

SCIENCE

IMPORTANT QUESTIONS

(Questions from Board
Papers)

"Arun Maths
Hub"

Difference between
Questions from
Board Papers

"Arun Maths Hub"

Oxidation and Reduction

Oxidation	Reduction
Oxidation is a process in which oxygen is added to a substance	Reduction is a process in which oxygen is removed from a substance
Oxidation is a process in which hydrogen is removed to a substance	Reduction is a process in which hydrogen is added to a substance
Oxidation is a process in which substance loses electrons	Reduction is a process in which substance gains electrons
Example: $2\text{Cu} + \text{O}_2 \xrightarrow{\text{Heat}} 2\text{CuO}$	Example : $2\text{KClO}_3 \xrightarrow{\text{Heat}} 2\text{KCl} + 3\text{O}_2$

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Exothermic and Endothermic reactions

Exothermic Reaction	Endothermic Reaction
1) Chemical reaction in which energy is evolved (given out) is called exothermic reaction	1) The chemical reaction in which energy is absorbed are called endothermic reactions
Example 1 : $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO} + \text{Heat}$	Example 1: $\text{NH}_4\text{Cl} \xrightarrow{\text{Heat}} \text{NH}_3 + \text{HCl}$
Example 2: Respiration	Example 2 : Photosynthesis

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Displacement and double displacement reaction

Displacement reaction	Double displacement reaction
In Displacement reaction, a more reactive element displaces a less reactive element from its salt solution	In Double displacement reaction, two reactants in solution exchange their partner ions (Two atoms or groups from different compounds displace each other)
Example: Zinc displaces copper from copper sulphate solution $\text{Zn} + \text{CuSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Cu}$	Example: The precipitation of barium sulphate by adding BaCl_2 to K_2SO_4 solution $\text{BaCl}_2 + \text{K}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + 2\text{KCl}$

Corrosion and Rancidity

Corrosion	Rancidity
The Phenomenon due to which the metals get corroded due to the effect of moisture and chemicals present in the atmosphere is called corrosion.	Fats and oils in food kept for long time get oxidised and become rancid and taste of food changes. This is called rancidity.
Corrosion can be prevented by coating a metal surface with paint or oiling or greasing or galvanizing	Rancidity can be prevented antioxidants are added to food containing oil and fat.
Example : rusting of iron (FERRIC OXIDE) , green layer above copper (COPPER CARBONATE) etc..	Example : An unusual smell coming out of chips after their expiry etc...

Acids and Bases

Acids	Bases
Acids are sour in taste	Bases are bitter in taste
Acids turn blue litmus to red	Bases turn red litmus to blue
In presence of water, acids give H^+ ion or H_3O^+ ion	In presence of water, bases give OH^- ion
pH of acids is less than 7	pH of base is more than 7
Examples: Hydrochloric acid (HCl), Sulphuric acid (H_2SO_4), nitric acid (HNO_3)	Examples: Sodium Hydroxide (NaOH), Calcium Hydroxide $Ca(OH)_2$

.Metal and Non Metals (Physical Properties)

Metal	Non-Metal
All metals are solid except mercury	Non-metals exist in all three states
Metals have high melting point and boiling point	The melting and boiling points of non-metals are comparatively low
Metals are malleable and ductile.	Non-metals are neither malleable nor ductile
Metals are good conductors of heat and electricity.	Non-metals are poor conductors of heat and electricity. (except graphite)
Metals are lustrous.	Non-metals are non-lustrous

Electric Motor and Electric Generator

Electric Motor	Electric Generator
It converts electric energy into mechanical energy	It converts mechanical energy into electric energy.
Current is supplied to the coil	Current is induced in the coil
It is based on magnetic effect of electric current	It is based on electromagnetic induction
It follows Fleming's left hand rule	It follows Fleming's right hand rule

Ethanol and Ethanoic acid

Ethanol	Ethanoic acid
The functional group in ethanol is $-OH$ alcohol.	And functional group in Ethanoic acid is $-COOH$ (carboxylic acid)
It does not change the colour of blue litmus paper.	It can change the colour of blue litmus to red
It does not react with Sodium bicarbonate ($NaHCO_3$)	It reacts with Sodium bicarbonate ($NaHCO_3$) releasing CO_2 gas

Periods and Groups

Periods	Groups
Periods are horizontal rows in the periodic table	Groups are vertical columns in the periodic table
Modern periodic table has 7 periods	Modern periodic table has 18 groups
Elements in a period have the same electron configurations	Elements in a group share chemical or physical properties

