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FOR MPSC (राज्यसेवा) & PSI, STI, ASO

7887878001 / 7887878002 /groups/77926463145586
www.thelakshyaacademy.in lakshyacareeracademynashik@gmail.com

पत्ता : श्रीनाथ अपार्टमेंट, मुरकुटे लायब्ररी समोर, लेन नं.३, पंडीत कॉलनी, नाशिक-२

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प्रकाशक

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Phone No : **7887878001 / 7887878002**

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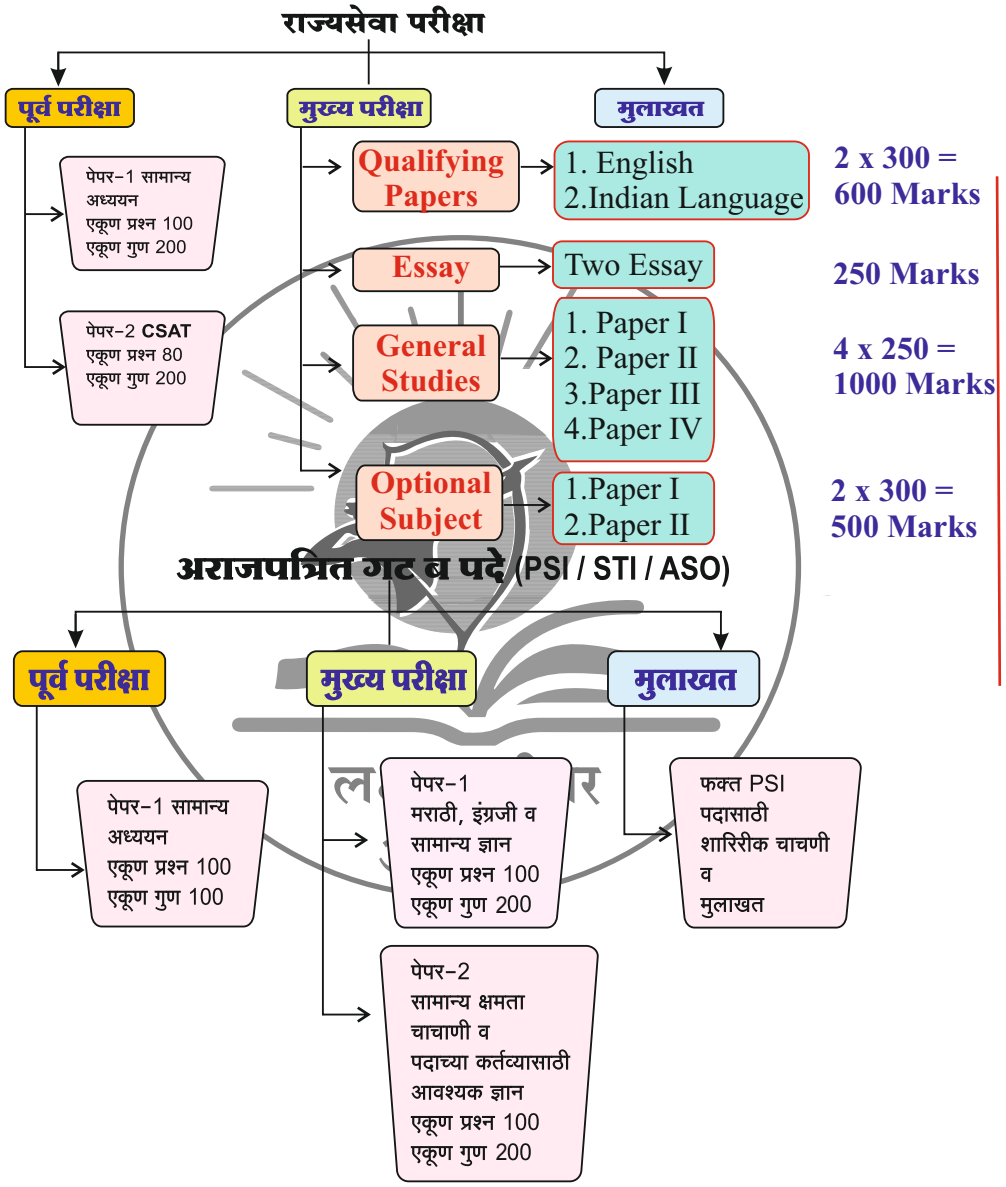
परिक्षेचे स्वरुप



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STANDARD SIX

1. Natural Resources – Air, Water and Land

Air, water and land are the factors important for sustaining the living world on the earth and for fulfilling their basic needs. They are called natural resources. Air, water and land are called the earth's atmosphere, hydrosphere and lithosphere, respectively. These living things and the parts of the lithosphere, hydrosphere and atmosphere which they occupy are together called the biosphere. The hydrosphere occupies a much larger part than the lithosphere. Land 29% Water 71%

Air :

The air in the atmosphere around the earth contains nitrogen, oxygen, carbon dioxide, six inert gases, nitrogen dioxide, sulphur dioxide, water vapour and dust particles. The troposphere contains about 80% of the total mass of gases in the air, while this proportion is about 19% in the stratosphere. Further, in the mesosphere and ionosphere, the proportion of the mass of gases goes on decreasing. Gases are not found in the exosphere and beyond.

