

Key Notes

Chapter – 1

Crop Production and Management

- In order to provide food to our growing population, we need to adopt certain agricultural practices.
- Same kind of plants grown and cultivated at a place constitute a crop.
- In India, crops can be broadly categorised into two types based on seasons - rabi and Kharif crops.
- It is necessary to prepare soil by tilling and levelling. Ploughs and levellers are used for this purpose.
- Sowing of seeds at appropriate depths and distances gives good yield. Good variety of seeds are sown after selection of healthy seeds. Sowing is done by seed drills.
- Soil needs replenishment and enrichment through the use of organic manure and fertilisers. Use of chemical fertilisers has increased tremendously with the introduction of new crop varieties.
- **Preparation of Soil:**
 - (i) Few inches of the top soil is loosened and turned ploughing/tilling.
 - (ii) Weeds are removed from the soil before removed from the soil before sowing the seeds.
 - (iii) Ploughed field has big soil pieces (crumbs) which are broken by planks.
 - (iv) Field is levelled for sowing.
- Supply of water to crops at appropriate intervals is called irrigation.
- Weeding involves removal of unwanted and uncultivated plants called weeds.
- Harvesting is the cutting of the mature crop manually or by machines.
- Separation of the grains from the chaff is called threshing.
- Proper storage of grains is necessary to protect them from pests and microorganisms.
- Food is also obtained from animals for which animals are reared. This is called animal husbandry.
- **Fertiliser:** The inorganic compounds containing nutrients such as nitrogen, potassium and phosphorus. They are made in the factories. Example: Urea, ammonium sulphate, potash, etc.

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- **Cultivator:** Used for ploughing the soil and is driven by a tractor. This helps to save time and labour.
- **Hoe:** Used for loosening the soil and for removing weeds.
- **Irrigation:** Supplying of water to the crop plants from the wells, canals or water reservoirs.

Method of Irrigation:

- (i) Tradition methods of Irrigation: Moat, Chain pump, Dheki, Rahat.
- (ii) Modern methods of Irrigation: Sprinkler system, Drip system.
- **Harvesting:** The cutting and collecting of the matured crops from the fields. Harvesting in our country is either done manually by sickle or by a machine called harvester.
- **Storage:** Harvested food grains normally contain more moisture than required for storage. Large scale of storage of grains is done in silos and granaries to protect them from pest like rats and insects. Farmers store grains in jute bags or metallic bins.
- **Manure:** A natural substance prepared from decomposition of plant and animal wastes (cow dung, animal bones, dead leaves, dead insects and vegetable wastes) by the action of microbes.

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Chapter – 2

Microorganisms: Friend and Foe

- **Microorganisms:** Microorganisms are too small and are not visible to the unaided eye.
- They can live in all kinds of environment, ranging from ice cold climate to hot springs and deserts to marshy lands.
- Microorganisms are found in air, water and in the bodies of plants and animals.
- They may be unicellular or multicellular.
- Microorganisms include bacteria, fungi, protozoa and some algae. Viruses, though different from the above mentioned living organisms, are considered microbes.
- Viruses are quite different from other microorganisms. They reproduce only inside the host organism; bacterium, plant or animal cell.
- Some microorganisms are useful for commercial production of medicines and alcohol.
- Some microorganisms decompose the organic waste and dead plants and animals into simple substances and clean up the environment.
- Protozoans cause serious diseases like dysentery and malaria.
- Some of the microorganisms grow on our food and cause food poisoning.
- Some microorganisms reside in the root nodules of leguminous plants. They can fix nitrogen from air into soil and increase the soil fertility.
- Some bacteria and blue green algae present in the soil fix nitrogen from the atmosphere and convert into nitrogenous compounds.
- Certain bacteria convert compounds of nitrogen present in the soil into nitrogen gas which is released to the atmosphere.
- **Pathogens:** Some of the microorganisms cause diseases in human beings, plants and animals. Such disease causing microorganisms are called pathogens.
- **Cleaning of Environment:** The microorganisms decompose dead organic waste of plants and animals converting them into simple substances. These substances are again used by other plants and animals. Microorganisms can be used to degrade the harmful and smelly substances and thereby clean up the environment.

