

Science & Society

A Dual Approach to
Science and Social Science

GRADE

6



Section I : Science

1. Measurement and Motion

Exercise

A. 1. (c) 2. (b) 3. (c) 4. (b) 5. (a)

B. 1. Standard units are used in measurement because these are standardized, reliable and can be uniformly used by everyone. Other units like footstep and hand span are unreliable because they vary from person to person.

	CGS System	SI System
Mass	Gram; gm	Kilogram; kg
Length	Centimetre; cm	Metre; m
Time	Second; s	Second; s

3. To make accurate measurements, we must use appropriate instruments and know how to use these instruments properly.

4. An object is in motion if its position changes with time, in relation to a stationary object in its surroundings.

5. Rotation and revolution.

C. 1. We do not measure all lengths in just one standard unit of length because when making measurement which involves very large numbers or very small numbers, using one standard unit of length becomes very difficult and impractical. Therefore, for measurements involving small numbers submultiples of standard units are used and for large numbers multiples of standard units are used.

2. To measure length of a line segment we should :

- ❖ Keep the ruler exactly along the line segment to be measured.
- ❖ Avoid using worn out portions of the ruler.
- ❖ Keep the eye vertically above the point where the measurement is to be taken.

3. A divider and a thread can be used to measure the length of curved line.

4. **Linear or Rectilinear Motion :** When an object moves in a straight line, it is said to be in linear or rectilinear motion, for example, a car moving on a straight road, an apple falling from a tree, or a bullet shot from a gun.

Circular or Curvilinear Motion : When an object moves along a curved path, it is said to be in circular or curvilinear motion, for example, a car moving on a curved road, a ball tied to a string and whirled around.

5. Motion that repeats itself at regular intervals of time is said to be periodic motion. For example,
- (i) A ball tied to a string is known as a pendulum which undergoes periodic motion.
 - (ii) A swing also performs a periodic motion in a similar manner.
- D.** Do it yourself.
E. Do it yourself.
F. Do it yourself.



2. Light, Shadows and Reflections

Exercise

- A.** 1. (d) 2. (b) 3. (c) 4. (c) 5. (a)
- B.** 1. Sun and stars are natural sources of light. Candle and electric bulb are man-made sources of light.
2. When light falls on a non-luminous object, it gets reflected in different directions. When this reflected light reaches our eyes, we can see the object.
3. The property of light travelling in a straight line in a homogeneous transparent medium is known as rectilinear propagation of light.
4. A shadow is formed when the path of light is obstructed by an opaque object, and is always black or grey.
5. We can see an image of an object in a plane mirror if an object is placed in front of a plane mirror.
- C.** 1. Three properties of shadow are as follows :
- ❖ The shape of the shadow depends on :
 - (a) the shape of the object, and
 - (b) the position of the source of light.
 - ❖ Whatever be the colour of the object, the colour of the shadow cast by it is always black (some portions of the shadow may be grey).
 - ❖ Other than its shape, no details of the object can be seen on the shadow.
2. Draw it yourself.
3. An image differs from a shadow in the following ways :
- ❖ A shadow is black while the image is of the same colour as the object.

- ❖ A shadow is similar in shape to the object, but shows no other details about the object. An image is not only of the same shape as the object but has all its details.
- 4. Draw it yourself.
- 5. Draw it yourself.
- D.** Do it yourself.
- E.** Do it yourself.



3. Electric Current and Circuits

Exercise

- A.** 1. (d) 2. (c) 3. (d) 4. (b) 5. (a)
6. (d) 7. (c) 8. (c) 9. (b)
- B.** 1. Electric circuit is a closed path that provides a continuous flow of electric current from a current source to the equipment being used.
2. An electric circuit is said to be closed when there is flow of electricity through the circuit.
3. An open circuit is one in which one of the metal wires is disconnected from the cell. When the metal wire is disconnected, there is no path for the current to flow. Hence, electricity cannot flow in an open circuit.
4. An electric cell needed in an electric circuit because it is the source of electrical energy in a circuit.
5. The function of switch in an electric circuit is to either make or break the electric circuit. A switch is used to turn current to an electrical appliance either on or off.
- C.** 1. Draw it yourself. 2. Draw it yourself.

Conductors	Insulators
Materials which allow current to pass through them are known as conductors. Examples of conductors are : copper, silver and mercury. Mercury is a liquid metal.	Materials which do not allow current to pass through them are known as insulators. Examples of insulators are : plastic, wood and oil. Oil is a liquid insulator.

- 4. A solar cell is a cell that directly converts solar energy into electrical energy.

Uses of solar cell :

- (i) A collection of solar cells is used as a source of power for satellites launched into space.
 - (ii) In isolated places where there is no electricity, solar cells supply power to the street light.
5. The electricity used at home is generated by large generators far away from the city. It is brought to our houses using thick wires. We should never perform any experiment with the electricity used at home, as this can be very dangerous.

D. Do it yourself.

E. Do it yourself.

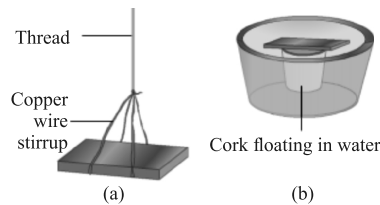
4. The Magnet and Magnetism

Exercise

- A. 1. (a) 2. (a) 3. (a) 4. (c) 5. (a)
- B. 1. A freely suspended magnet always come to rest in the north-south direction because the earth itself behaves like a huge bar magnet with its magnetic poles near the geographical North and South Poles. The south pole of this bar magnet is near the geographical North Pole, while the north pole of the bar magnet is near the geographical South Pole.
2. If a magnet is broken into two pieces, it will turn into two separate magnets, each with its own north and south pole.
3. No, a strong magnet cannot attract a piece of copper because copper is a nonmagnetic material.
4. Rule of attraction of magnets states that, “when a south pole of a magnet is brought close to the north pole of another magnet, they attract”.
- Rule of repulsion of magnets states that, “When a north pole of a magnet is brought close to the north pole of another magnet, they repel”.
- In other words, unlike poles attract and like poles repel each other.
5. Magnets are stored with magnetic keepers because magnets become weaker after sometimes if their poles are left free. This is called self demagnetization. To avoid this, pieces of iron known as keepers are placed across both ends of a magnet. These keepers help the magnet to preserve its magnetism over a long period of time.
- C. 1. Put some iron filings on a sheet of paper. Roll a magnet in the filings and then lift it up. Most of the iron filings stick to the magnets at the

ends. There are fewer iron filings in between and almost none at the centre. Thus, in a magnet, the regions of strongest magnetism are near the ends.

2. A magnet can be suspended freely to show direction either as a suspended bar magnet or as a pivoted needle mounted in a glass box.



3. You can check if the material is a magnet by the following methods :
- (a) Place the material in water such that it floats. If it is a magnet, it will come to rest at approximately the north-south direction.
 - (b) If it doesn't float, suspend it with the help of a string such that it is freely movable. If it is a magnet, it will come to rest in north-south direction.
 - (c) Take the supposed magnet and break it into two. If the pieces attract, it is a magnet.
 - (d) Bring near the supposed magnet another magnetic material. If it attracts, then it is a magnet.
4. An iron nail can be magnetized by using a magnet in the following manner :
- Place an iron nail on a table. Hold it down firmly and stroke it about 30 times, from one end to the other with one pole of a bar magnet. After you reach the other end, lift the magnet high and bring it back to the first end. The iron nail now becomes a magnet.
5. The three uses of magnets are as follows :
- ❖ In electric motors used in fans and in bicycle and automobile dynamos for making electricity.
 - ❖ In refrigerator door stickers, closing mechanism of refrigerator doors, bulletin boards and toys.
 - ❖ In audio and video tapes and computer hard disks to store information.

D. Do it yourself.

E. Do it yourself.



5. Classification of Matter

Exercise

- A. 1. (d) 2. (c) 3. (b) 4. (b) 5. (b)
- B. 1. Matter is anything that occupies space and has mass. For example, water and air are matter, while feelings and sound are not matter.
2. The substances, whose smallest particles are atom, are called elements. For example : iron, oxygen and copper.
The substances, which are made up of two or more elements are called compounds. For example : water, sugar and salt.
3. When we touch different types of materials, each materials feels different. This indicate the difference in texture of each material. The different feel of different materials to the touch is known as texture.
4. Metals are lustrous, but an iron rod used in construction does not shine because iron rod lose their lusture when exposed to air and moisture. If we remove its top layer by a sandpaper, we will see its lustre.
5. There are about 118 different elements known to us. Ninety-two of these occur naturally on the earth while the others have been made in laboratories. Some common elements are hydrogen, chlorine, oxygen, helium, zinc, silicon, sodium, silver, gold, carbon, sulphur, phosphorus, magnesium, aluminium, nitrogen and mercury.
Just as thousands of words can be made from just 26 letters, atoms join together to make molecules. Millions of different kinds of molecules are made from these 118 different kinds of atoms. That is why there are millions of compounds all around us.
- C. 1. Solid, liquid and gas.
Solids, liquids and gases have different properties due to differences in the arrangement of molecules.
In solids, the molecules are very tightly packed and so they attract each other very strongly. This force of attraction keeps them together. The positions of molecules in a solid are fixed and they can only vibrate about their fixed positions. This is why solids have a definite shape and volume. As it is difficult to move the molecules away from each other, solids are rigid and hard.
In liquids, the molecules are less tightly packed and so, they do not attract each other so strongly. The positions of the molecules in a liquid are not fixed and they can move around within the liquid. Liquids are not rigid and do not have a definite shape.
In gases, the molecules are very far apart and there is hardly any attraction between them. Therefore, they move around independently.