Air contains :

- Nitrogen 78%
- Oxygen 21%
- Argon 0.9%
- Carbon dioxide 0.03%
- Other constituents of air 0.07%

The amount of the gases in the air is the greatest near the surface and decreases as we go higher and higher from the surface.

Some uses of gases in air :

- **Nitrogen** – Helps living things to build the necessary proteins. It is useful in the production of ammonia and in airtight packaging of foodstuffs.
- **Oxygen** – Necessary for respiration in living things and for combustion.
- **Carbon dioxide** – Plants use it for producing their food. Used in fire extinguishers.
- **Argon** – Used in electric bulbs.
- **Helium** – Used for obtaining low temperature and also for generating lift in airships.
- **Neon** – Used in decorative lights and for street lighting.
- **Krypton** – Used in fluorescent tubes.

Forest fires :

A forest fire is an uncontrolled fire in a forest, pasture or grassland due to natural or man-made causes. Forest fires spread at a tremendous speed.

Effects of forest fires :

- Great damage to natural wealth and biodiversity.
- Pollution of air.

The National Disaster Management Authority was established in 2005. It undertakes planning and implementation of disaster management work.

5. Substances in the Surroundings –Their States and Properties

When a substance changes from one state to another, the process is called change of state of the substance. The state of a substance changes if it is heated or cooled. Every substance in our surroundings, is found in either the solid, liquid, or gaseous state. In the 19th century, the scientist J. Willard Gibbs showed that the characteristic properties of a substance depend on its physical state and the arrangement of particles in it.

Points	Solids	Liquids	Gases
Example	A piece of iron	Water, spirit, oil	Air
Shape	Has a shape of its own. Retains shape, no matter how it is kept.	Does not have a shape of its own. Takes the shape of the container.	Does not have a shape of its own. Occupies all the available space.
volume	Has a definite volume. Solids like sugar, sand when poured on a flat surface, form a heap.	It has a specific volume. Occupies definite portion of a container. Spreads on a flat surface on pouring. Flows downwards along a slope.	Does not have a definite volume. On changing the pressure on a gas in a closed container, its volume also changes

Change in the physical state of a substance is an effect of the amount of heat in it. On gaining heat the substance changes from solid to liquid and liquid to gas. On the other hand, when the substance cools, or loses heat, it changes from gaseous to liquid and liquid to solid state.

The temperature and a thermometer :

A thermometer is used to measure temperature. Degrees Celsius (^{o}C) is the unit of measuring temperature. There are several types of thermometers available. Nowadays digital thermometers are frequently used.

Advantages and Shortcomings of Synthetic Fibre	
7. As they have a shine, they enhance the appearance of the wearer. 8. Clothes made from these threads are wrinkle-free and scratch-free.	the skin and causes serious injuries. 6. These fibres are not decomposed by micro-organisms.

7. Nutrition and Diet

Nutrients and foodstuffs :

There are six main nutrients in our food: Carbohydrates, fats, proteins, fibre, vitamins and minerals. In living things, the process of taking in food and water and using it for growth and other purposes is called 'nutrition', and the constituents of food useful for these purposes are called 'nutrients'.

Carbohydrates :

Our main need is of energy. It is fulfilled by carbohydrates. Hence, our diet includes a large proportion of cereals in the form of rice, chapatti or roti, bhakri and bread which contain carbohydrates. Cereals are our staple food.

Fats :

Some part of our energy requirement is also fulfilled by fatty foods such as oil, ghee and butter. We get energy in the form of heat from the food we eat. Heat is measured in kilocalories. Hence, the energy in food items is also measured in kilocalories (Calories). Children of growing age need to get approximately 2000 to 2500 Calories from the food they eat.

Proteins :

We need proteins for the purposes of growth, repairing the wear and tear of the body and for other life processes. We get proteins from the sprouts, milk and milk products, meat and eggs in our food.

Minerals and vitamins :

To improve the body's resistance to disease and for other life processes the body needs vitamins, minerals and fibre in the diet. We require vitamins and minerals in small quantities, but their deficiency can lead to various diseases. The body needs several inorganic substances. They are called minerals.

