# Sound

11

## Exercise

### Section 1 : Formative Assessment (CCE Pattern)

**A. Answer the following questions orally :**

**Ans.** 1. The frequency of a sound will be low which is produced when the vocal cords are tight and thin.

2. If we shout on the moon, the sound will slower then the Earth because there is no air.

3. Differences between noise and music :

| Music | Noise |
|---|---|
| (i) It is a pleasant sound. | (i) It is an unwanted sound. |
| (ii) It is produced by systematic vibration. | (ii) It is produced by irregular vibrations. |

**B. Multiple Choice Questions (MCQs) :**

**Tick (✓) the correct answers :**

**Ans.** 1. (c) 2. (a) 3. (a) 4. (c) 5. (a)

**C. Fill in the blanks :**

**Ans.** 1. All unpleasant and undesirable sounds are known as **noise**.

2. The frequency of a sound determines its **pitch**.

3. Sound cannot travel through **vacuum**.

4. Sound above 20000 Hz are called **ultrasonic sound**. They **cannot** (can/cannot) be heard.

5. The SI unit of frequency of sound is **Hertz (Hz)**.

**D. Write True or False for the following statements :**

**Ans.** 1. True 2. False 3. False 4. True 5. False

**E. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Vibration | (i) Maximum displacement of a vibrating body from its mean position |
| 2. Frequency | (ii) To and fro motion of a vibrating body about its mean position |
| 3. Amplitude | (iii) Produced sound in humans |
| 4. Larynx | (iv) A medium through which sound cannot travel |
| 5. Vacuum | (v) The number of vibrations produced by a vibrating particle in one second |

## Section 2 : Summative Assessment (CCE Pattern)

**F. Define the following terms :**

**Ans.**

1. Vibration : The to fro or back and forth motion of an object.
2. Frequency : The number of oscillations or vibrations made by the vibrating body in one second.
3. Vacuum : Vaccum is a airless tube through which sound can not travel.
4. Oscillation : A regular movement of an object between one position and another.
5. Pitch : Pitch is a term used to describe the frequency of sound waves.

**G. Differentiate between the following :**

**Ans.**

1. Musical sound and Noise : Musical sound is a pleasant sound which is produced by systematic vibrations. While noise is an unwanted sound which is produced by irregular vibrations.
2. Audible and Inaudible Sound
   Usually audible sound is used to mean the sound which can be perceived by the human ear. Audible and inaudible sounds are relative terms. Audibility of sound depends upon the capability of the ear. The audible range of sound for human beings is from 20 Hz to 20 KHz. The sounds having frequencies above and below this range are inaudible sounds for human beings.
3. Frequency and Time period : Frequency in the number of oscillations or vibrations made by the vibrating body in one second.
   Time Period : The time taken by a vibrating body to complete one vibration.

**H. Answer the following questions in short :**

**Ans.**

1. Sound : Sound is something that produces the sensation of hearing in our ears. We can't imagine of a world without sound because sound makes to communicate easily.
2. Frequency :The number of oscillations or vibrations made by the vibrating body in one second.
   Amplitude : The maximum displacement or extent of vibration or oscillation of a vibrating body from its mean position.
3. Ultrasonic sound waves are used to improve the quality of homogenized milk, to control pests, etc.
4. When you shout, you can hear the echo of your voice. This happens because of the reflection of sound from a surface. Thus, echo can be defined as reflected sound waves. The reflecting surface must be present at a distance of 17 metre or more for you to be able to hear the echo.
   Sound can also be absorbed. Surfaces like wood, carpets, curtains, etc. absorb sound. Soft surfaces are good absorbers of sound as compared to the hard surfaces. Sound is better reflected by hard surfaces. So we hear more clearly in a furnished room than in empty room.

5. Pitch is a term used to describe the frequency of sound waves. If you increase the frequency of sound (there are more wavelengths in a second), you get a higher pitched sound. When you decrease the frequency, you get a lower pitched sound. Pitch of female voice is higher than that of male voice.
6. Loudness of a sound depends on the amplitude of the vibration or oscillation. It is measured in decibels (dB).
   Common Sounds and their intensities in dB

| | | |
|---|---|---|
| Jet aircraft | 140 | |
| | 130 | Gunshot |
| | 120 | Pain threshold |
| Thunder | 110 | Woodworking shop |
| Rock concert | 100 | Air drill machines |
| | 90 | Lawn mower |
| Concert hall seat | 80 | |
| Heavy traffic | 70 | |
| Typewriter | 60 | |
| Quiet conversation | 50 | |
| | 40 | Average residence |
| | 30 | |
| Whisper | 20 | Ambient outdoor noise in wilderness |
| Quiet recording studio | 10 | |
| | 0 | Hearing threshold |

7. Differences between noise and musical sounds

| Musical Sound | Noise |
|---|---|
| 1. It is a pleasant sound. | 1. It is an unwanted sound. |
| 2. It is produced by systematic vibrations. | 2. Produced by irregular vibrations. |

**I. Answer the following questions in detail :**

**Ans.** 1. SOURCES OF SOUND

Sound is produced by a variety of objects around us. In nature, we hear different kinds of sounds. The gale howls, rain patters, trees whisper and running water ripples and gurgles. Various types of sound are produced by human beings also. Crying, laughing, sneezing, snoring, whistling, wheezing, etc. are some distinct human sounds. Roaring engines, whining jet planes, explosions, etc. produce unpleasant sounds. It is an interesting fact that some animals can also mimic some sounds made by human beings. For instance, the young one of an orangutan cries like a human infant. A hyena laughs like a human being.

Sound helps living beings to communicate. Human beings communicate

with each other by way of talking. Even animals communicate with each other by producing different sounds. Birds produce different sounds which help them in communi-cating with other birds of the same species.