So, a gas has no fixed shape or volume. The molecules move around in all the space available to them. This is the reason why a gas fills up the space available to it.

2. When sugar is put into water, the water molecules break the sugar into individual molecules. These molecules of sugar are then dispersed throughout the water and are so small that they cannot be individually seen. In such a state, the sugar is said to have dissolved in water.
 3. The mass per unit volume of a substance is known as density. Any substance such as iron or aluminium which is denser than water will sink in water. On the other hand, a substance such as wood or cotton which is less dense than water will float on water.
 4. Liquids which mix with each other are called miscible liquids. For example, water and alcohol. Liquids that do not mix with each other are called immiscible liquids. For example, water and kerosene.
 5. Those object through which light can pass easily are called transparent objects e.g., water, glass. The object which do not allow the light to pass through are called opaque object e.g., wood, stone.
- D. Do it yourself.
E. Do it yourself.
F. Do it yourself.



6. Separating the Substances

Exercise

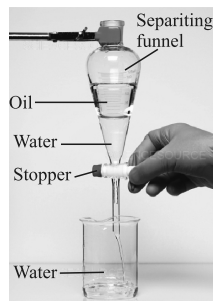
- A. 1. (d) 2. (c) 3. (c) 4. (b) 5. (a)
- B. 1. To separate a mixture, we have to use such a property which is exhibited by one constituent of the mixture and not by others.
2. Filter paper have fine pores and this makes the insoluble solids to separate from the liquid.
 3. Temperature is specified for a saturated solution because the solubility of a solute in a solvent is directly proportional to temperature, so as the temperature of the solution increases, a saturated solution becomes unsaturated.
 4. Handpicking can be used to separate the constituents of a mixture only when the constituents of the mixture are easily visible and can be separated.
 5. The process of adding alum to water to hasten sedimentation is called 'loading'. This name has been given to the process due to the specific role that alum plays in the sedimentation process.

- C. 1. Three properties of mixtures are as follows :
- The constituents of a mixture may have any ratio.
 - The constituents retain their individual properties. It is because the molecules of the constituents do not change.
 - The constituents can be separated by simple methods.
2. It is necessary to separate a mixture into its constituents for the following situations :
- To remove undesirable constituents :** Small stones in rice can be harmful for our teeth and body. So, it is necessary to remove them before cooking the rice.
 - To Obtain Useful Constituents :** Butter is obtained from milk or curd by churning it. Crude oil or petroleum is a mixture of several useful constituents. Useful products like petrol, kerosene, diesel, tar, etc. are obtained from crude oil.
3. To separate a mixture of grass, pebbles and sand, the first step is to pass the mixture through a fine filter. Sand will pass through the filter leaving grass and the pebbles on the filter. Then, we can winnow the grass and the pebbles since, they have different weights to separate them from each other.

4. **To separate a mixture of two immiscible liquids**

Pour oil and water in a separating funnel and let it stand for some time. You can clearly see two layers—water at the bottom and oil on top. Carefully turn the stopper of the funnel and allow the water to flow out into a beaker placed below the funnel. Stop the flow as soon as the layer of oil reaches the stopper.

The two liquids are thus separated, water being in the beaker and the oil in the separating funnel.



A separating funnel is used to separate immiscible liquids.

5. Water is considered an important solvent because water can dissolve a large number of substances that are important for life. Waste products are also dissolved in water before they can be excreted from the body. Most of the chemical reactions occurring in the body take place in the presence of water. Plants absorb nutrients from the soil only if they are soluble in water. Minerals from the roots and food from the leaves are transported to different parts of the plant through water only. Gases such as oxygen and carbon dioxide are soluble in water. This makes aquatic life possible.

D. Do it yourself.

E. Do it yourself.



7. Air and Its Composition

Exercise

- A.** 1. (d) 2. (b) 3. (d) 4. (b) 5. (b)
6. (c) 7. (d)
- B.** 1. The blanket of air surrounding the earth is known as atmosphere.
2. Though air contains only 0.03% carbon dioxide, it is important as plants use it to make food for the entire living world.
3. The amount of water vapour in the air is known as humidity.
4. Breathing is the physical process of inhaling and exhaling of the gases between the cells and the environment, while respiration is the process of breathing in, getting energy from food and breathing out.
5. A fish breathes by taking water into its mouth and forcing it out through the gill passages. When water passes through the gills, oxygen dissolved in water is absorbed.
6. Yes, Nitrogen is needed by plants for their growth.
7. The ozone layer is an important layer of the atmosphere because it prevents harmful rays of the sun called ultraviolet rays, from reaching the earth. These rays can cause eye problems and skin cancer.
8. Air is said to be polluted when the composition of different gases in the air is dramatically altered. Moreover, addition of gases that are not normally found in the air also leads to air pollution.
- C.** 1. Air is a mixture of gases, mainly containing nitrogen (about 78% by volume) and oxygen (about 21% by volume). The remaining 1% is made up of argon (about 0.9%), carbon dioxide (0.03%), and small amounts of other gases. Varying quantities of water vapour, smoke and dust are also present. The amount of these in the air varies from place to place and from time to time.
2. In water lily, since the lower surface of leaves are in direct contact with water, stomata are present only on the upper surface of the leaves that are exposed to air.
3. Oxygen cycle is the natural cycle of consumption of oxygen by respiration and burning, and its release by photosynthesis. It is a delicately balanced process.
4. Four uses of air are as follows :
(i) Air is used to generate electricity.
(ii) Air is used to run flour mills.
(iii) We dry wet clothes out in the open.
(iv) Aeroplane, balloons are able to fly because of air.

5. The atmosphere maintains the right temperature on the earth. The heat and light of the sun fall on the earth's atmosphere. Some of it is absorbed by the atmosphere, while the rest is reflected back into the space. This prevents the earth from becoming very hot during the day. At night, the trapped heat in the atmosphere prevents the earth from cooling too much. The atmosphere, thus, acts like a blanket around the earth and keeps the earth's surface at the right temperature for life to exist.

6. Air pollution causes a number of respiratory diseases such as cough and asthma.

Some methods to control air pollution are :

- ❖ Plant more trees.
- ❖ Use filters in vehicles and factories to prevent harmful gases from escaping into the air.
- ❖ Use food waste and plant waste such as leaves to make compost.

D. Do it yourself.

E. Do it yourself.



8. Living and Non-living Things

Exercise

- A. 1. (c) 2. (c) 3. (a) 4. (a) 5. (d)
- B. 1. Animals move around in search of food and shelter and to escape from enemies.
2. The structural unit of a living thing is the cell. Yes, all living things are made up of cells.
3. Autotrophs are known as producers because they are able to make their own food from raw materials and energy. Hetrotrophs are known as consumers because they consume producers or other consumers.
4. The oxygen taken in by living things during breathing is combined with the food that is digested by them to produce energy.
5. Urine, sweat and exhaled air.
- C. 1. Living things respond to changes in their environment. When we accidentally touch a hot utensil, we quickly withdraw our hand. The withdrawing of our hand is a response. Its cause is called the stimulus which, in this case, is the hot utensil.
2. Living things grow by the division of cells. The growth of living things is different from the growth of non-living things like a crystal or a heap of sand. Growth in living things occurs within the organism by cell

division. In single-celled organisms, growth occurs only in the size of the cell. In non-living things, growth occurs because of addition of material from the outside.

3. Following are the three ways of reproduction :
 - (i) Sexual
 - (ii) Asexual
 - (iii) Vegetation propagations.
4. If a plant is potted near a window, its stem will bend toward the light as it grows. The growth of a plant towards light is known as phototropism.

In the same way, roots grow towards the earth and stems tend to grow against it. This response of roots and stems towards and against the earth is known as geotropism. For example, cockroaches and earthworms show negative phototropism. They move away from the light.
5. A species is a group of similar living organisms that have similar body parts, live in the same habitat, eat the same kind of food and reproduce among themselves.

D. Do it yourself.

E. Do it yourself.



9. Plants and their Parts

Exercise

- A.** 1. (d) 2. (c) 3. (b) 4. (d) 5. (b)
- B.** 1. There is another type of plants which is different from herbs, shrubs and trees. These plants with weak stems cannot stand upright. These are called creepers. Some of these spread out on the ground, for example strawberry. Other climb or stand up with the help of a support, such as grapevine and gourd. They are called climbers.
2. The functions of the network of veins in a leaf is to transport water, minerals and food. Also, it provides support to the leaf.
 3. Prop roots grow down from the branches and on reaching the ground fix themselves to the soil. They support the tree just like pillars.
 4. Pollination is the act of transferring pollen grains from the anther to the stigma of either the same flower or of another flower of the same kind by wind, water or insects.
 5. Leaves prepare food through the process of photosynthesis. So, they are called food factories of plant.

C. 1. (a) **Functions of the Root**

- ❖ If we try to pull out a plant from the ground, it will not come out easily. The roots anchor or fix the plant firmly to the soil.
- ❖ If we cut all its roots and fix it to ground, the plant will dry up after some time because roots absorb water and minerals present in the soil. Water and mineral salts reach the stem and the branches, through a system of thin tubes present in the roots and the stem.
- ❖ Roots also bind the soil particles together, thereby preventing soil erosion.