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Synthetic Fibres and Plastics

- Synthetic fibres and plastics, like natural fibres, are made of very large units called polymers. Polymers are made up of many smaller units. Polymers are made up of many smaller units.
- While natural fibres are obtained from plants and animals, synthetic fibres are obtained by chemical processing of petrochemicals. Like natural fibres, these fibres can also be woven into fabrics.
- Synthetic fibres find uses ranging from many household articles like ropes, buckets, furniture, containers, etc. to highly specialized uses in aircrafts, ships, spacecrafts, healthcare, etc.
- Depending upon the types of chemicals used for manufacturing synthetic fibres, they are named as Rayon, Nylon, Polyester and Acrylic.
- The different types of fibres differ from one another in their strength, water absorbing capacity, nature of burning, cost, durability, etc.
- Today, life without plastics cannot be imagined. Be it home, or outside, plastic is every where.
- The waste created by plastics is not environment friendly. On burning plastics release poisonous gases. On dumping in the ground they may take years to degenerate. This is because of their non-biodegradable nature.
- We need to use synthetic fibres and plastics in such a manner that we can enjoy their good qualities and at the same time minimise the environmental hazards for the living communities.
- **Types of Synthetic Fibers:**
 - (i) **Rayon:** It is made from cellulose obtained from wood pulp. It is used to make containers, car upholstery, etc.
 - (ii) **Nylon:** A polyamide made from petroleum. It is lightweight, strong and durable. The fabric allows easy evaporation and dries quickly. It is used in parachutes, flak vest, combat uniforms, tires, etc.

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- (iii) **Polyester:** A versatile and important man-made fabric. It has an outstanding characteristic of resisting wrinkle and springing back into its crisp, smooth shape. It is strong and soft. It is used in dresses, suits, rainwear, etc.
- (iv) **Acrylic:** A fibre similar to that of wool and is used to make sweater, blankets, shawls, etc. It is lightweight, soft and warm. Also it is cheaper than natural wool. It is resistant to chemicals, moths and sunlight. Therefore, they are widely in use nowadays.
- **Plastics:** Like synthetic fibres, plastic is also a polymer. Some plastics have a linear arrangement of the units and some have a cross-linked arrangement of the units. Examples: Polythene.
- **Characteristics of Plastics:**
 - (i) **Non-reactive:** Not affected by air, water, soil, etc.
 - (ii) **Light, strong and durable:** Light, strong and durable and can be moulded into different shapes and sizes.
 - (iii) **Poor Conductors:** Do not allow heat and electricity to flow through them.
- **Effect of Plastics on Environment:** Natural materials like wood and paper are biodegradable (bio = living; degradable = able to broken down). In contrast, most plastics do not decay, therefore, they are non-biodegradable. The lightweight nature of plastics can also be a problem. Burning of plastics also release poisonous fumes into the atmosphere. This way plastics pollute the environment.

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Chapter – 4

Materials: Metals and Non-Metals

- Metals are lustrous whereas non-metals have no lustre.
- Generally, metals are malleable and ductile. Non-metals do not have these properties.
- Generally, metals are good conductors of heat and electricity but non-metals are poor conductors
- On burning, metals react with oxygen to produce metal oxides which are basic in nature. Non-metals react with oxygen to produce non-metallic oxides which are acidic in nature.
- Some metals react with water to produce metal hydroxides and hydrogen gas. Generally, non-metals do not react with water.
- Metals react with acids and produce metal salts and hydrogen gas. Generally, non-metals do not react with acids.
- Some metals react with bases to produce hydrogen gas.
- More reactive metals displace less reactive metals from their compounds in aqueous solutions.
- Metals and non-metals are used widely in every day life.

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Chapter – 5

Coal and Petroleum

- **Natural Resources:** Resources include everything provided by the nature. They form the wealth of a country.
- **Types of Natural Resources:**
 - (i) **Inexhaustible:** There are some resources that are present unlimited in nature and will not be exhausted even if used continuously. Example: Sunlight, Air.
 - (ii) **Exhaustible:** These resources are limited and can soon get exhausted because of their excessive use. Example: Forests, wildlife, minerals, coal, petroleum, etc.
- Coal, petroleum and natural gas are fossil fuels.
- Fossil fuels were formed from the dead remains of living organisms millions of years ago.
- Fossil fuels are exhaustible resources.
- Coke, coal tar and coal gas are the products of coal.
- Petroleum gas, petrol, diesel, kerosene, paraffin wax, lubricating oil are obtained by refining petroleum.
- Coal and petroleum resources are limited. We should use them judiciously.
- **Refining:** Petroleum is mixture of various constituents such as petroleum gas, petrol, diesel, lubricating oil, paraffin wax, etc. Refining is the process of separating the various constituents / fractions of petroleum. It is carried out in a petroleum refinery.
- **Natural Gas:** A very important fuel as it is easy to transport through pipes and can be compressed and stored under high pressure as Compressed Natural Gas. It causes no pollution and has high calorific value.

