloride solution.

Sodium chloride solution will not react with caustic soda solution, while hydrogen chloride solution will react with it.

4- A magnet is dipped into nickel filings.

Nickel filings are attracted to the magnet, and the density of the filings is at its maximum at the poles of the magnet and decreases at the middle of the magnet.

5- When a magnet is suspended freely from its center.

It takes a certain direction of earth acting as a huge magnet

6-The presence of an object in the outer space (according to the mass and weight of the object). - An object being launched outside Earth's gravitational field (according to the mass and weight of the object).

The object's mass remains constant while its weight becomes zero

7- Moving of an object (astronaut) from Earth's surface to the Moon's surface (according to the mass and weight of the object (astronaut).

The mass of the object (the astronaut) remains constant, while the weight becomes 1/6 its weight on Earth's surface.

Weight = mass X gravitational field intensity.

N

Kg

لو جه بال Gram
على طول divide 1000

N/Kg

Charles de coulomb

- He put the Inverse square law (Coulomb's law)
- He helped in putting the basis of the electromagnetic theory.
- The measuring unit of static electricity is Coulomb.

North geographic pole
South magnetic pole

North magnetic pole
South geographic pole

North pole of compass or suspended magnet

South pole of compass or suspended magnet

My WEIGHT on Earth is around 560N

My WEIGHT on the moon is around 90N

My MASS is always 56kg!!

Best of luck