(b) **Functions of the Stem**

- ❖ The stem keeps the plant upright.
- ❖ It bears branches, leaves, flowers and fruits. Leaves are arranged in such a way that they are exposed to plenty of sunlight.
- ❖ It transports (or conducts) water, mineral and food to all parts of the plant. A set of thin tubes from the roots are connected to thin tubes in the stem. Water and minerals are transported through these tubes to leaves, flowers, buds and fruits. The food that is made by leaves passes to other parts of the plant through another set of thin tubes.

(c) **Functions of the Leaf**

The leaves are green in colour due to the presence of a green pigment called chlorophyll. Leaves make food in the presence of sunlight with the help of water from the soil and carbon dioxide in the air. Chlorophyll traps sunlight and provides energy to the plant to make food. This making of food by the leaves is called photosynthesis.

The food prepared by the leaf is a type of sugar called glucose. It may further change into starch before being stored by the plant. Some of this food is used by the plant to perform its life functions and store the rest in fruits, roots, stems or leaves. This way, leaves provide food to the entire living world.

(d) **Functions of the Flower**

The most important function of flowers is reproduction. They help in the union of male and female gametes. Flowers provide nectar to certain birds and insects, which in turn help in the transfer of pollen from one flower to the other.

2. Tap roots have a main root from which a number of branch roots arise. Fibrous roots are thin fibre-like roots arising from the base of the stem.
3. A cactus plant grows in deserts which have very little water. To prevent loss of water from the leaves, these are modified to become

spines. The green stem of the cactus performs all the functions performed by the leaves in other plants, such as preparation of food. This stem is fleshy and also stores water for long periods.

4. Do it yourself.
Leaves release water from the plant through the stomata in the process called transpiration. It helps to cool down the leaves. Another important function is that as the water escapes from the leaves, the roots pull more water to compensate for this loss. This water brings important nutrients required by the plant from the soil.

5. Do it yourself.

- D. Do it yourself.
E. Do it yourself.
F. Do it yourself.



10. Food and Its Components

Exercise

- A. 1. (c) 2. (a) 3. (d) 4. (b) 5. (d)
- B. 1. Vitamins and minerals are protective foods. They are required in small quantities and are essential for the normal working of the body.
2. Proteins are needed for the growth and repair of the body by building new cells. They are body-building foods.
3. The two cooking methods that destroy nutrients in food are :
(i) Cooking food in excess water dissolves many nutrients, particularly water soluble vitamins, in the water. When the extra water is thrown away, the nutrients dissolved in water are also lost.
(ii) Cooking food at high temperature can destroy vitamin C.
4. Vitamins and minerals are needed by our body in small quantities only.
5. Rickets' symptoms are bow legs, pigeon-type chest, and bending of the spine.

C. 1.		Vitamin	Importance
(a)	A	For normal growth; keeps the eyes and skin healthy.	
(b)	C	For healthy growth and strong blood vessels.	
(c)	D	Helps to use calcium for formation of strong bones and teeth.	
(d)	K	Helps in the clotting of blood.	

2. Mineral	Importance
Calcium	For strong bones and teeth.
Sodium	For the proper functioning of the nervous system.
Potassium	For growth, for keeping cells and blood healthy.
Iron	For the formation of the substance that helps red blood cells carry oxygen to body cells.

3. A balanced diet contains the proper amounts of each nutrient required by the body. It is necessary to remain healthy. A balanced diet contains the proper amount of each nutrient required by the body. It is necessary to remain healthy.

A balanced diet is individual specific. It cannot be the same for everybody. It depends on age, sex and the type of work that one does.

- ❖ In early childhood, the child grows rapidly and so, needs more proteins.
- ❖ Nursing mothers and pregnant women also need more proteins for the growing baby.
- ❖ A hard-working labourer needs more energy, and so must have more fats and carbohydrates.

4. Individuals who are unable to consume a balanced diet and therefore do not get the required amount of nutrients from their diet suffer from deficiency diseases. Four deficiency diseases are :

Scurvy : This is a disease caused by the lack of vitamin C.

Rickets : This is caused by the lack of vitamin D and calcium.

Anaemia : This is caused by the deficiency of iron in the diet.

Goitre : This is caused by the lack of the mineral iodine.

5. Plant foods such as fruits and vegetables contain a carbohydrate, called roughage, that cannot be digested by the body. It is an important part of our diet due to the following reasons :

- ❖ Roughage adds bulk to our food.
- ❖ It ensures proper bowel movement and prevents constipation.
- ❖ As per scientists, a high-fibre diet reduces the risk of heart diseases and bowel cancer.

D. Do it yourself.

E. Do it yourself.

F. Do it yourself.

G. Do it yourself.



11. Movement in the Body

Exercise

- A. 1. (d) 2. (a) 3. (a) 4. (a) 5. (b)
- B. 1. Teeth, food pipe, stomach, small and large intestine. The main function of digestive system is to digest and absorb nutrients necessary for growth and maintenance of the body.
2. The spine is the supporting structure for the entire skeleton and it also protects the spinal cord.
3. The muscles pull the tendons to move the bones. Muscles cannot push. Therefore at least two sets of muscles are required to move the bone in one direction.
4. Liquid skeleton, exoskeleton and endoskeleton. For example, earthworms have liquid skeletons, cockroaches have exoskeletons and fish have endoskeleton.
5. Adaptations in birds that help them to fly are as follows :
- (i) The bones of the bird are hollow and very light, making it easy for them to rise in air.
 - (ii) Strong muscles in their breastbones help birds to flap their wings and fly.
- C. 1. An organ system is a group of organs that work together to perform one or more functions.

	Organ System	Main Function
(i)	Skeletal system	Gives support to the body; protects internal organs; allows movement.
(ii)	Muscular system	Movement of body parts.
(iii)	Circulatory system	Transports nutrients and oxygen to all parts of the body; transports waste.

2. (a) An earthworm moves by expanding and contracting its body muscles.
- (b) A snake moves by curving its body into many loops, each loop pushing against the ground.
- (c) A fish moves by moving its tail fin in a zig-zag pattern.
3. There are four main functions of the skeleton which are as follows :
- ❖ **Support** : The human body has a number of soft organs and muscles. So, it becomes necessary to have a hard framework to

support these parts, otherwise the body will collapse. The skeleton provides this framework and holds the human body upright.

- ❖ **Protection** : The bones protect the soft organs of the body. The brain is protected by the skull; the heart and lungs are protected by the thin long bones called the ribs in the chest.
 - ❖ **Movement** : Though individual bones are hard, many can move at places where they are joined to other bones. That is why we can move our arms, legs, fingers and many other parts of the body.
 - ❖ **Making blood cells** : Bones are hard outside but they are soft and spongy inside. Their inside contains a soft substance called the bone marrow. Blood cells are made in this bone marrow.
4. The joints are the places where two bones join together. The joints are of three types, depending on the types of movement they allow—immovable, slightly movable and freely movable.
 5. The skeleton which is outside the body but is not made up of bones, is known as an exoskeleton while the skeleton, which lies inside the body, is known as endoskeleton. For example, snails, cockroaches and ants have exoskeletons and birds, fish and mammals have endoskeletons.
- D. Do it yourself.
E. Do it yourself.



Section II : Social Science

12. The Earliest Cities

Exercise

- A. 1. (b) 2. (a) 3. (c) 4. (d) 5. (d)
- B. 1. T 2. T 3. T 4. F 5. T
- C. 1. Indus Valley Civilization is also known as Harappan Civilization because Harappa was the first site to be excavated in this civilization.
2. Most cities were very well planned. In Mohenjo-daro, the main street was over 800 metres long and 10 metres wide. The streets crossed each other at right angles. Houses were built on both sides of the street in a planned way. Baked bricks were used to construct buildings.
3. Dholavira was different from the other Indus cities in that it was divided into not two but three parts—a citadel, a middle town and a lower town. Each part was enclosed by a stone wall. Many graves have been found here. The excavated graves contain pottery and jewellery.

4. About 3,500 years ago, a big change came in the life of the Harappan people. The number of people living in cities became less. Overseas trade stopped. Instead of baked bricks, sun-dried bricks began to be used for construction. The houses became less impressive. In Mohenjo-daro, the drains were choked and garbage got piled up on the streets.

We do not know why this was happening. But something was wrong. A general 'decline' had perhaps begun. But specific causes must have differed from city to city. There may have been natural disasters such as earthquakes, floods, epidemics or a change in the course of River Indus.

- D.**
1. For a long time, after the discovery of Harappa, Mohenjo-daro and other nearby sites, it was believed that this civilization was limited to a small area near the Indus river. But further excavations showed that it was spread over large parts of present-day Pakistan and the Punjab, Haryana, Uttar Pradesh, Rajasthan and Gujarat in India. Hundreds of sites belonging to this civilization have been discovered in these places. Some have been excavated and thoroughly researched while some are still waiting to be excavated.
 2. Most cities, including Harappa and Mohenjo-daro, were divided into two parts. The part built on raised ground was the citadel or the 'acropolis'. It had high brick walls to provide protection during floods. It had public buildings, religious structures and granaries. The ruler and the ruling class, consisting of rich merchants and priests, probably lived there.
The other part, or the lower town, was at a lower height but much bigger in area. It had small buildings and common people lived here.
 3. The Great Bath is the most impressive structure at Mohenjo-daro. Rectangular in structure, it resembles a swimming pool. It is made of baked bricks and was made watertight with a layer of bitumen or tar. It has two flights of steps, one on each side. There are rooms on the side for changing clothes. Watertight was probably drawn from a well and drained out after use. It was perhaps used for bathing on special occasions.
 4. The drainage system of the cities was very well planned. The bathrooms had sloping floors and had drains which were connected to the street drains. The kitchen also had drains connected to the main street drains. The street drains ran along the sides of the street. They were covered with bricks and were cleaned from time to time.
 5. People followed different occupations. There were farmers, weavers, potters, jewellers, metal-workers, toy-makers, stone-cutters, seal-makers, boat-makers, masons and traders.