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Chapter – 6

Combustion and Flame

- **Combustion:** The process of burning a substance in the presence of air (oxygen) and undergoes a chemical reaction to produce heat and light.
- The substances which burn in air are called combustible.
- Oxygen (in air) is essential for combustion.
- During the process of combustion, heat and light are given out.
- Ignition temperature is the lowest temperature at which a combustible substance catches fire.
- **Flame:** It is a zone or burning vapour. The substances which vapourise during burning give flames. Example: Kerosene oil and molten wax.
- Inflammable substances have very low ignition temperature.
- Fire can be controlled by removing one or more requirements essential for producing fire.
- Water is commonly used to control fires.
- Water cannot be used to control fires involving electrical equipments or oils.
- There are various types of combustions such as rapid combustion, spontaneous combustion, explosion, etc.
- There are three different zones of a flame - dark zone, luminous zone and non-luminous zone.
- An ideal fuel is cheap, readily available, readily combustible and easy to transport. It has high calorific value. It does not produce gases or residues that pollute the environment.
- Fuels differ in their efficiency and cost.
- Fuel efficiency is expressed in terms of its calorific value which is expressed in units of kilojoule per kg.
- **Types of Fuels:**
 - (i) **Solid Fuels:** Combustible substances which are solid at room temperature. Example: coal, coke, wood, charcoal, etc.
 - (ii) **Liquid fuels:** Volatile liquids which produce combustible vapour. Example: Petrol, kerosene, alcohol, diesel, etc.

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(iii) **Gasous fuels:** Combustible gases or mixture of combustible gases. Example: Natural gas, LPG, biogas, coal gas, etc.

- **Effects of Burning of Fuels:**

(i) Carbon fuels like wood, coal petroleum release unburnt carbon particles. These are dangerous pollutants causing respiratory diseases, such as asthma.

(ii) Incomplete combustion of carbon fuels gives carbon monoxide which is a poisonous gas.

(iii) Increased concentration of carbon dioxide in the air is believed to cause global warming.

(iv) Oxides of Sulphur and nitrogen dissolve in rain water and form acids. Such rain is called acid rain. It is very harmful for crops, buildings and soil.

- Unburnt carbon particles in air are dangerous pollutants causing respiratory problems.
- Incomplete combustion of a fuel gives poisonous carbon monoxide gas.
- Increased percentage of carbon dioxide in air has been linked to global warming.
- Oxides of sulphur and nitrogen produced by the burning of coal, diesel and petrol cause acid rain which is harmful for crops, buildings and soil.

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Chapter – 7

Conservation of Plants and Animals

- **Biodiversity:** Occurrence of innumerable number of different types of organisms and the whole range of their varieties (biotypes) adapted to different climates, environments and areas.
- Wildlife sanctuary, national park and bio-sphere reserve are names given to the areas meant for conservation and preservation of forest and wild animals.
- Biodiversity refers to the variety of living organisms in a specific area.
- Plants and animals of a particular area are known as the flora and fauna of that area.
- Endemic species are found only in a particular area.
- Endangered species are those which are facing the danger of extinction.
- Red Data Book contains a record of endangered species.
- Migration is the phenomenon of movement of a species from its own habitat to some other habitat for a particular time period every year for a specific purpose like breeding.
- We should save, reuse and recycle paper to save trees, energy and water.
- Reforestation is the restocking of destroyed forests by planting new trees.
- **Flora:** Different types of plants belonging to an area. Example: Silver ferns, sal, teak, mango, etc.
- **Fauna:** All animals found in an area. Example: dog, frog, insects, bull, jackal, etc.
- **Endemic Species:** Species of plants and animals found exclusively in a particular area. These are not naturally found anywhere else.
- **Extinct Species:** Species of plants and animals which have already been lost. Example: Dodo, Indian cheetah, Pink-headed duck, etc.
- **Threatened Species:** Species that is liable to become extinct if it is not allowed to realise its full biotic potential by removed the caused of threat.
- **Type of Threatened Species:**
 - (i) **Endangered Species:** A species of animal or plant that is seriously at risk of extinction. Example: Indian rhinoceros, Asiatic lion, Asiatic wild ass, etc.