Significance of a balanced diet :

- An increased capacity to work.
- Good physical and mental health.
- Increased capacity to fight/resist diseases.
- Helps in proper growth of the body.

Malnutrition :

Malnutrition occurs when all the nutrients that the body needs are not obtained in the proper proportions from the diet. This happens when a person does not get sufficient food or when the diet is not balanced. If one's diet exceeds one's need, it is called over nutrition.

Adulteration of food :

In order to earn more profits, cheaper substances of low quality are mixed with the foodstuffs. These substances are called adulterants and adding them to foodstuffs is called adulteration of food. Adulterants may even be poisonous or harmful to health. Such adulterated food is impure and harmful and so unfit for consumption.

8. Our Skeletal System and the Skin

The various organs are safe within the body cavity. The human skeleton is a protective shell for all the internal organs. A fracture in a bone causes severe and unbearable pain and the part with the broken bone swells immediately.

'X-rays' were discovered by Wilhelm Conrad Roentgen. An X-ray image shows whether a bone is broken and also the exact spot where it is broken. This helps in providing the proper treatment.

The human skeletal system :

All the bones in our body are not of the same shape. Every bone is different. All the bones together form a framework or skeleton. The skeleton gives a shape to the body. All the bones of the body along with cartilage together form the skeletal system. Bones are hard. They are not flexible. Bones are composed of two main constituents. Bone cells are biotic, while calcium carbonate, calcium phosphate, minerals and salts are the abiotic constituents of bones. Calcium imparts strength to the bones.

Types of Bones :

Bones of our body are classified into four types.

- Flat bones

Joints :

Joints are the places where two or more than two bones are connected to each other. Joints are of two types.

1) Movable Joint

Bones can move. Examples: bones of arms and legs

2) Immovable Joint

Bones cannot move. Example: bones of the skull. (Other than the lower jaw)

Types of joints :

1. Hinge joint : This type of joint allows the movements of bones only in one direction. It moves in a 180^{o} angle. Examples: the elbow and knee joints.

2. Ball and socket joint : In this type of joint, the bones can move in two or more directions - in a 360^{o} angle. Examples: shoulder and hip joints.

3. Gliding joint : In this type of joint, the bones can only slide over each other. Examples : wrist and ankle joints.

The skin

The skin is an important and large organ of all living things. The skin has hair. There are nails on the skin at the tips of the fingers and toes. The skin gives us the sense of touch. The skin is an important sensory organ of the body.

The structure of the skin :

Human skin is made up of two main layers. The outermost layer is called the epidermis and the layer below it is called the dermis. Below the dermis, there is a network of blood vessels and nerve fibres. The subcutaneous layer under this network maintains normal body temperature. The epidermis has various layers. In the skin, there are glands which secrete sweat. They are called sweat glands.

After playing in the hot sun or after hard physical labour, the temperature of the body rises. Then sweat is released. It helps to reduce the temperature of the body. Our body temperature usually remains constant at approximately $37^{o}C$.

As we grow older, the proportion of fat beneath the skin reduces. However, the previously taut skin does not shrink. This causes wrinkles on the skin of older people.

simple machines.

Let us learn about some simple machines.

An inclined plane :

If a slanting plank is used to lift a weight, we have to bear less of the weight and lifting it becomes easier. Such a plank is called an 'inclined plane'.

A wedge :

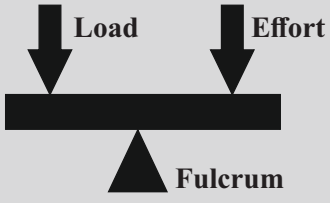
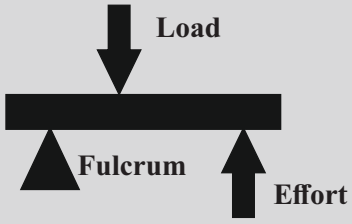
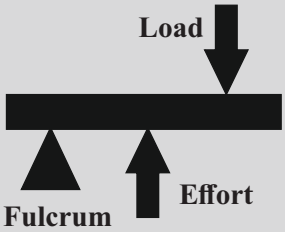
An axe is used for cutting wood. A sharp tool is formed on joining two inclined planes. Such a tool is called a wedge.

A lever :

A farmer is using a strong crow-bar to remove the big stone bogged down in the farm. Such a machine is called a lever.

A lever has three parts, namely, effort, load and fulcrum.

1. The support at which the rod of a lever is rested is called the 'fulcrum of a lever'. The lever rotates about the fulcrum.
2. The weight lifted by a lever or the force against which the lever acts is called the 'load'. The arm of the lever from the fulcrum to the load is called the 'load arm'.
3. The force applied on the other end of the rod to lift the load is called the 'effort'. The part of the lever from the fulcrum to the effort is called the 'effort arm'.