E. Do it yourself.

F. Do it yourself.



13. The Ancient Kingdoms

Exercise

- A.** 1. (c) 2. (d) 3. (d) 4. (b) 5. (d)
- B.** 1. F 2. F 3. F 4. F
- C.** 1. The Vedic texts, such as the Brahmanas and the Upanishads and Buddhist texts, such as the Jataka Tales are the main source of information about this period. They inform us about the janapadas and mahajanapadas which existed in this period.
2. The monarchical mahajanapada was ruled by a king. The king was very powerful. He had a large army and many sources of revenue. Kingship was hereditary and the king's son succeeded him to the throne. Magadha, Vatsa, Avanti and Kosala were the important kingdoms.
3. Craftsmen such as carpenters, potters and weavers paid taxes, either in cash or kind or by offering free service to the king. Buying and selling of goods were also taxed.
4. Villages grew in size to become towns. Towns also grew around centres of trade and craft. At times, craftsmen and artisans came together to work as a group. These places also grow into towns. Ujjayini, Ayodhya, Vaishali, Kaushambi, Champa and Tamralipti were some important towns of this period.
- D.** 1. The small tribes of the earlier period transformed into large kingdoms called janapadas. The larger and more powerful janapadas were called mahajanapadas.
2. Following are the two main changes in agriculture which helped farmers to produce more : First, the iron plough, an improvement over the wooden plough, came to be used on a larger scale. Second, the practice of transplanting paddy, *i.e.*, growing saplings separately and then planting them in the fields, became common. This ensured that many more plants survived and hence more grains were produced. Increased production meant that the king got a greater share of the revenue.
3. Trade was boosted during this period due to the introduction of money. Till now, trade was done through barter. Now, silver and copper (punch-marked coins) coins began to be used which led to an increase in trade.
- Inland trade was brisk. Goods were sent far and wide. Bimbisara, the king of Magadha, built roads and bridges throughout his empire which this encouraged trade. Besides land routes, trade was carried out

through sea routes also. The main articles traded were silk, muslin, perfumes and ivory.

4. The people were grouped into four varnas—Brahmins, Kshatriyas, Vaishyas and Shudras. These varnas were based on birth. This means that if a person was born in a Brahmin family, he would automatically become a Brahmin.

People of different varnas performed different tasks. The Brahmins were expected to teach the Vedas and perform religious rituals and sacrifices. The Kshatriyas were warriors and fought wars. The Vaishyas were involved in trade and agriculture. Only the first three varnas could study the Vedas and perform sacrifices. The Shudras had to serve the other three groups. In addition, there was another group of people—the untouchables, who were even lower in social rank than the Shudras.

- | | | |
|----|-------------------------------|--|
| E. | 1. Do it yourself. | 2. Do it yourself. |
| F. | 1. Fertile soil | 2. Timber and elephants provided by forests |
| | 3. Large deposits of iron ore | 4. Protected by nature |
| | 5. Large Army | 6. Powerful rulers |
| G. | Do it yourself. | |
| H. | Do it yourself | |



14. The Mauryan Empire

Exercise

- A. 1. (d) 2. (c) 3. (c) 4. (d) 5. (c)
B. 1. (X) 2. (✓) 3. (X) 4. (X) 5. (✓)
C. 1. The Indika tells us about the political, social and economic conditions of life during that period. The Arthashastra deals with ways to govern an empire. It describes the administration of the Mauryas.
2. Kalinga war was fought in 261 BCE. Ashoka attacked Kalinga because Kalinga was the only kingdom which was not under Mauryan control. It was important as it controlled the land and sea routes to South India and South-east Asia.
3. Dhamma is the Prakrit word for the Sanskrit term ‘dharma’, which means religious duty. Ashoka gave up the policy of conquest through war (*dig-vijaya*) and began to follow a policy of conquest through dharma (*dhamma-vijaya*). Spreading dhamma became his goal in life.

4. The king was the supreme authority who took all important decisions concerning the empire. He was assisted by a council of ministers who acted as the king's advisors.
- D.**
1. The war with Kalinga was a turning point in Ashoka's life. The death, destruction and suffering that he saw in the war made him repentant. He realized the futility of fighting and vowed not to fight any more wars. He devoted the rest of his life to serve his people.
 2. Ashoka was very much concerned about the welfare of the people his empire. In one of his edicts, he says—'All men are my children, and just as I desire for my children that they should obtain welfare and happiness both in this world and the next, the same do I desire for all men.'
- Ashoka built good roads and planted trees on both sides of the road. Along the roads, he constructed rest houses where travellers could rest. A large number of wells were dug. He also built many hospitals, both for people and animals. He regularly went on tours of his empire and tried to solve the problems of his subjects. He did his best to ensure that the people were happy.
3. Two steps taken by Ashoka to spread Dhamma were :
 - (i) He led by personal example and followed the principles of dhamma in his daily life.
 - (ii) He appointed officials called dharma mahamatras to spread dhamma. These officers went from place to place to spread the message of dhamma among the people. Some of the event went outside the country to Sri Lanka, South-east Asia, Central Asia and Egypt.
 4. **Administration of Pataliputra** : Mauryan administration was divided into four divisions—central, provincial, district and village. The administration of the capital city of Pataliputra was separate.

Central : The king was the supreme authority who took all important decisions concerning the empire. He was assisted by a council of ministers who acted as the king's advisors.

Provincial : The empire was divided into many provinces and each was headed by a prince. He administered the province as the king's representative and was assisted by many officers.

District : A province was further divided into districts. The 'Pradeshta' was the head of the district and was assisted by the 'yuktas' and the 'rajukas'. They maintained law and order measured the land and collected taxes.

Village : A district comprised a number of villages. Villagers assisted government officials in marking the village boundaries, maintaining

land records and collecting taxes. Each village has a headman who was chosen by the villagers themselves.

Sources of Revenue : Land revenue was the main source of income. Depending upon the fertility of the soil it was fixed between one-fourth and one-sixth of the produce. Revenue was also obtained from trade. Pataliputra, Ujjain, Taxila (Takshashila) and Broach were important inland trading centres. Overseas trade was carried on with Rome, Egypt, China and Sri Lanka. Other sources of income were forests, mines, custom duties, fines and gifts. Arthashastra also mentions water tax.

- F. 1. Ashoka is known as King Piyadassi.
2. King Antiochus.
3. King Piyadassi made provisions for two types of medical treatment :
 medical treatment for humans and medical treatment for animals.
- G. Do it yourself.
- H. Do it yourself.



15. The Post-Mauryan Period

Exercise

- A. 1. (d) 2. (c) 3. (b) 4. (c) 5. (b)
- B. 1. Cheras were also known as Keralaputras. Neduncheraladan was the famous Chera King. He fought against the Cholas and Pandyas. He even captured Roman fleet.
2. Nedunchezhyan was a powerful ruler of the Pandya Dynasty. He defeated both the Cholas and the Cheras. He was also a patron of arts and literature. The third sangam at Madurai was probably held when he was the king.
3. The Silk Route was called so because silk was the main traded item. Rulers tried to control the silk route as they protected the traders from attacks by robbers and the traders gave them a part of their profits in return.
4. Hinduism by this time, had undergone many changes. Rituals, sacrifices and ceremonies became less important. The emphasis now was on loving devotion to god or 'bhakti'. A pure heart was all that was needed to worship god. The teachings of the Bhagavad Gita also became popular in this period.
- C. 1. Kanishka was deeply influenced by Buddhism. He patronized Buddhist monks and donated money to build viharas or monasteries. It was during his reign that a great assembly of Buddhist monks was held

in Kashmir. It is generally known as the Fourth Buddhist Council. At this council, scholars met and discussed issues. Many important decisions related to Buddhism were taken at this council. Ashvaghosha, who wrote the Buddhacharita, lived at the court of King Kanishka.

2. Trade flourished during this period. The Indo-Greeks, Kushanas and the Satavahanas issued a large number of gold, silver and copper coins. Ports such as Kalyan, Broach and Sopara were the main centres of trade with other countries.

The development of new crafts also promoted trade. Taxila, Ujjayini and Mathura became prosperous due to trade.

The Silk Route : Trade brought India into contact with distant lands. The Silk Route was popular among the traders. It was called so because silk was the main traded item. The Chinese were the first to make silk and they carried silk to other parts of the world along this route.

The Silk Route was the most important trade route. It had several branches. The main branch started from China, ran across Central Asia and ended at the West Asian provinces of the Roman Empire. It was through this route that India exported textiles, pearls, silk, ivory and precious stones. In return, it obtained copper, glass, tin and gold.