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- (ii) **Vulnerable Species:** A vulnerable species is a species of animals or plants which are likely to become endangered unless something changes. Example: Chinkara deer and black buck, golden langur, etc.
- (iii) **Rare Species:** Species whose population are originally small and scattered in the world.
- **National Parks:** Protective areas reserved exclusively for the betterment of the wildlife. These are established at the approval of legislature. Example: Hazaribagh National Park in Jharkhan, Desert National Park in Rajathan, etc.
- **Sanctuaries:** Hunting prohibited areas set up by government are known as sanctuaries. These are only for the protection of wild animals. Example: Jaldapara in Madarihat (West Bengal), Keoladeo Ghana in Bharatpur (Rajasthan)
- **Migration:** The regular, periodic, two way movements of birds and some animals from their place of residence to some other place along well defined routes. It is linked to seasonal factors, breeding, shortage of foods, etc. The Bharatpur bird sanctuary is known for the migratory birds.

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Chapter – 8

Cell — Structure and Functions

- **Cell:** The smallest structural and functional unit of an organism, which is typically microscopic and consists of cytoplasm and a nucleus enclosed in a membrane.
- All organisms are made of smaller parts called organs.
- Organs are made of still smaller parts. The smallest living part of an organism is a 'cell'.
- Cells were first observed in cork by Robert Hooke in 1665.
- Cells exhibit variety of shapes and sizes.
- Number of cells also varies from organism to organism.
- Some cells are big enough to be seen with the unaided eye. Hen's egg is an example.
- Some organisms are single-celled, while others contain large number of cells.
- The single cell of unicellular organisms performs all the basic functions performed by a variety of cells in multicellular organisms.
- The cell has three main parts, (i) the cell membrane, (ii) cytoplasm which contains smaller components called organelles, and (iii) the nucleus.
- **Cell membrane:** The basic component of a cell. The cytoplasm and nucleus are enclosed within cell membrane. There is an outer thick layer in cells of plants called **cell wall**.
- **Cytoplasm:** The jelly-like substance present between the cell membrane and the nucleus. Various organelles present in the cytoplasm are:
 - (i) Mitochondria
 - (ii) Plastids (present only in plant cell)
 - (iii) Endoplasmic reticulum (ER)
 - (iv) Ribosome
 - (v) Lysosome
 - (vi) Vacuole
 - (vii) Golgi body
 - (viii) Centrosome (present only in animal cell).
- **Nucleus:** Nucleus is separated from cytoplasm by a nuclear membrane. It is generally spherical in the centre of the cell.

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- **Nuclear membrane:** Nucleus is separated from the cytoplasm by a membrane called the nuclear membrane.
- **Nucleolus:** Nucleus contains a still smaller round body known as nucleolus.
- **Chromosomes:** Nucleus contains thread-like structures called chromosomes. These carry genes and help in inheritance or transfer of character from the parents to the offsprings
- Cells without well organised nucleus, i.e. lacking nuclear membrane, are called prokaryotic cells.
- Plant cells differ from animal cells in having an additional layer around the cell membrane termed cell wall.
- Coloured bodies called plastids are found in the plant cells only. Green plastids containing chlorophyll are called chloroplasts.
- Plant cell has a big central vacuole unlike a number of small vacuoles in animal cells.
- **Size of cells:** The size may be as small as a millionths of a metre or may be as large as a few centimetres. Size of the cells has no relation with the size of the body of the animal or plant. It is related to its function.

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Reproduction in Animals

- There are two modes by which animals reproduce. These are: (i) Sexual reproduction, and (ii) Asexual reproduction
- Reproduction resulting from the fusion of male and female gametes is called sexual reproduction.
- The reproductive organs in the female include ovaries, oviducts and uterus.
- The reproductive organs in male include testes, sperm ducts and penis.
- The ovary produces female gametes called ova and the testes produce male gametes called sperms.
- The fusion of ovum and sperm is called fertilization. The fertilized egg is called a zygote.
- Fertilization that takes place inside the female body is called internal fertilization. This is observed in human beings and other animals such as hens, cows and dogs.
- Fertilization that takes place outside the female body is called external fertilization. This is observed in frogs, fish, starfish, etc.
- The zygote divides repeatedly to give rise to an embryo.
- The embryo gets embedded in the wall of the uterus for further development.
- The stage of the embryo in which all the body parts are identifiable is called foetus.
- Animals such as human beings, cows and dogs which give birth to young ones are called viviparous animals.
- Oviparous Animals: Animals that lay eggs are called oviparous animals, e.g., frogs, lizards, butterflies, etc.
- Animals such as hen, frog, lizard and butterfly which lay eggs are called oviparous animals.
- The transformation of the larva into adult through drastic changes is called metamorphosis.
- The type of reproduction in which only a single parent is involved is called asexual reproduction.
- In hydra, new individuals develop from buds. This method of asexual reproduction is called budding.
- Amoeba reproduces by dividing itself into two. This type of asexual reproduction is called binary fission.