Lever of the first order	Lever of the second order	Lever of the third order
The fulcrum is in the centre, the load is at one end while the effort is at the other end. 	The load is in the centre, the fulcrum on one side, and the effort, on the other side. 	The effort is in the centre, the fulcrum on one side, and the load on the other side. 

A pulley :

Such a device with a grooved wheel and thread designed to lift weights is called a pulley.

A wheel and axle :

The giant wheel is fitted to a rod at its centre. This rod is called an 'axle'.

STANDARD SEVEN

1. The Living World : Adaptations and Classification

Adaptation :

Gradual changes occur in the body parts and also in the behaviour of organisms which help them to adjust to their surroundings. Such changes are called adaptations. They take place over a long period of time.

Adaptation in aquatic plants :

Some of the aquatic plants are firmly rooted in the soil at the bottom of the water bodies. Their stems are submerged, while leaves and flowers float on the surface. However, some plants are entirely afloat. Their roots are not anchored in the soil. The surfaces of leaves and stems of many aquatic plants are covered with a waxy layer.

Leaves of some aquatic plants are thin and slender like a ribbon. This shape helps them to withstand fast currents of water. Air spaces in stems and petioles of aquatic plants are useful for floating in water.

Adaptation in desert plants :

Desert plants are either leafless or their leaves are like small needles or have been modified into thorns. As a result, they lose very little water by evaporation. The stem stores water and food and is therefore fleshy. The stems are green as they perform photosynthesis in the absence of leaves. Their roots penetrate deep into the soil and some roots spread away into the soil in search of water. There is a thick layer of a waxy substance on the stems of these plants.

Adaptation in plants of snowy regions :

Plants of snowy regions mainly include conifers like deodar and pine. These trees are conical in shape due to their sloping branches. In the heavy snowfall and extreme cold in these regions, their conical shape prevents the snow from accumulating on the tree and the thick bark helps the tree to withstand the cold.

Adaptation in plants of forest regions :

A variety of plants - trees, shrubs and herbs - are found in forests. These plants compete amongst themselves for sunlight. Hence, trees grow tall to get sunlight and climbers and vines grow to a great height with the support of trees. Spring-like tendrils on the stems of some climbers is an example of adaptation.

However, if its temperature falls below $4^{O}C$ its density starts decreasing. This means that the density of water is maximum at $4^{O}C$. If the temperature of water is lowered below $4^{O}C$, its density decreases and volume increases. It means that water expands when the temperature falls below $4^{O}C$. This is called the anomalous behaviour of water.

When the salt dissolves in water, its particles spread in water. Slowly they become smaller and smaller. Ultimately they become so small that they cannot be seen, that is, they mix completely with water. This is what is called dissolving.

Solute : the substance that dissolves - Salt

Solvent : the substance in which the solute dissolves - Water

Solution : what we get when the solute dissolves in the solvent.

Uses of water according to its properties :

1. Water is useful for water transport due to its fluidity. Water falling down from a height is used to generate electricity with the help of a generator.
2. Water is a good coolant and is used in motor vehicles to control the temperature of the engine.
3. Many substances are soluble in water. Water is a universal solvent. Water is used as a solvent in factories, laboratories, foodstuffs and in various types of biological processes occurring in the body such as digestion, excretion, etc.
4. Water is useful for cleaning purposes such as for bathing, washing clothes.

Soil :

Properties of soil :

Colour is an important property of soil. The soil gets its colour as a result of several processes. The colour of soil near land surface is darker than the colour of the lower layers. Soil may be of different colours, such as black, red, copper, yellow, gray. The colour of the soil depends upon its texture and its organic ingredients as well as on chemical ingredients like iron, lime.

Soil texture :

Soil contains particles of different sizes. The texture of the soil is determined by the proportion of particles of the various sizes in it. Following are the types of soil on the basis of its texture.

Sandy soil :

The proportion of sand, i.e., large particles is high in sandy soil. Water drains rapidly through sandy soil. It is easy to plough this soil. But it is less fertile. This is because the particles of sandy soil are made of the mineral called silicon

studied nowadays.

The carbon cycle :

The circulation and recycling of carbon from the atmosphere to living organisms and after their death back to the atmosphere is called the carbon cycle. Abiotic carbon atoms are circulated and recycled into biotic form mainly through photosynthesis and respiration. Hence, the carbon cycle is one of the important bio-geo-chemical cycles.

Plants convert carbon dioxide into carbohydrates by the process of photosynthesis. Similarly, they produce carbon compounds like proteins and fats, too. Herbivores feed upon plants. Carnivores feed upon herbivores. In this way, biotic carbon is transported from plants to herbivores, from herbivores to carnivores and from carnivores to apex consumers.