3. The first step in the spread of Buddhism to Central Asia was due to the missionary activities of Emperor Ashoka. He sent missionaries to many places in Central Asia to popularize Buddhism. During the reign of King Kanishka too, many Indian missionaries went to Central Asia and introduced Mahayana Buddhism in this region. In this new form, Buddha was considered a form of god on earth and his images came to be worshipped. The worship of Bodhisattvas and Buddhist saints also became popular. From Central Asia and China, Buddhism spread to Korea and Japan.

The Silk Route helped greatly in the spread of Buddhism to Central Asia and China. Pilgrims and missionaries from India travelled to China and Central Asia through this route. Kumarajiva, the famous Buddhist monk, went to China and stayed there for some time to spread Buddhism. Buddhist pilgrims from China also came to India. The accounts they have written provide valuable evidence on Buddhism. Some famous Chinese pilgrims who came to India were Fa Hien, Hiuen Tsang and I-tsing. They came to study Buddhism, collect Buddhist texts and to visit Buddhist monasteries. After this, there was a regular exchange of pilgrims between India and China.

Buddhism also spread to the countries of South-east Asia. Emperor Ashoka sent his son Mahendra and daughter Sanghamitra to Sri Lanka to spread Buddhism. Dipavamsa and Mahavamsa are the famous Buddhist writings from Sri Lanka. Other countries such as Java,

Sumatra, Vietnam, Thailand and Cambodia were also influenced by Buddhism. The Great Stupa at Borobodur in Java was dedicated to the Buddha.

4. (a) **Kingdoms of the South :** The Three Kingdoms of 'Tamilakam'

The Cholas : The Cholas ruled in the Kaveri delta and their capital was Uraiyur.

Karikala was the most powerful Chola king. He fought against the Cheras and the Pandyas. He even attacked Sri Lanka and occupied some of its part. He constructed many roads and encouraged trade with other regions. Puhar or Kaveripattanam was an important port-city of this period.

The Cheras : The Cheras, also known as Keralaputras ruled over present-day Kerala and some parts of Tamil Nadu. Vanji was their capital.

Neduncheraladan was the most famous Chera king. He fought against the Cholas and the Pandyas. He even captured a Roman fleet.

The Chera rulers encouraged trade. They traded with Rome and Egypt.

The Pandyas : The Pandyas controlled the region around Madurai. According to Megasthenes, the kingdom was ruled by a woman who had a large army.

Nedunchezhyyan was a powerful ruler of the Pandya Dynasty. He defeated both the Cholas and the Cheras. He was also a patron of arts and literature. The third sangam at Madurai was probably held when he was the king.

The kingdom was famous for pearls which it exported to Rome.

(b) **The Silk Route :** Trade brought India into contact with distant lands. The Silk Route was popular among the traders. It was called so because silk was the main traded item. The Chinese were the first to make silk and they carried silk to other parts of the world along this route.

The Silk Route was the most important trade route. It had several branches. The main branch started from China, ran across Central Asia and ended at the West Asian provinces of the Roman Empire. It was through this route that India exported textiles, pearls, silk, ivory and precious stones. In return, it obtained copper, glass, tin and gold.

Many rulers tried to control the Silk Route. They protected the traders from attacks by robbers and the traders gave them a part of their profits in return. This was profitable for both.

D. Do it yourself.

- E. 1. TAMIL, PANDYAS 2. PEARLS, MADURAI
 3. KASHMIR, KANISHKA 4. MAHAYANA, HINAYANA
 5. FAHIEN, HIUEN TSANG
- F. Do it yourself.
- G. Do it yourself.



16. The Gupta and the Post-Gupta Period

Exercise

- A. 1. (a) 2. (c) 3. (b) 4. (b) 5. (a)
- B. 1. Samudragupta Harisena Allahabad Pillar Inscription
 2. Chandragupta II Vikaramaditya Navratnas
 3. Harshavardhana Kannauj Nalanda University
 4. Pulakeshin II Khusrao II Vatapi
 5. Narasimhavarman I Vatapikonda Kanchi
- C. 1. (b) 2. (e) 3. (d) 4. (a) 5. (c)
- D. 1. Information about the Gupta period is available from both archaeological and literary sources. The Allahabad Pillar Inscription is the most important archaeological source. Temples, coins and paintings are some other archaeological sources.
 The main literary sources include the works of Kalidasa and the accounts of Fa Hien and I-tsing.
2. The word 'prashasti' comes from Sanskrit and means 'in praise of'. Court poets often wrote accounts in which they listed the achievements of the monarch and praised him. They then engraved such accounts on pillars so that the people could read them. Samudragupta's pillar inscription is one such prashasti.
3. Harsha's capital was Kannauj. He conquered Punjab, eastern Rajasthan and the whole of the Ganga valley, up to Assam. He also attacked the Chalukyan king, Pulakeshin II, but was defeated.
 Harsha did not annex all the territories that he conquered. He allowed some kings, whom he defeated, to continue ruling. They accepted him as their overlord and paid him an annual tribute. They also gave him money and soldiers whenever he needed them.
4. Agriculture was the main occupation of the people. Much of the revenue came from land. There were a large number of revenue

officers to collect the revenue. Merchants and craftsmen also paid taxes. The tax was used to ensure good administration, give grants and donations and maintain the army. To maintain an army consisting of horses, elephants, chariots and foot soldiers required a lot of money.

- E.
1. As mentioned in the Allahabad Pillar Inscription, during his northern campaigns, he defeated nine kings of Aryavarta : Nandin, Balavarman, Nagasena, Rudradeva, Chandravarman, Mathila, Gangapathinaga, Nagadatta and Achyuta.
 2. Harsha was patron of arts and learning. He himself was a good writer. He wrote three plays in Sanskrit—Ratnavali, Priyadarshika and Nagananda. Scholars such as Banabhatta, Dandin and Subandhu lived in his court. In his early years, Harsha was a worshipper of Shiva but later he became a Buddhist. He was tolerant of other religions. He organized a grand assembly at Kannauj in 641 CE. He also gave money to the University of Nalanda. This university prospered and became a famous centre of learning. Hiuen Tsang spent many years here studying Buddhist texts.
 3. Hiuen Tsang was a Chinese traveller who came to India during the reign of Harsha. He spent more than eight years in India and wrote a detailed account about Harsha's administration and his people.
 4. Some new developments also happened during this period.
 - (i) The administration became decentralized. Local officers were independent of central control and took decisions on their own. In the region ruled by the Pallavas, there were two local assemblies—the ur and the sabha. There were also several sub-committees which looked after the routine matters of the village such as making roads, constructing temples, digging wells providing water to the fields, etc.
 - (ii) Some administrative positions became hereditary. On many occasions, the son succeeded to the post held by his father.
 - (iii) The administrative officers came to be paid in land grants instead of cash. The officers were expected to collect revenue from this land. This made them even more independent. Whenever there was a weak ruler at the centre, they broke away from his control and declared themselves independent.
- F. Do it yourself.
G. Do it yourself.
H. Do it yourself.
I. Do it yourself.
J. Do it yourself.

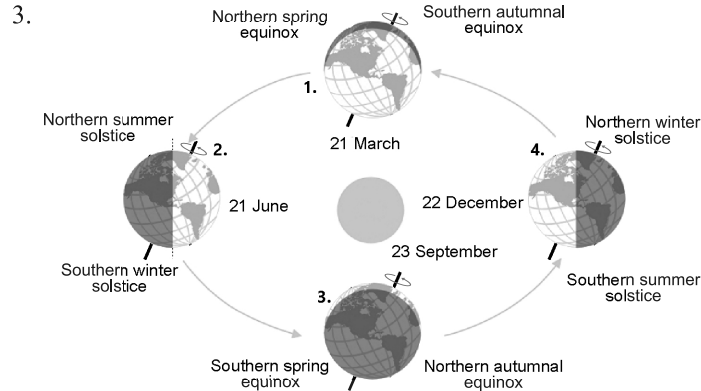


17. The Earth's Motions

Exercise

- A. 1. (b) 2. (b) 3. (b) 4. (d) 5. (b)
- B. 1. west, east 2. $66\frac{1}{2}^\circ$ 3. inclination 4. elliptical
- C. 1. T 2. T 3. F 4. T
- D. 1. We notice that the length of days and nights is not the same throughout the year. This variation is due to the inclination of the earth's axis which causes the Northern Hemisphere to remain inclined towards the sun for half of the year and the Southern Hemisphere during the other half.
2. During summer, in the Northern hemisphere, the North Pole is inclined towards the sun due to which it receives more heat and light. So, the days are longer than nights.
3. The earth takes 365 days, 5 hours, 48 minutes and 56 seconds (*i.e.* about $365\frac{1}{4}$ days) to complete one revolution around the sun. The time taken by the earth to go round the sun once is called a year. Thus, revolution is also called the annual motion of the earth.
For our convenience, we count only 365 days in a year. The balance of about 6 hours is computed to one extra day after every four years. This additional day is added to the month of February in that year. Thus, February has 29 days and that year has 366 days. This year is called a leap year.
4. The earth completes one revolution around the sun in about $365\frac{1}{4}$ days or one year. This period divided into four seasons—spring, summer, autumn and winter. The change of seasons is due to :
- (i) the rotation of the earth on its axis.
 - (ii) the revolution of the earth around the sun.
 - (iii) the inclination of the earth's axis.
- E. 1. **Effects of the Earth's Rotation**
- (i) We feel that the sun, the moon and other heavenly bodies move from east to west.
 - (ii) It causes days and nights on earth.
 - (iii) It gives us the concept of direction based on sunrise and sunset.
 - (iv) It causes the bulging of the earth at the equator and flattening at the poles.
 - (v) It gives us a day of 24 hours.
 - (vi) It causes deflection in the direction of winds and ocean currents.
 - (vii) It causes tides twice a day.