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Chapter – 10

Reaching the age of Adolescence

- Humans become capable of reproduction after puberty sets in. Between the ages of 11 years and 19 years children are called adolescents.
- The onset of puberty brings about growth of the reproductive organs. Hair grows at various places on the body. Breasts develop in girls and facial hair (moustache and beard) appear in boys. Voice of boys becomes hoarse as voice box enlarges during adolescence.
- Children gain height during adolescence.
- **Puberty:** It is the time when sex organs begin to work. It brings about growth in reproductive organs and changes in the body.
- **Changes during Puberty:**
 - (i) **Increase in Height:** The bones of the legs and arms elongate and the individual becomes tall and lanky.
 - (ii) **Changes in Body Shape:** In boys, the body becomes more muscular, the shoulder becomes wider. In girls, the body shows curves in certain parts and the region below the waist becomes wider and broader.
 - (iii) **Change in Voice:** In boys, the voice becomes hoarse and heavy due to the extra growth of larynx (voice box). In girls, the voice becomes high pitched and shriller.
 - (iv) **Sweat and sebaceous glands:** It becomes more active and secretes more sweat and oil.
 - (v) Emotional aspects develop.
 - (vi) Mental and intellectual development is at its peak.
- The onset of puberty and maturity of reproductive parts are controlled by hormones.
- Hormones are secretions of endocrine glands which pour them directly into the blood stream.
- Pituitary gland secretes hormones which include growth hormone and hormones that make other glands such as the testes, ovaries, thyroids and adrenals, secrete hormones. Pancreas secretes insulin, thyroid produces thyroxine and adrenals produce adrenalin.
- Testosterone is the male hormone and estrogen, the female hormone. The uterine wall in females prepares itself to receive the developing fertilised egg. In case there is no fertilisation, the thickened lining of the uterine wall breaks down and goes out of the body along with blood. This is called menstruation.
- Sex of the unborn child depends on whether the zygote has XX or XY chromosomes.
- It is important to eat balanced food and maintain personal hygiene during adolescence.

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Chapter – 11

Force and Pressure

- **Force:** A push or a pull, that changes or tends to change the state of rest or uniform motion of an object or changes its direction or shape.
- A force arises due to the interaction between two objects.
- Force has magnitude as well as direction.
- A change in the speed of an object or the direction of its motion or both implies a change in its state of motion.
- Force acting on an object may cause a change in its state of motion or a change in its shape.
- A force can act on an object with or without being in contact with it.
- **Types of Forces:**
 - **Contact Forces:** The forces act on a body when the source of force is in actual contact with the body.
 - (i) **Muscular Force:** The force exerted by the muscles of the body.
 - (ii) **Mechanical Force:** The force produced by a machine.
 - (iii) **Frictional Force:** The force that opposes the motion of an object.
 - **Non-Contact Forces:** Forces which do not involve physical contact between two bodies on which they act.
 - (i) **Magnetic Force:** A magnet exerts a non-contact force on objects made of iron, steel, cobalt or nickel.
 - (ii) **Electrostatic Force:** The force which result due to repulsion of similar charges or attraction of opposite charges.
 - (iii) **Gravitational Forces:** The force that exists between any two masses because of their mass.
- Force per unit area is called pressure.
- Liquids and gases exert pressure on the walls of their containers.
- The pressure exerted by air around us is known as atmospheric pressure.