After death, all types of consumers, are decomposed by decomposers like bacteria and fungi and carbon dioxide is released again into the atmosphere and is used again by living organism. In this way, carbon is continuously passed on from one living organism to another. After the death of living organisms, carbon goes to the atmosphere and is again taken up by living organisms.

Carbon dioxide is released into the atmosphere through abiotic processes like burning of fossil fuels and wood, forest fires and volcanic activity. Oxygen is released into the atmosphere by the biotic process of photosynthesis and CO_2 through respiration. The equilibrium of oxygen and carbon dioxide gases in the atmosphere is maintained by plants.

The oxygen cycle :

Oxygen forms 21% of the atmosphere. It is also present in the hydrosphere and lithosphere. Circulation and recycling of oxygen within the biosphere is called the oxygen cycle. This cycle, too, includes both the biotic and abiotic components.

Oxygen is highly reactive and it readily reacts with other elements and compounds. As oxygen is found in various forms like molecular oxygen (O_2), water (H_2O), carbon dioxide (CO_2), inorganic compounds, etc. the oxygen cycle of the biosphere is extremely complex. Oxygen is released in the process of photosynthesis whereas it is used up in processes like respiration, combustion, decomposition, corrosion, rusting, etc.

Most micro-organisms use oxygen for respiration. Such microbes are called aerobes. Microbes which do not need oxygen are called anaerobes. Oxygen is important for the synthesis of proteins, carbohydrates and fats. It is also used in various chemical reactions. Ozone (O_3) is produced from oxygen through various

Necessity of solid waste management :

1. For preventing environmental pollution and to keep the surroundings clean.
2. For energy as well as fertilizer production and through that to generate work and employment opportunities.
3. To reduce the strain on natural resources through treatment of solid waste.
4. To improve the health and quality of life and to maintain environmental balance.

10. Information Communication Technology : The new direction of progress

Memory :

Memory is the place for storing data obtained from the input and also the generated solution or answer by the computer. There are two types of memories in a computer.

1. Internal Memory 2. External Memory.

The internal memory is of two types.

1. **RAM (Random Access Memory) :** This is created from electronic components. Any electronic component can function only as long as it is supplied with electricity.
2. **ROM (Read Only Memory) :** The information stored here can only be read. We cannot make changes to the information originally stored here.

Two main components of computers :

Hardware : Hardware consists of all the electronic and mechanical parts used in computers.

Software : Software refers to the commands given to the computer, information supplied to it (input) and the results obtained from the computer after analysis (output).

11. Reflection of Light

Light is actually electromagnetic radiation which causes the sensation of vision.

Mirror and types of mirrors :

In scientific language, a surface which reflects light and creates clear images is called a mirror. A mirror is a reflecting surface. Mirrors are of two types: plane mirrors and spherical mirrors.

Properties :

1. Molecules of fullerenes are found in the form of buckyballs and buckytubes.
2. There are 30 to 900 carbon atoms in one molecule of a fullerene.
3. Fullerenes are soluble in organic solvents such as carbon disulphide, chlorobenzene.

Uses :

1. Fullerenes are used as insulators.
2. Fullerenes are used as a catalyst in water purification.
3. At a certain temperature fullerene exhibits superconductivity.

B. Non-crystalline / Amorphous forms :

The arrangement of carbon atoms in this form is not regular. Coal, coke \are the non-crystalline forms of carbon.

1. Coal : Coal is a fossil fuel. It contains carbon, hydrogen and oxygen. It also contains nitrogen, phosphorus and sulphur. It occurs in the solid state. It is of four types.

a. Peat : Formation of peat is the first step in the formation of coal. It contains a high proportion of water and less than 60% of carbon. Therefore, not much heat can be obtained from peat.

b. Lignite : Peat was transformed into Lignite due to increased pressure and temperature inside the earth. It contains 60 to 70% of carbon. Lignite is the second step of the formation of coal.

c. Bituminous coal : Bituminous coal was formed as the third step of formation of coal. It contains 70 to 90% of carbon.

d. Anthracite : Anthracite is known as the pure form of coal. This coal is hard and contains about 95% of carbon.

2. Charcoal : The charcoal that is made from animals is made from their bones, horns, etc. On the other hand, the charcoal made from plants is formed by combustion of wood in an insufficient supply of air.

Uses of coal :

1. Coal is used as fuel in factories and homes.
2. Coal is used to obtain coke, coal gas and coal tar.
3. Coal is used in thermal power plants for generation of electricity.
4. Charcoal is used in purification of water and organic material.