2. Days and nights are caused by the rotation of the earth around on its own axis. Due to spherical shape of the earth, only one half of it gets light from the sun at a time. The portion of the earth that receives sunlight experiences day, while the portion which is in darkness experiences night.



- F. 1. Do it yourself.
2. Do it yourself.
- G. Do it yourself. H. Do it yourself.
- I. Do it yourself.



18. Major Realms of the Earth

Exercise

- A. 1. (a) 2. (b) 3. (c) 4. (c) 5. (d)
- B. 1. Mt. Elbrus 2. Eurasia 3. Gran Chaco 4. Indian
- C. 1. F 2. T 3. T 4. F
- D. 1. The name of continents in increasing order of their size are : Australia, Europe, Antarctica, South America, North America, Africa and Asia.
2. The name of oceans in increasing order of their size are : Arctic, Indian, Atlantic and Pacific Ocean.
3. **Composition of the Atmosphere**
(i) The atmosphere comprises of colourless, odourless and tasteless gases.
(ii) Air is a mixture of gases, water vapour, dust particles and smoke.
(iii) The composition of air varies from place to place and from time to time.

- (iv) The composition of clean and dry air is fairly uniform in the lower layer of the atmosphere, upto a height of about eight km.
 - (v) Pure and dry air mainly contains nitrogen (78 per cent) and oxygen (21 per cent).
 - (vi) Oxygen, being heavy, is confined to the lower layers of the atmosphere. All living organisms need oxygen to breathe.
 - (vii) Other gases found in small quantities include argon, carbon dioxide, neon, ozone, hydrogen, helium, methane, etc.
 - (viii) Carbon dioxide absorbs the heat radiated by the earth and keeps the planet warm. Plants use it to prepare food (through photosynthesis).
 - (ix) Besides these gases, water vapour, dust particles, smoke, salt, etc., are also present in the atmosphere.
4. On the basis of composition, density, temperature and other properties, the atmosphere can be divided into five layers—Troposphere, Stratosphere, Mesosphere, Thermosphere and Exosphere.
5. Main elements of biosphere are : (a) Atmosphere (b) Lithosphere (c) Hydrosphere.
- E.**
1. (i) **Asia** : Asia is the largest continent in the world in terms of area and population. Major part of this continent lies in Northern Hemisphere.
 - (ii) **Africa** : Africa is the second largest continent. Africa was called 'The Dark Continent' by the Europeans.
 - (iii) **North America** : It is surrounded by Arctic Ocean in the north, the Pacific Ocean in the west and the Atlantic Ocean in the east. In the south, the Isthmus of Panama links it to South America.
 - (iv) **South America** : The north-south extent is about 7,650 km and the east-west extent is about 4,800 km. Mt. Aconcagua is its highest peak.
 - (v) **Europe** : It looks like peninsula. It is a continent of high mountains.
 - (vi) **Australia** : It is the smallest continent. A major part of Australia is a plateau with a few low isolated mountain ranges.
2. The Importance of Oceans
 - ❖ Common salt is supplied by the oceans.
 - ❖ Oceans are the main source of moisture in the atmosphere.
 - ❖ They exercise direct control over the atmospheric temperature.
 - ❖ The ocean currents modify the climate of the coastal areas.
 - ❖ They are the main source of fish and other marine life.

- ❖ They are the storehouse of various minerals and chemicals.
 - ❖ They provide a free and permanent highway for travel and trade.
 - ❖ They possess enormous energy in the form of tidal waves from which electricity can be generated.
 - ❖ Oceans provide natural links between the continents.
 - ❖ The shortage of drinking water can be solved by treating ocean water.
3. The Importance of Atmosphere
- ❖ The atmosphere prevents the sun's radiations from reaching the surface of the earth.
 - ❖ It does not permit the harmful ultraviolet rays to reach the surface of the earth.
 - ❖ It prevents the extremes of temperature during day and night.
 - ❖ It softens the glare of the sun during daytime.
 - ❖ It acts as a greenhouse by keeping the earth's surface warm at night.
 - ❖ The air has weight and thus, exerts pressure. The atmospheric pressure depends on the temperature of the air. A change in atmospheric pressure causes the movement of air as winds.
 - ❖ The movement of air helps in condensation of moisture and precipitation.
 - ❖ The change of weather is also due to the presence of the atmosphere.
 - ❖ Sound waves are transmitted due to the presence of air.
4. Human activities have always been aimed at meeting their increasing needs. To achieve this, human beings often disturb the natural balance between the different elements of the biosphere. For example, the large scale burning of fossil fuels (like coal and petroleum), the illegal dumping of wastes into oceans and other water bodies, large scale mining of minerals, cutting down of forests to provide land for growing crops, etc., have had a negative impact on the biosphere. All these activities of human beings have led to the pollution of air, land and water. Pollution is a human-made disturbance, which nature cannot stop or ratify. We have to cut down on the increasing pollution in order to maintain the delicate balance of nature, which is essential for our growth and survival.

F. Do it yourself.

G. Across (→)

- | | |
|-------------------|------------|
| 1. SOUTHERN OCEAN | 3. ELBRUS |
| 4. TROPOSPHERE | 5. OXYGEN |
| 10. ANTARCTICA | 11. AFRICA |
| 12. COLORADO | |

Down (↓)

2. AUSTRALASIA

6. GRANCHACO

7. PACIFIC

8. MARIANA

9. BERING

H. Do it yourself.

I. Do it yourself.



19. India's—Location and Political Divisions

Exercise

A. 1. (d) 2. (c) 3. (c) 4. (b) 5. (d)

B. 1. seventh 2. cancer 3. 30 degrees

4. Afghanistan, Pakistan

C. 1. F 2. T 3. F

D. 1. The Indian mainland extends roughly between $8^{\circ}4'N$ latitude in the south and $37^{\circ}6'N$ latitude in the north and between $68^{\circ}7'E$ longitude in the west and $97^{\circ}25'E$ longitude in the east. The Tropic of Cancer ($23\frac{1}{2}^{\circ}N$) passes almost halfway through the country. The latitudinal and longitudinal extent of India is approximately the same—nearly 30 degrees.

2. The standard meridian of India is $82^{\circ}30'E$. It passes through Mirzapur (Uttar Pradesh).

3. India has common land boundary with Pakistan, Afghanistan, China, Nepal, Bhutan, Myanmar and Bangladesh.

4. The states of India situated along the coast are : Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Odisha and West Bengal.

E. 1. India is located in the Northern and Eastern Hemisphere. It is situated in the southern part of Asia, at the head of the Indian Ocean and so, has a favourable location with respect to international trade and commerce.

The Indian mainland extends roughly between $8^{\circ}4'N$ latitude in the south and $37^{\circ}6'N$ latitude in the north and between $68^{\circ}7'E$ longitude in the west and $97^{\circ}25'E$ longitude in the east. The Tropic of Cancer ($23\frac{1}{2}^{\circ}N$) passes almost halfway through the country. The latitudinal and longitudinal extent of India is approximately the same—nearly 30 degrees. The northern part of India is broader than the southern part.

2. India is situated in the southern part of Asia, at the head of Indian Ocean and so, has a favourable location with respect to international trade and commerce.

India is the only country in the world after which an ocean has been named, *i.e.* the Indian Ocean. Our country's southern part is a peninsula which divides the northern part of the Indian Ocean into the Bay of Bengal on the eastern side and the Arabian Sea on the western side.

3. The Indian Standard Time (IST) is 5 hours and 30 minutes ahead of Greenwich Mean Time (GMT).

F. 1. Do it yourself.

2. Do it yourself.

G. 2:30 a.m.

H. 8:30 p.m.

I. Do it yourself.



20. Physical Features of India

Exercise

A. 1. (d) 2. (d) 3. (d) 4. (c) 5. (a)

B. 1. T 2. F 3. T 4. F

C. 1. (b) 2. (e) 3. (d) 4. (c) 5. (a)

D. 1. India can be broadly divided into the following four physical divisions :

(i) The Northern Plains

(ii) The Northern Mountains

(iii) The Peninsular Plateaus

(iv) The Coastal Plains and the Islands

2. The northern plains have many advantages, such as :

(i) A flat surface for building roads, railways, houses and factories.

(ii) Rivers provide water for irrigation.

(iii) New deposits of alluvium every year.

(iv) A favourable climate for round-the-year farming.

3. To the north lie the Aravallis, the Vindhya, the Satpuras and the Rajmahal hills while the Western Ghats and the Eastern Ghats form its western and eastern boundaries respectively. However, unlike the Himalayas, these ranges have no high peaks or glaciers. The average height of the plateaus ranges from 600 m to 900 m and it slopes from west to east.

4. Besides many islands found along the coast of India, there are two main groups of islands. One of them is the Lakshadweep islands in the Arabian Sea and the other is the Andaman and Nicobar Islands in the Bay of Bengal.

Minicoy, with an area of about five sq km, is the largest island in the Lakshadweep group. The Andaman and Nicobar group stretches for a distance of about 600 km. Most of these islands are mountainous and are covered with thick forests.

- E. 1. The Himadri or the Greater Himalaya is the highest mountain range in the world. Most of the mountain peaks here are permanently covered with snow. Mt. Everest (8,848 m) In Nepal is the highest peak in the world. Kanchenjunga (8,598 m) is the highest peak in the Indian Himalayan ranges.