Key Notes

Chapter – 12

Friction

- **Friction:** A force that opposes motion between two objects that are in contact with each other. Smoother surfaces exhibit less friction, rougher surfaces exhibit more friction.
- Friction opposes the relative motion between two surfaces in contact. It acts on both the surfaces.
- Friction depends on the nature of surfaces in contact.
- **Types of Friction:**
 - (i) **Static Friction:** When a body is at rest, the force of friction is called the static friction and is always equal and opposite to the applied force. The force of friction which acts when the body is just at the verge of sliding on the surface is called limiting friction.
 - (ii) **Sliding friction:** The friction force which opposes the actual relative sliding motion between two contact surfaces. Sliding friction is smaller than static friction.
 - (iii) **Rolling Friction:** The frictional force that exists between two surfaces when a body rolls over the other. Rolling friction is smaller than sliding friction.
- **Increasing Friction:** By pressing the surfaces together more strongly. When brakes are applied on a bicycle or car, the brake pads press against a moving part of the wheel and the force of friction increases.
- **Reducing Friction:** Polishing, Lubricating, using ball bearings, separation of surfaces by air, streamlined shape.
- **Causes of friction:** Friction is caused by the irregularities on the two surfaces in contact. Even those surfaces which appear very smooth have a large number of minute irregularities on them.
- For a given pair of surfaces friction depends upon the state of smoothness of those surfaces.
- Friction depends on how hard the two surfaces press together.
- Static friction comes into play when we try to move an object at rest.
- Sliding friction comes with play when an object is sliding over another.

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- Sliding friction is smaller than static friction.
- Friction is important for many of our activities.
- Friction can be increased by making a surface rough.
- The sole of the shoes and the tyres of the vehicle are treaded to increase friction.
- The friction is sometimes undesirable.
- Friction can be reduced by using lubricants.
- When one body rolls over another body, rolling friction comes into play. Rolling friction is smaller than the sliding friction.
- In many machines, friction is reduced by using ball bearings.
- Fluid friction can be minimised by giving suitable shapes to bodies moving in fluids.

Key Notes

Chapter – 13

Sound

- **Sound:** A kind of sensation received by our ears and perceived by our brain. Sound is produced by vibrating objects.
- **Musical Sound:** The sound which produce a pleasing effect on the ear.
- **Noise:** The sounds which produce a jarring or unpleasant effect.
- **Types of Sound:**
 - (i) **Audible Sound:** Vibrations whose frequency lies between 20 Hz to 20,000 Hz (20 kHz)
 - (ii) **Inaudible Sound:** The sounds having frequencies above 20,000 Hz and below 20 Hz cannot be heard by the normal human ear.
- In human beings, the vibration of the vocal cords produces sound.
- Sound travels through a medium (gas, liquid or solid). It cannot travel in vacuum.
- The eardrum senses the vibrations of sound, It sends the signals to the brain. This process is called hearing.
- The number of oscillations or vibrations per second is called the frequency of oscillation.
- The frequency is expressed in hertz (Hz)
- Larger the amplitude of vibration, louder is the sound.
- Higher the frequency of vibration, the higher is the pitch, and shriller is the sound.
- Unpleasant sounds are called noise.
- Excessive or unwanted sounds lead to noise pollution. Noise pollution may pose health problems for human beings.
- Attempts should be made to minimise noise pollution.
- Plantation on the roadside and elsewhere can reduce noise pollution.
- **Amplitude:** The maximum distance of a vibrating or swinging object from its position of rest.
- **Time Period:** One complete to and fro movement of the pendulum around its mean position is called one oscillation. The time taken by the vibrating particle to complete one oscillation is called time period.

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- **Frequency:** The number of vibrations or oscillations made by a vibrating body in a second. The unit of frequency is hertz (Hz).
- **Characteristics of Sounds:**
 - (i) **Loudness:** The sensation produced in the ear which enables us to distinguish between a loud and a faint sound. Larger the amplitude of vibration, the louder is the sound produced.
 - (ii) **Pitch:** The characteristics of sound which distinguishes between a shrill sound and a soft sound. Higher the frequency of vibration, higher is the pitch.
 - (iii) **Quality:** Characteristic which enables us to distinguish between musical notes emitted by different musical instruments or voices even though they have the same pitch and loudness.