Concave and Convex lens

Concave Lens	Convex Lens
A concave lens is thinner in the middle and thicker at the edges.	A convex lens is thicker in the middle and thinner at the edges.
It is also known as Diverging Lens	It is also known as Converging Lens
Its focal length is negative.	Its focal length is positive.
It always produces a virtual image.	It always produces a real image (forms a virtual image only when the object is between the focus and optical centre)

Nervous System and Hormonal System

Nervous System	Hormonal System
Electrical impulses are the messengers in the nervous system	Hormones are the chemical messengers in the endocrine system that target cells through the bloodstream
Nerve impulses are transmitted through neurons	Hormones are transmitted through blood vessels.
Brain and the spinal cord are involved in the nervous system	Glands and reproductive organs (ovaries and testes) are involved in the endocrine system.
The nervous system is under both voluntary and involuntary control	The endocrine system is under involuntary control

Calcination and Roasting

Calcination	Roasting
It is the process of heating the ore in <u>absence of air</u>	It is the process of heating the ore in <u>presence of air</u>
It is used for <u>carbonate ores</u>	It is used for <u>sulphide ores</u>

Biodegradable and Non biodegradable

Biodegradable	Non biodegradable
Biodegradable waste is decomposed and degraded by microbes	Non-Biodegradable waste cannot be decomposed by microbes
they are eco friendly	they are not eco friendly
Biodegradable substances are not harmful to the environment.	They are harmful to the environment.
Biodegradable waste are used to produce energy manure, compost and biogas	Non-Biodegradable waste can be separated and recycled but the process is very expensive
Examples- vegetables wastes, animal excreta	Examples- plastic, polythene

Phototropism and Geotropism

Phototropism	Geotropism
Phototropism is the response of plants towards or away from the sunlight	Geotropism is the response of plants towards or away from the earth's gravity
stem of the plant shows positive phototropism	root of the plant shows positive geotropism
root of the plant shows negative phototropism	stem of the plant shows negative geotropism
The stimulus is sunlight in phototropism	gravity is the stimulus in geotropism

Aerobic and Anaerobic respiration

Aerobic respiration	Anaerobic respiration
The breakdown of glucose in the presence of oxygen to produce more amount of energy is called as aerobic respiration.	The breakdown of glucose in the absence of oxygen to produce energy is called as anaerobic respiration
Glucose breaks down into carbon dioxide and water.	Glucose breaks down into ethyl alcohol, carbon dioxide, and energy
It can be found in the cytoplasm and the mitochondria.	It can be found only in the cytoplasm
The high amount of energy is produced.	Less amount of energy produced.

Saturated and unsaturated hydrocarbons

Saturated hydrocarbons	Unsaturated hydrocarbons
Saturated Hydrocarbons have single covalent bonds between carbon atoms	Unsaturated hydrocarbons are the straight chain compounds containing double or triple covalent bonds.
These are also known as alkanes.	Hydrocarbons with a double bond between carbon atoms are known as alkenes. Hydrocarbons with triple bonds between carbon atoms are known as alkynes.
Saturated Hydrocarbons are less reactive.	Unsaturated Hydrocarbons are more reactive
Gives a clean flame on burning.	Gives yellow flame with lots of black smoke on burning.
Saturated hydrocarbons under go substitution reactions	Unsaturated hydrocarbons under go addition reactions.

Real Image and Virtual Image

Real Image	Virtual Image
Real image is formed when rays of light meet at a point after reflection /refraction .	virtual image is formed when rays of light appear to meet (When diverging rays are extended) at a point.
The real image can be captured on screen	The virtual image cannot be captured on a screen
real image is always inverted	virtual image is always erect.
Converging lens are used to produce the image	Diverging lens are used to produce the image
Concave mirror is used to produce the image	A plane mirror or convex mirror is used to produce the image

Asexual and sexual reproduction

Asexual reproduction	Sexual reproduction
It is uniparental.	It is usually bi-parental.
In this type of reproduction male and female gametes are not involved	In this type of reproduction male and female gametes are involved and fertilized
Characteristics of only one parent are inherited.	Characteristics of both parents are inherited.
The progeny and the parent will be genetically identical.	The progenies will be genetically different from the parents.
Example : Binary fission in amoeba, budding in hydra	Example : reproduction in multi-cellular organisms.

Blood and lymph

Blood	lymph
It is a red colour fluid.	It is a colourless fluid.
It is associated with the circulation of oxygen and carbon dioxide, nutrients hormones, waste products etc.	It helps in body defence and is a part of the immune system.
It is part of the circulatory system	It is part of the lymphatic system
it contains plasma, RBC's, WBC's, platelets and proteins.	It contains plasma, less number of WBC's and platelets. It lacks proteins.