The Shiwalik or the Outer Himalaya is the southernmost mountain range. It is made up of loose deposits of soft rocks, mud and silt. Landslides are common in this range.

The Purvanchal ranges which lie along the eastern boundary of India, form a series of low hills. They have Patkai Bum and the Naga hills in the north and the Mizo hills in the south. The central part has the Garo, Khasi and Jaintia hills.

2. Roughly triangular in shape, the peninsular plateaus are located to the south of the northern plains. It is the oldest structure of the Indian Subcontinent. They are surrounded by hill ranges on all the three sides. To the north lie the Aravallis, the Vindhya, the Satpuras and the Rajmahal hills while the Western Ghats and the Eastern Ghats form its western and eastern boundaries respectively. However, unlike the Himalayas, these ranges have no high peaks or glaciers. The average height of the plateaus ranges from 600 m to 900 m and it slopes from west to east.

The plateaus are made up of igneous and metamorphic rocks. They have an undulating surface with low hills and rounded tops. The Narmada river divides the entire plateau region into two parts—the Central Highlands and the Deccan plateau.

3. Rivers which rise from Himalayas contain water throughout the year due to melting snow of Himalayas, whereas rivers of Deccan plateau contain water only during rainy season.

4. **The Western Coastal Plain :** The Konkan Coast is the northern part of the Western coastal plain while the southern part is called the Malabar coast.

The backwaters or lagoons, locally called kayals, are a special feature of the Malabar coast.

The Eastern Coastal Plain : The Northern Circars are the northern part of the Eastern coastal plain while the southern part is the Coromandel coast. Rivers such as the Mahanadi, Godavari, Krishna and Kaveri have formed fertile deltas along the Eastern coastal plain.

F. Do it yourself.

G. Do it yourself.

H. Do it yourself.



21. Unity in Diversity

Exercise

- A.** 1. (d) 2. (c) 3. (c) 4. (b)
- B.** 1. F 2. F 3. F 4. T
- C.** 1. India is a diverse country as it is a large country with a large number of physical features, regions, languages, customs, dress and food habits. Every major religion in the world like Hinduism, Islam, Buddhism, Sikhism, Jainism, Christianity and Zoroastrianism are followed in India.
The Indian Constitution provides the right to everyone to practise any religion and develop their own language and culture. So, we have unity in diversity in India.
2. Ancient Indian knowledge has been passed on by word of mouth. Stories with moral lessons were told through song, dance and drama. This is called the art of folk theatre. Folk dances are mostly based on seasons. For example, Bhangra from Punjab and Garba from Gujarat.
3. Any music that is dedicated to the almighty is called religious music such as Kabir's couplet and Surdas' bhajans. While all traditional music sung usually during weddings and festivals are called as folk music.
4. Three National festivals are : Independence Day, Republic Day and Gandhi Jayanti. Three religious festivals are : Diwali, Holi and Eid.
- D.** 1. Culture is made up of ideas, beliefs, customs, traditions, art, religions, music and dance. The food habits of the people, the festivals they celebrate, their art and handicrafts are all part of their culture.
2. Two main schools of Indian Classical Music are :
- (a) North Indian School (Hindustani)
- (b) South Indian School (Carnatic)
- Gharana tradition is the one where the students learn music from a guru by living in his house.
3. **Backwaters** : These are a chain of lagoons that lie parallel to the Arabian Sea Coast. They are a network of canals and lakes and are fed by around 38 rivers.
- Gompas** : These are Buddhist temples. Many villages in Ladakh have a Gompa or monastery, a complex of temples and prayer halls. These serve as places of worship, meditation and as schools and are an important part of the lives of the people.

4. Progress and growth in communication, transport and technology during the 20th century have overcome geographical boundaries, turned the world into a global village and revolutionized our way of living. The world is linked as never before. Economies, societies and cultures have been connected through a global network spread all over the world.
- E. Do it yourself.

22. All Human Beings are Equal

Exercise

- A. 1. (b) 2. (c) 3. (d) 4. (a) 5. (a)
- B. 1. social level 2. Discrimination 3. harmoniously
4. treated badly 5. Prejudice or discrimination
- C. 1. Some people make fun of and laugh at those who are different because they develop negative attitudes and opinions against such people because they feel safe and comfortable with only those who talk, dress and think like them.
2. Prejudice can be guided by the person's race, rationality, caste or religion.
3. A child is 'special' when his or her capacities and needs are different from other children. He or she has difficulties, disabilities, which other children do not have. A broad classification of special children can be made on the basis of child's mental and physical condition.
4. Part III of the Constitution of our Republic deals with Fundamental Rights. It has powerful provisions to fight all forms of discrimination, including those which are based on race, caste or descent.
- D. 1. Prejudice is an unreasonable dislike for a particular group of people, or preference for one group over another. Thus there are negative attitudes towards or opinions about a person or group simply because the person belongs to a specific religion, race, nationality or another group.
2. Discrimination means unfair treatment of a person or group on the basis of prejudice. It means treating other people badly, not letting them participate in certain activities, restricting their access to work, or living in certain neighbourhoods, or denying them the things to which they are entitled to by right and law. For example, in some villages, some people are not allowed to draw water from the village well or to worship at a temple.

3. Fundamental rights ensure the protection and equality of the weaker and backward sections of the society.
4. Categories for whom special steps are to be taken by the government are :
 - (i) women and children
 - (ii) Scheduled Castes (SCs)
 - (iii) Scheduled Tribes (STs)
 - (iv) Other Backward Classes and minorities
 - (v) physically challenged people

The Constitution says that it is the duty of the state to protect the weaker and backward sections from social injustice. Seats are reserved for SCs and STs in the legislatures and educational institutions.

- E. Do it yourself.
F. Do it yourself.



23. Different Forms of Government

Exercise

- A. 1. (a) 2. (c) 3. (d) 4. (a) 5. (b)
- B. 1. (c) 2. (a) 3. (e) 4. (b) 5. (d)
- C. 1. The political system by which a country or a state is administered is called the government. Its functions are to :
- (i) look after the welfare of the people.
 - (ii) maintain law and order in the country.
 - (iii) build the infrastructure of the country.
- The functions of the government are carried out by its three organs (i) the legislature which is the law-making organ, (ii) the executive which implements these laws and (iii) the judiciary which ensures that these laws are carried out.
- Democratic governments and non-democratic or authoritarian governments are classified on the basis of accountability to people.
2. Following are the two main differences between the parliamentary and presidential system of government :
- (a) In the parliamentary form, the executive is a part of the legislature and there is fusion of powers. While under the presidential system, the legislature and the executive are separate and there is separation of powers.

- (b) In the parliamentary system, the head of the state is separate from the head of the government. The head of government is elected on the basis of the number of members his political party has in the legislature. If a party has a clear majority in the legislature, the leader of that party becomes the prime minister. While in the presidential form, the executive and legislature are separate. The real power lies in the hands of an elected president.
3. A constitution is a set of laws which define how a state or country is to be governed. These rules state the distribution of power and authority within the country. It also states the limit to this power and authority. All the institutions of the government work within the provisions of the constitution.

There are different types of constitutions : written and unwritten, rigid and flexible. These are as follows :

Written and Unwritten Constitution : In a written constitution, the fundamental principles of the government are formally written. The Constitution of India was prepared between 9 December 1946 and 26 November 1949 by the members of the Constituent Assembly.

The aims of the people and the vision of the leaders are contained and protected in the constitution so as to avoid any kind of conflict.

The British Constitution is an unwritten constitution and contains not a single document. It consists of constitutional conventions and practices that have created precedents for the working of institutions, together with documents such as Statutes and Acts of Parliament.

4. The rigidity and flexibility of a constitution is reflected in the process of amendment.

A written constitutions are rigid whereas a rigid constitution cannot be amended easily. To make amendments in the constitution, some specific procedures have to be followed. The central as well as the state majority is required to make changes or amendments in the constitution. The American and the Indian constitution are examples of a rigid constitution.

- D.** 1. The political system by which a country or a state is administered is called the government. Its functions are to :
- (i) look after the welfare of the people.
 - (ii) maintain law and order in the country.
 - (iii) build the infrastructure of the country.

The functions of the government are carried out by its three organs (i) the legislature which is the law-making organ, (ii) the executive which implements these laws and (iii) the judiciary which ensures that these laws are carried out.

2. Following are the main characteristics of an authoritarian government:
 - (a) A small group of people, a particular social class or a strong political party controls all the decision-making in the government.
 - (b) The country's citizens are not allowed to raise any questions about political institutions and their methods of functioning.
 - (c) Authority, obedience and order play an important part.
 3. In a federal form of government, the distribution of power is between the central and the state governments. Most laws made by the central government apply all over the country whereas laws made by the state government apply only in its respective state.
Examples of this form of government are India and USA.
 4. For a long time in many developed countries, women were not given the right to vote.
Many societies in the past have denied people the right to vote on the basis of race or ethnicity. For example, non-whites could not vote in the apartheid-era in South Africa. The system came to an end with the first free multi-party elections in 1994.
- E. Do it yourself.
F. Do it yourself.