3. Coke : The pure coal that remains when coal gas has been taken away from coal, is called coke.

Uses of coke :

1. Used as domestic fuel.
2. Coke is used as a reducing agent.
3. Coke is used in production of aeriform fuel such as water gas ($CO + H_2$) and producer gas ($CO + H_2 + CO_2 + N_2$).

Hydrocarbons : basic organic compounds :

Along with carbon, the element hydrogen is also included in most organic compounds. The compounds formed from only carbon and hydrogen are called basic organic compounds. These are also called hydrocarbons.

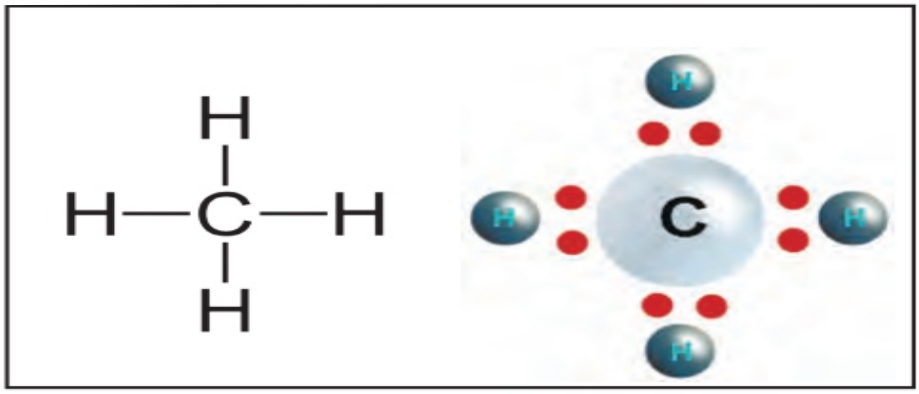
The valency of carbon is 4. However, this occurs by sharing of electron rather than a give and take of electrons. In other words a carbon atom can form four covalent bonds with other carbon atoms or atoms of different elements. When a carbon atom shares one electron each with four hydrogen atoms and forms four C-H bonds, a methane CH_4 molecule is formed.

Properties of covalent compounds :

1. Covalent compounds have low melting points and boiling points.
2. Generally they are insoluble in water and soluble in organic solvents.
3. They are poor conductors of heat and electricity.

Saturated and unsaturated hydrocarbons :

The hydrocarbons having only single bonds between carbon atoms are called saturated hydrocarbons. For example ethane ($C_2 - H_6$) which is ($CH_3 - CH_3$), propane ($CH_3 - CH_2 - CH_3$). Some hydrocarbons have a multiple bond between two carbon atoms. A multiple bond can be a double bond or a triple bond. Hydrocarbons having at least one multiple bond are called unsaturated hydrocarbons. For example, ethene ($H_2C=CH_2$), ethyne propene ($CH_3-CH=CH_2$), propyne ($CH_3(HCCH)$, -C CH)



13.7 Structural formula and electron dot model of methane

14. Substances in Common Use

Important salts in daily life :

Sodium chloride (Table salt- NaCl) :

Properties and uses :

1. Common salt is a colourless and crystalline ionic compound. There is no water of crystallization in its crystalline structure.
2. It is a neutral salt, salty in taste.
3. This compound is used for the production of salts like Na_2CO_3 , $NaHCO_3$.
4. When an electric current is passed through a saturated solution of sodium chloride (brine) it is electrolysed and hydrogen gas is released at the cathode while chlorine gas is released at the anode. This method is used for production of chlorine gas. In this method an important basic compound NaOH is formed in the cell.
5. When salt is heated to a high temperature (about 800^0C), it melts. This is called the fused state of the salt.
6. When fused salt is electrolysed, chlorine gas is released at the anode and liquid sodium metal, at the cathode.

Salt is also obtained from a certain type of rock. This salt is called rock salt. The mineral halite and Himalayan rock salt are some examples of rock salt. This salt is used to treat many diseases.

Sodium bicarbonate (Baking soda – $NaHCO_3$) :

Properties and uses

1. $NaHCO_3$ reacts with moist litmus paper and red litmus turns blue which means that it is basic in nature.
2. It is used to make bread, cake, dhokla.
3. Being basic in nature it is used to reduce acidity in the stomach.
4. $NaHCO_3$ is used to make the active substance CO_2 in the fire extinguisher.
5. Baking soda is used to clean an oven.

Bleaching powder (Calcium oxychloride $CaOCl_2$) :

Properties and uses :

1. Bleaching powder is a yellowish white coloured solid substance.
2. Its chemical name is calcium oxychloride.
3. It has a strong odour of chlorine gas.
4. It is used for disinfection of drinking water and the water in the swimming pool.