Autotrophic and heterotrophic nutrition

Autotrophic nutrition	Heterotrophic nutrition
Autotrophs are organisms that prepare their own food through the process of photosynthesis	Heterotrophs are organisms that cannot prepare their own food and depend upon autotrophs for nutrition
Autotrophs are producers in the food chain.	Heterotrophs are consumers in the food chain
Food is prepared from carbon dioxide and water in presence of sunlight.	Food cannot be prepared from carbon dioxide or water.
Example : green plants, algae and a few photosynthetic bacteria.	Example : All the animals, most bacteria have heterotrophic nutrition

Homologous and Analogous organs

Homologous organs	Analogous organs
Homologous organs have similar origin and basic structure but perform different functions in different organisms	Analogous organs are different in basic structure but perform same functions.
Inherited from a common ancestor	Not inherited from ancestors
Developed as a result of the adaptation to a different environment	Developed as a result of the adaptation to a similar environment
An arm of a human, the leg of a dog or a flipper of a whale are all homologous structures	From wings in birds, bats and insects to fins in penguins and fishes are all analogous structures

Arteries and Veins

Arteries	Veins
These blood vessels have thick walls and carry blood from the heart to different body parts.	These blood vessels have thin walls and carry blood from different body parts to the heart.
They do not have valves.	They have valves and prevent backflow of blood.
The pressure is high as the blood flows by the pumping pressure of the heart.	The pressure is low as the blood flows by the capillary action of the veins.
All the arteries carry oxygenated blood except the pulmonary artery.	All the veins carry deoxygenated blood except the pulmonary vein.

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Reflection and refraction of light

Reflection of light	Refraction of light
Reflection is the bouncing back of light when it strikes a smooth surface.	Refraction is simply bending or change in direction of light when it passes from one medium to another
The angle of incidence of the light is equal to the angle of reflection.	The angle of incidence is not equal to the angle of refraction.
Light returns to the same medium.	Light travels from one medium to another.

Resistance and Resistivity

Resistance	Resistor
Resistance is the physical property of a substance because of which it opposes the flow of current i.e. electrons	The resistivity is the property of the material which defines the resistance of the material having specific dimension
The SI unit of resistance is Ohm	The SI unit of resistivity is Ohm-meter.
$R = V / I$ V = Voltage, I = Current R = Resistance	$\rho = (R \times A) / L$ ρ = Resistivity, L = Length, A = Cross-sectional area
Resistance is directly proportional to the length and temperature while it is inversely proportional to the cross-sectional area of the material.	Resistivity is only proportional to the nature and temperature of the particular material.

Sensory neuron and motor neuron

Sensory neuron	Motor neuron
Neurons that carry sensory impulse from sensory organs to the central nervous system are known as sensory neurons	A neuron that carries motor impulses from the central nervous system to specific effectors is known as motor neurons.
Found in eyes, skin, ears, tongue and nose	Found in muscles and glands
Comprises of a short axon	Comprises of a long axon

Ammeter and Voltmeter

Ammeter	Voltmeter
It is used to measure current	It is used to measure voltage across two points
It is connected in series with the circuit	It is connected in parallel with the circuit
Resistance is low	Resistance is high
In schematic representation of ammeter, it is denoted by a circle with A inside it.	In schematic representation of voltmeter, it is denoted by a circle with V inside it.

Metal and Non Metals (Chemical Properties)

Metal	Non-Metal
Metals are electro-positive.	Non-metals are electronegative.
Metals reacts with oxygen to form basic oxides.	Non-metals react with oxygen to form neutral or acidic oxide.
Metals react with water to form hydroxide and hydrogen.	Non-metals do not react with water.
Metal oxides and hydroxides bonds have ionic bonds.	Non-metal oxides and hydroxides have covalent bonds
Metals react as reducing agent by donating electrons.	Non-metals are oxidizing agents that can gain the electrons.

Alveoli and Villi

Alveoli	Villi
They are small balloon-like sacs found in the lungs	Villi are finger like projections present in the inner wall of intestine
exchange of gases takes place	it increases its surface area and absorbs digested food

Pollination and Fertilization

Pollination	Fertilization
The transfer of pollen grains from the male to the female part of a flower.	The fusion of male and female gamete
Pollination takes place before fertilization.	Fertilization takes place after pollination.
It leads to fertilization	It leads to formation of seeds.
Pollination is an external process.	Fertilization is an internal process.

Alternating current and Direct Current

Alternating current	Direct Current
Both magnitude and direction of current change with time	Current flows with a constant magnitude in same direction
AC can be easily stepped up or stepped down	A transformer does not work on DC
Power loss in long distance transmission is low	Power loss in long distance transmission is high