Key Notes

Chapter – 14

Chemical Effects of Electric Current

- On passage of electric current through a solution following chemical effects may be seen:
 - (i) Bubbles of a gas on electrodes
 - (ii) Deposits of metal on electrodes
 - (iii) Change of colour of solution
- Conduction of Electricity by Liquids:**
 - (i) Liquids containing salts, acids or bases conduct electricity.
 - (ii) Distilled water does not conduct electricity because it does not have free ions.
 - (iii) The liquid which conducts electricity and undergoes decomposition is called the electrolyte.
 - (iv) The electrode connected to the positive terminal of battery is called anode while the connected to the negative terminal is called cathode.
- Electrolysis:** The chemical decomposition of constituents solution on passage of electric current.
- Electroplating:** It is the process of depositing a thin layer of a metal on any conducting substance by the process of electrolysis.

The object to be electroplated is made the cathode (negative electrode) by connecting it to the negative terminal of the battery. The metal which has to be deposited is made the anode (positive electrode) by connecting it to the positive terminal of the battery. The electrolyte is usually a salt solution of the metal to be coated.
- Application of Electroplating:**
 - (i) Metals that rust are often coated with other metals to prevent rusting.
 - (ii) Chromium plating is found on bath taps, car bumpers, etc. to give a bright attractive appearance and resist scratches and wear.
 - (iii) Silver plating is done on cutlery and jewellery items.
- Some liquids are good conductors of electricity and some are poor conductors.
- Most liquids that conduct electricity are solutions of acids, bases and salts.
- The passage of an electric current through a conducting liquid causes chemical reactions.
- The resulting effects are called chemical effects of currents.
- The process of depositing a layer of any desired metal on another material, by means of electricity, is called electroplating.

Key Notes

Chapter – 15

Some Natural Phenomena

- Some objects can be charged by rubbing with other objects.
- There are two kinds of charges — positive charge and negative charge
- Like charges repel and unlike charges attract each other.
- The electrical charges produced by rubbing are called static charges.
- When charges move, they constitute an electric current.
- An electroscope may be used to detect whether a body is charged or not.
- The process of transfer of charge from a charged object to the earth is called earthing.
- The process of electric discharge between clouds and the earth or between different clouds causes lightning.
- Lightning strike could destroy life and property.
- Lightning conductors can protect buildings from the effects of lightning.
- An earthquake is a sudden shaking or trembling of the earth.
- Earthquake is caused by a disturbance deep inside the earth's crust.
- It is not possible to predict the occurrence of an earthquake.
- Earthquakes tend to occur at the boundaries of earth's plates. These boundaries are known as fault zones.
- Destructive energy of an earthquake is measured on the Richter scale. The earthquake measuring 7 or more on Richter scale can cause severe damage to life and property.
- We should take necessary precautions to protect ourselves from earthquakes.
- **Richter Scale:** A logarithmic scale, ranging from 1 to 10 for indicating the intensity of an earthquake.
- **Seismic Waves:** The energy released at the focus of an earthquake, propagates outwardly.
- **Seismograph:** An instrument by which seismic waves of an earthquake are monitored.
- **Epicentre:** A point on the earth above the seismic force.
- **Fault Zones:** Earthquake prone areas in the earth's crust.

Key Notes

Chapter – 16

Light

- **Light:** The natural agent that stimulates sight and makes things visible. Light is reflected from all surfaces.
- Regular reflection takes place when light is incident on smooth, polished and regular surfaces.
- Diffused/irregular reflection takes place from rough surfaces.
- **Reflection of Light:** Bouncing back of light after striking the surface, in the same medium, is called reflection.
- **Types of Reflection:**
 - (i) **Regular Reflection:** When a narrow beam of light strikes a mirror, the light will not reach your eye unless your eye is positioned at just the right place where the law of reflection is satisfied.
 - (ii) **Diffused or Irregular Reflection:** When light is incident upon a rough surface, it is reflected in many directions.
- Two laws of reflection are
- The angle of incidence is equal to the angle of reflection.
- Incident ray, reflected ray and the normal drawn at the point of incidence to the reflecting surface, lie in the same plane.
- Image formed in a plane mirror undergoes lateral inversion.
- Two mirrors inclined to each other give multiple images.
- Beautiful patterns are formed in a kaleidoscope because of multiple reflections.
- Sunlight, called white light, consists of seven colours.
- Splitting of light into its constituent colours is known as dispersion.
- Important parts of the eye are cornea, iris, pupil, lens, retina and optic nerve.
- A normal eye can see nearby and distant objects clearly.
- Visually challenged persons can read and write using Braille system.
- Visually challenged persons develop their other senses more sharply to improve their interaction with their environment.
- **Parts of Human Eye:**