Measurement of thickness, density and level :

It is necessary to maintain the required thickness in the manufacture of aluminium, plastic, iron sheets of differing thickness. In the manufacturing process, a radioactive substance is placed on one side and an instrument to measure radiation on the other. The radiation read by the measuring instrument varies with the thickness of the sheet. Material inside a packing can also be examined by the same technique. **Luminescent paint and radioluminescence**

The radioactive substances radium, promethium, tritium with some phosphor us are used to make certain objects visible in the dark, for example, the hands of a clock, and certain other objects. Krypton-85 is used in HID (High Intensity Discharge) lamps while promethium-147 is used in portable X-ray units as the source of beta rays.

Use in Ceramic articles :

Luminous colours are used to decorate ceramic tiles, utensils, plates, etc. Earlier uranium oxide was used in these paints.

2. Field of agriculture :

1. The genes and chromosomes that give seeds properties like fast growth, higher productivity, etc. can be modified by means of radiation.
2. The radioactive isotope cobalt-60 is used for food preservation.
3. Onions, potatoes are irradiated with gamma rays from cobalt-60 to prevent their sprouting.
4. Strontium-90 is used as a tracer in the research on various crops.

Medical science :

1. Polycythemia : The red blood cell count increases in the disease polycythemia. Phosphorus 32 is used in its treatment.
2. Bone cancer : Strontium-89, strontium-90, samarium-153 and radium-223 are used in the treatment of bone cancer.
3. Hyperthyroidism : Enlargement of thyroid gland, weight loss in spite of appetite, insomnia are the symptoms of hyperthyroidism. It occurs due to overproduction of hormones by the thyroid gland. Iodine-123 is used in the treatment of hyperthyroidism .
4. Tumour detection : Boron-10, iodine-131, cobalt-60 are used in treatment of brain tumour, while arsenic-74 is used in detection of small tumours in the body.

Hazards of radioactive substances and radiation :

1. The central nervous system is affected by radioactive radiations.
2. Hereditary defects are generated by bombardment of radiation on D.N.A in the body.
3. Radioactive radiation can penetrate the skin, and causes diseases like skin

Powder coating :

Powder coating is a method of applying a layer harder than paint on the surface of an iron object to prevent rusting. In this method, a polymer resin, a pigment and some other ingredients are melt mixed, cooled and ground into a uniform powder. This powder is sprayed on the polished metal surface by electrostatic spray deposition (ESD).

Anodizing :

A protective layer is formed naturally on the surface of aluminium metal by reaction with oxygen in air. In the anodizing process, this layer can be made of the desired thickness. Anodizing is done by electrolysis. Dilute acid is taken in the electrolytic cell and the aluminium article is dipped in it as the anode. When an electric current is passed hydrogen gas is released at the cathode and oxygen gas at the anode. A reaction with oxygen occurs and a layer of hydrated aluminium oxide is formed on the anode.

Ceramic :

Ceramic is a heat resistant substance formed by kneading an inorganic substance in water and then shaping it and hardening it by heating. Pots made by a potter, Mangalore roofing tiles, construction bricks, pottery, terracotta articles are some examples of common ceramic articles that we see around.

Porcelain :

Hard, translucent and white coloured ceramic. made by using the white clay called kaolin, found in China. Glass, granite and the mineral feldspar is mixed with kaolin and kneaded with water. The resulting mixture is shaped and fired in a kiln at a temperature of 1200 to 1450 ^{0}C. On firing again after glazing, beautiful articles of porcelain are obtained.

Bone china :

Bone china is made by adding some ash of animal bones in the mixture of china clay, feldspar and fine silica while making porcelain. This ceramic is harder than porcelain.

Advanced ceramics :

Oxides like Alumina (Al_2O_3), Zirconia (ZrO_2) Silica (SiO_2) and some other compounds like silicon carbide (SiC), boron carbide (B_4C) are used instead of clay for making advanced ceramic. This ceramic requires a temperature of 1600 to 1800 ^{0} C and an oxygen free atmosphere for firing. This process is called sintering.

Ceramics can withstand high temperatures without decomposing. Ceramic is brittle, water resistant and an electrical insulator. Therefore, it is used in

Cerebrum :

This is largest part of our brain and consists of two cerebral hemispheres. These hemispheres are joined with each other with the help of tough fibres and nerve tracts. The cerebrum occupies two-thirds of the brain. Hence, it is also called the large brain. Its surface has deep, irregular ridges and grooves which are called convolutions. Convolution increases the surface area of the cerebrum and therefore a large number of nerve cells can be accommodated.

Cerebellum :

This is the smaller part of the brain situated below the cerebrum at the back of the cranial cavity. Its surface shows shallow grooves instead of deep convolutions.