24. Panchayati Raj System

Exercise

- A. 1. (a) 2. (a) 3. (c) 4. (c) 5. (c)
6. (a)
- B. 1. The Panchayati Raj is a system of self-government in rural areas in India. It strengthens the foundations of Indian democracy as it focusses on rural development by involving the rural community.
2. When the British ruled our country, they appointed their own officials to look after the affairs of the people. As a result, the institution of panchayats declined.
3. The Pradhan or Sarpanch is the head of the Gram Panchayat. He is usually elected by the members of the Gram Panchayat. He is responsible for organizing the panchayat meetings. He signs important documents and co-ordinates the activities of the panchayat.
4. The Block Samiti has different names in different states. For instance, it is called 'Kshetra Samiti' in Uttar Pradesh, 'Anchalik Parishad' in West Bengal and 'Mandal Panchayat' in Karnataka. However, its

functions in all the states are more or less the same. It works as an essential link between the Gram Panchayats and the Zila Parishad.

5. These institutions of local self-government help to strengthen democracy in our country and also help to bring about social change. In a large country like ours, where there are so many problems related to development and people living in different regions with different needs, the Panchayati Raj system is very important. This system should be further strengthened.
- C.
1. The Panchayati Raj is a three-tier system which works at three levels—the Gram Panchayat at the village level, the Block Samiti at the block level and the Zila Parishad at the district level.
Some panchayats combine to form a Block Samiti which takes care of the needs of the whole block. But there are certain things the Block Samiti cannot handle by itself. The organization at the top of the Panchayati Raj system, called the Zila Parishad, helps the Block Samitis. It is made up of the representatives of the Block Samitis of the district and other members who work at the district level.
 2. In 1992, the Central Government amended the Constitution and framed rules for the Panchayati Raj system. These were to be followed by all the states and union territories. These rules became effective from April 1993. The rules are as follows :
 - (i) It must be a three-tier system—the village level, the intermediate or block level and the district level. Panchayats at the intermediate level may not be constituted in states with a population of less than 20 lakhs.
 - (ii) There should be direct election for all the seats in a Panchayat.
 - (iii) There should be reservation to ensure representation of the Scheduled Castes and the Scheduled Tribes in proportion to their population in the area.
 - (iv) A member of a Panchayat should not be less than 21 years of age.
 - (v) The State Election Commission should hold Panchayat elections regularly.
 3. The Nyaya Panchayat, which works like a local court, is an important part of the Panchayat system. It settles minor disputes and provides justice quickly. There is one Nyaya Panchayat for four to five villages. Its members are elected by the Gram Panchayats. However, a member of the Gram Panchayat cannot be a member of the Nyaya Panchayat.
The Nyaya Panchayat passes judgements on petty civil and criminal cases. The members study both sides of the case and give a ruling. The process of justice is swift, simple and inexpensive. If a person feels that he or she has not received justice in a Nyaya Panchayat, then he can appeal in a higher court of justice.

4. All plans of the Block Samiti are implemented with the help of the Block Development Officer (BDO). His main function is the implementation of development plans prepared by the Block Samiti. She/He is responsible for the whole block. The Block Pramukh and the Block Development Officer successfully implement the developmental programmes in a block.
 5. The State Government provides grants for the Panchayati Raj system in a state. It also has the power to dissolve a panchayat, if it is not functioning properly. The executive and the technical staff in the Panchayati Raj system are chosen from different state departments. In the broad guidelines given in our Constitution, it is the State Government that formulates the rules and regulations regarding the functioning of the Panchayati Raj system.
- D. Do it yourself. E. Do it yourself.
 F. Do it yourself.



25. Local Self-Government In Urban Areas

Exercise

- A. 1. (b) 2. (d) 3. (c) 4. (b) 5. (a)
 B. 1. (b) 2. (c) 3. (d) 4. (a)
- C. 1. Different forms of urban local bodies exist depending upon the size of the city and the nature and extent of civic functions. The forms of urban local bodies are of three types—Nagar Panchayat, Municipality and Municipal Corporation.
2. A Municipality is elected for a term of five years. It can be dissolved earlier if it does not function according to the rules laid down or is not able to function effectively. In such a case, new members have to be elected within six months so as to complete the term.
3. Some seats are reserved for members belonging to the Scheduled Castes and Scheduled Tribes. One-third of the total seats are reserved for women.
4. The day-to-day work of the Municipalities and Municipal Corporations is carried out by several committees which are formed to perform various tasks. These comprise of 5 to 12 members and are headed by a chairperson. Committees such as the Education Committee and the Public Health Committee play an important role in the administration of cities.

5. The three public conveniences that the municipalities and municipal corporations provide are : (a) To provide for vegetable markets, (b) food grains market and (c) other consumer goods.
- D.**
1. A Nagar Panchayat looks after water supply, drainage, sanitation, cleaning of streets, street lighting, primary education, health, organization and management of fairs, bathing ghats and slum improvement.
Nagar Panchayat is a form of urban local self-government that is established in towns that are under Transition.
 2. The State Government appoints a chief Executive Officer known as Municipal Commissioner of the Municipal Corporation. She/He sees that decisions made by the corporation are executed. She/He also acts as a link between the State Government and the Municipal Corporation. Different officers such as those in charge of departments of health, education, engineering and sanitation help him/her in this work. The Municipal Commissioner co-ordinates their work and has the power to appoint lower level employees.
 3. The Municipalities and Municipal Corporations have similar functions. They have both obligatory and optional functions. Some of these functions are as follows :
 - (i) Maintenance of public hygiene—To arrange for the collection and disposal of garbage.
 - (ii) Public health—to build hospitals and dispensaries, to arrange for vaccinations to protect people against diseases such as cholera, smallpox and tuberculosis and to prevent adulteration of foodstuff.
 - (iii) Public conveniences—To provide for vegetable markets, foodgrain markets and other consumer goods, to provide for and maintain public toilets and urinals, to provide fresh and clean drinking water, and electricity and to ensure proper lighting of streets.
 - (iv) Registering births and deaths—To maintain records of births and deaths and issue certificates for the same and to provide for and maintain graveyards, cremation grounds and electric crematoriums.
 - (v) Education—To build and maintain schools, public libraries, museums and zoos.
 - (vi) Roads and bridges—To build and maintain roads and bridges within the city limits.
 4. The waste treatment process has the following benefits :
 - (i) Foul smell from garbage is removed.
 - (ii) Waste becomes free of flies, mosquitoes and germs.

- (iii) Waste treatment prevents production of methane and other foul smelling gases, therefore, there are less chances of smoke, fire and explosion hazards at the dumping yards.
- 5. Just as Panchayati Raj bodies plan and allocate resources for the development of rural areas the urban local bodies plan and allocate resources for the development of urban areas. A Planning Committee is formed in each district. It looks into the plans prepared by the Panchayati Raj bodies and the urban bodies and prepares a development plan for the district as a whole.
- E. Do it yourself.
- F. Do it yourself.
- G. Do it yourself.



26. District Administration

Exercise

- A. 1. (c) 2. (b) 3. (c) 4. (c) 5. (d)
- B. 1. F 2. T 3. F 4. F 5. F
- C. 1. Maintaining law and order in the district is the most important responsibility of the District Collector. She/He can pass orders to check lawlessness and rioting. In this task, she/he is assisted by the Superintendent of Police.
- 2. Land records are important for determining the rightful owner of the land. These records are also required to help the farmers secure loans from banks. The collection of revenue is also important as the government needs money to run its various bodies.
- 3. The district administration provides civic amenities such as health care, education and maintenance of government buildings and roads. It also reviews the overall development of the district.
- 4. Emergency situations such as floods, famines, fire, epidemics and earthquakes sometimes arise in a district. During such times, the district administration provides relief to the affected citizens. As citizens, it is our duty to cooperate with the district administration and assist them when such a situation arises.
- D. 1. **Functions of District Administration :** The main functions are as follows :
 - (i) maintain law and order
 - (ii) maintain land records and collection of revenue

- (iii) provide civic amenities
 - (iv) supervise activities of the Panchayats
 - (v) provide relief work
2. The Sub-divisional officer, Tehsildar, Naib-Tehsildar or Deputy Tehsildar, Kanungo and Lekhpal (Patwari) are the officials in charge of matters concerning collection of revenue. The Sub-divisional officer is responsible for revenue collection at the sub-division level. He is the link between the District Collector and the Tehsildar. The Tehsildar is the main official in the district responsible for actual collection of revenue.

The Superintendent (Land Records) and a Deputy Superintendent (Land Records) maintain land records at the district level while the Kanungo and the Lekhpal or Patwari maintain land records at the village level.

3. Difference between Civil Courts and Criminal Courts

S. No.	Civil Courts	Criminal Courts
1.	Civil cases are tried in these courts.	Criminal cases are tried in these courts.
2.	Civil courts deal with matters related to money, debts, property, divorce etc.	Criminal courts deal with matters related to murder, robbery, assault, dacoity etc.
3.	Judges of these courts cannot imprison or give capital punishment to the guilty	Judges of these courts have the power to send the guilty to jail or give capital punishment.

The incharge of the criminal court is the session judge, while the district judge or additional district judge is incharge of the civil court.

4. The Sessions Judge can award a death sentence. The Chief Judicial Magistrate can award a sentence up to 7 years of imprisonment. A Magistrate of First Class can award a maximum sentence up to 3 years of imprisonment or a fine or both. A Magistrate of Second Class can award a maximum sentence up to 2 years of imprisonment, or a fine, or both. The amount of fine depends on the nature of the crime as well as the powers of the judge.

- E. Do it yourself.
- F. Do it yourself.