Key Notes

- (i) **Cornea:** Transparent bulge on the front surface of the eyeball which protects the eye and helps in refraction of light.
- (ii) **Iris:** Coloured diaphragm behind the cornea which controls the amount of light entering the eye.
- (iii) **Pupil:** Dark hole in the middle of iris through which light enters the eye.
- (iv) **Eye lens:** Transparent, crystalline structure behind pupil and iris.
- (v) **Ciliary muscles:** Hold the eye lens in position and control the focal length of the eye lens.
- (vi) **Retina:** Surface of the rear part of the eyeball where the light entering the eye is focused.
- (vii) **Rods and Cones:** Rod cells respond to the brightness of light while cone cells respond to colours.
- (viii) **Blind spot:** It is the least sensitive point where no rods and cones are present.
- (ix) The space between the cornea and the eye lens is filled with **aqueous humour**.
- (x) The space between the eye lens and the retina is filled with **vitreous humour**.

Key Notes

Chapter – 17

Stars and the Solar System

- The phases of the moon occur because we can see only that part of the moon which reflects the light of the Sun towards us.
- Stars are celestial bodies that emit light of their own. Our sun is also a star.
- It is convenient to express distances of stars in light years.
- Stars appear to move from east to west.
- The pole star appears to be stationary from the Earth, because it is situated close to the direction of the axis of rotation of the Earth.
- Constellations are groups of stars that appear to form recognisable shapes.
- The solar system consists of eight planets and host of asteroids, comets and meteors.
- A body revolving around another body is called a satellite.
- Moon is the natural satellite of the Earth. Some planets also have natural satellites.
- Venus is the brightest planet in the night sky.
- Jupiter is the largest planet of the solar system.
- The artificial satellites revolve around the Earth. They are much closer than the moon.
- Artificial satellites are used for weather forecasting, long distance communication and remote sensing.
- **Sun:** It is the source of almost all energy on Earth. It continuously emits huge amounts of heat and light.
- **Planets:** A planet has a definite path in which it revolves around the sun called orbit. Time taken by a planet to complete one revolution increases as the distance from the sun increases.
- There are eight planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.
- Other members in our solar system are:
 - (i) **Asteroids:** These are rocky planetary bits orbiting around sun. asteroid belt lies between Mars and Jupiter.
 - (ii) **Comets:** These are heavenly bodies that revolve around the sun. It appears generally as a bright head with a long tail.

Key Notes

- (iii) **Meteors and Meteorites:** Meteor is a brief streak of light in the night sky caused by a meteoroid. Smaller meteors melt and burn up creating streaks of light. Few meteoroids which survive as they pass through the Earth's atmosphere and reach the Earth surface are called meteorites.
- (iv) **Artificial Satellites:** Man-made objects sent into space to orbit the earth. Example: IRS, EDUSAT, INSAR.
- **Constellations:** A group of stars forming some kind of recognisable figures or patterns are known as constellations.
 - Constellations appear to move from east to west as Earth rotates from west to east.
 - Orion- the Hunter, Ursa Major- the Great Bear or Saptarishi, Cassiopeia are some constellations.

Key Notes

Chapter – 18

Pollution of Air and Water

- **Pollution:** An undesirable change in the physical, chemical or biological characteristics of air, water and land that may be harmful to human life and other animals, living conditions, industrial processes and cultural assets.
- **Pollutants:** The agents that pollute our environment are called pollutants. Pollutants are the substances which contaminate air and water.
- Air pollution is the contamination of air by impurities which may have a harmful impact on the living organisms and the non-living components.

- **Source of Air Pollution:**

Natural Sources: Smoke and dust arising from forest fires or volcanic eruptions. Methane gas arising from decaying organic matter.

Man-made Sources: Exhaust gases from factories, power plants and automobiles.

- Carbon monoxide, nitrogen oxides, carbon dioxide, methane and sulphur dioxide are the major pollutants of air.
- Increasing levels of greenhouse gases like CO_2 are leading to global warming.
- Water pollution is the contamination of water by substances harmful to life.
- Sewage, agricultural chemicals and industrial waste are some of the major contaminants of water.
- Water which is purified and fit for drinking is known as potable water.
- Water is a precious natural resource. We must learn to conserve it.

- **Greenhouse Effect:**

Earth absorbs a part of Sun's radiation and reflects back the other.

Reflected radiation traps in atmosphere.

This warms the Earth.

Process enhanced by the increased amount of CO_2 in atmosphere.