Medulla oblongata :

This is the hind-most part [illegible]. There are two triangular swollen structures called pyramids on the upper side of medulla oblongata. The medulla oblongata continues downwards as the spinal cord.

Spinal cord :

The spinal cord is a part of the central nervous system and it is held within the vertebral column. It is slightly thick but gradually tapers towards the end. There is a thread-like fibrous structure at its end. It is called the Filum terminale.

Parts of the Brain	Functions
Cerebrum	Control of voluntary movements, concentration, planning, decision-making, memory, intelligence, and intellectual activities.
Cerebellum	1. Co-ordination of voluntary movements. 2. Maintaining the body's balance.
Medulla oblongata	Control of involuntary activities like the beating of the heart, blood circulation, breathing, sneezing, coughing, salivation, etc.
Spinal cord	1. Conduction of impulses from the skin towards the brain. 2. Conduction of impulses from brain to muscles and glands. 3. Functions as centre of co-ordination of reflex actions.

First filial generation (F_1) :

Mendel observed that all plants of first filial generation (F_1) were tall. Mendel concluded that factors of tall plants are dominant over the factors of dwarf plants.

Second filial generation (F_2) :

In the second filial generation (F_2), both i.e. tall and dwarf types of plants appeared. According to the data collected by Mendel, out of 929 pea plants, 705 were tall and 224 were short. Thus, the phenotypic ratio of these plants is 3(tall) : 1(dwarf) and genotypic ratio is 1(TT):2(Tt):1(tt). Thus, it can be inferred that in the F_2 generation, phenotypically there are two types of plants whereas genotypically there are three types.

Mendel's experiment of dihybrid cross

Parental Generation (P_1)

Phenotype : Rounded-yellow seeds Wrinkled-green seeds

Genotype : RRYY rryy

Gametes RY ry

First Filial Generation (F_1) RrYy

Phenotype : (Rounded-yellow seeds)

Parental Generation (P_2) Selfing in F_1

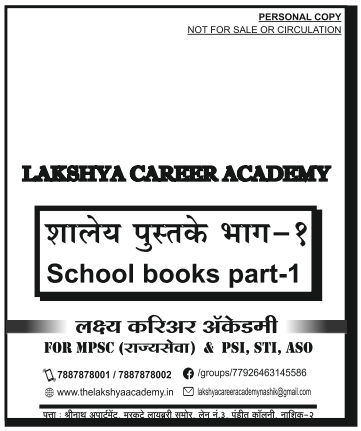
Phenotype : Rounded-yellow seeds Rounded-yellow seeds

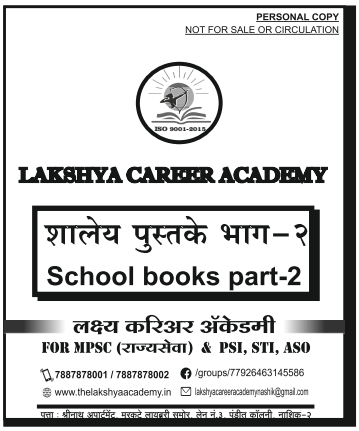
Genotype : RrYy RrYy

Gametes RY, Ry, rY, ry RY, Ry, rY, ry

Second Filial Generation (F_2)

Male gamete / **Female gamete**	RY	Ry	rY	ry
RY	RRYY	RRYy	RrYY	RrYy
Ry	RRYy	RRyy	RrYy	Rryy
rY	RrYY	RrYy	rrYY	rrYy
ry	RrYy	Rryy	rrYy	rryy





- : लक्ष्य करिअर अॅकेडमी वैशिष्ट्ये : -

१) पूर्व + मुख्य + मुलाखत + शारीरिक चाचणी या सर्व भागांची परिपूर्ण तयारी
२) सर्व अभ्यासक्रमाची परिक्षेआधी उजळणी
३) प्रत्येक विषयाला स्वतंत्र तज्ज्ञ मार्गदर्शक/शिक्षक
४) टेस्ट सिरीज (एकूण ४०)
५) सर्व विषयांच्या छापील नोट्स
६) वृत्तपत्र वाचनातून चालू घडामोडींची पूर्णपणे तयारी
७) CSAT (क्लास मध्ये २०० उतार्यांची तयारी)
८) बुध्दिमापन चाचणी व गणित विषयासाठी विशेष लक्ष (प्रत्येक चाप्टर वर ५० प्रश्नांची तयारी)
९) अभ्यासिका पूर्णपणे मोफत
१०) एका बॅचमध्ये फक्त ३० विद्यार्थी
११) दररोज मुख्य परीक्षेसंदर्भातील प्रश्नांचा लेखी सराव
१२) अभ्यासासाठी दर १५ दिवसांनी वैयक्तिक मार्गदर्शन