2. The ear has three major parts, described as the outer ear, middle ear, and inner ear.

   Outer Ear : Sound waves enter the outer ear and travel through the ear canal to the eardrum. The eardrum vibrates due to the incoming sound waves and transmits these vibrations to the middle ear.

   Middle Ear : Three tiny bones called the malleus (hammer), the incus (anvil), and the stapes (stirrup) amplify the sound and send it to the inner ear.

   Inner Ear : The sound vibrations create ripples in the fluid to the cochlea. Projections from tiny hair cells bend, causing electrical impulses that the auditory nerve, or eighth cranial nerve, sends to the brain. The brain translates these impulses into what we experience as sound.

3. To understand that sound needs a material medium to propagate.

   Procedure : Take a dry empty, transparent plastic jar or box, with an air tight lid. Remove the lid from the jar. Take a big piston (pichkaari) and carefully make a hole just to fit in the nozzle of the closed piston in the lid, as shown in the figure below. Make the fitting air tight with the help of clay. Now, keep a small radio or an i-pod inside the jar and turn in 'on', with a considerable volume. Replace the lid on the mouth of the jar, taking full care that the fitting of the piston does not get disturbed. You must be able to listen to the sound coming out from the i-pod/radio from inside the jar. Next, pull the handle of the piston outward, to its maximum possibility. Try to listen to the sound of the i-pod. Can you still hear it as clear as earlier?

   You can try listening to the i-pod once again, by completely closing the piston. Isn't that wonderful, the sound comes back. There was nothing wrong with the i-pod. Pull the piston out once again, the sound disappears again.

4. NOISE POLLUTION

   The disturbance produced in the environment by loud and harsh sounds from various sources is called noise pollution.

   Sources of Noise Pollution

   Noise pollution is a by-product of industrialization, urbanization and modern civilization.

   Broadly speaking, noise pollution has two main sources, i.e., industrial and non-industrial. Industrial sources include noise from various sirens, hooters and machines in industries. Non-industrial sources of noise include the noise created by vehicular traffic and the neighbourhood.

   Noise pollution can also be categorized as natural and man-made. Some man-made sources of noise pollution are as follows :

Road traffic : Road traffic is one of the main and growing sources of noise pollution. Transport mediums are the worst offenders, with trucks, buses, cars, and motorcycles all producing excessive noise.
Rail traffic : Rail transport is also not free from noise pollution. However, it affects only a smaller group of population living along the railway lines.
Air traffic : Construction of airports within the cities has contributed heavily to the noise pollution. Airplane engines generate a lot of unwanted noise.
Construction sites : Construction of metros, highways, city streets and buildings is a major contributor to noise pollution. The sources of construction noise include pneumatic hammers, air compressors, bulldozers, loaders, dump trucks (and their backup signals), and pavement breakers.
Industries : Neighbours of noisy manufacturing plants can be disturbed by sources such as fans, motors and compressors mounted on the outside of the industries. Interior noise can also be transmitted through open windows and doors. These interior noise sources have a significant impact on industrial workers, among whom noise-induced hearing loss is unfortunately very common.
Building : Noise in the buildings from plumbing, boilers, generators, air conditioners and fans can be annoying.
Consumer products : Certain household equipments, such as vacuum cleaners and some kitchen appliances are noisemakers.

**Section III : Activities Assessment (CCE Pattern)**

Do yourself

**Unit 5 : How Things Work**

# Electrolysis and Its Applications

12

**Exercise**

**Section 1 : Formative Assessment (CCE Pattern)**

**A. Answer the following questions orally :**

**Ans.** 1. Salty water can be good electrolysis.
2. If the strength of the current used in electroplating is very high, it will increase electrolysis.
3. Johann Wilhelm Ritter will increase electrolysis.

## B. Multiple Choice Questions (MCQs) :

**Tick (✓) the correct answers :**

**Ans.** 1. (d) 2. (a) 3. (b) 4. (c) 5. (d)

## C. Fill in the blanks :

**Ans.**
1. **Electrolysis** is the process of extracting metals from their ores.
2. Tap water mixed with **salt** is a good conductor of electricity.
3. **Electrolysis** is the process of refining metals by the passage of electric current.
4. An ion is an atom having a positive or negative charge due to the loss or gain of **electrons**.
5. The impurities that settle down below the anode are known as **gang**.

## D. Write True or False for the following statements :

**Ans.** 1. False 2. False 3. True 4. True

## Section 2 : Summative Assessment (CCE Pattern)

## E. Define the following :

**Ans.**
1. Anion : Anion is the negatively charged ion.
2. Cation : Cation is the positively charged ion.
3. Electrolyte : Electrolyte is the solution prepared by dissolving an ionic compound in a liquid.
4. Cathode : Cathode is the electrode connected to the negative terminal of a battery.
5. Anode : Anode is the electrode connected to the positive terminal of a battery.

## F. Answer the following questions in short :

**Ans.**
1. We are not advised to touch electrical appliances with wet hands because tap water consists of small amounts of salts dissolved in it which makes it is a good conductor of electricity.
2. We need to add salt solution in distilled water in order to make it conductor.
3. Electroplating : Another important use of electrolysis is electroplating. The process of electroplating is employed to coat one metal with another metal.
4. Effects of electroplating :

(i) The bumpers of cars are plated with chromine.

(ii) Iron is coated with tin.

(iii) A stainless steel spoon is plated with silver.

5. Three industrial applications of chemical effects of electric current :

(i) Refining impure metals, into pure ones.

(ii) Extracting of metals from their ores.

(iii) Electroplating.

**G. Answer the following questions in detail :**

**Ans.** 1. To know about the behaviour of electric current when passed through a conducting solution.

Procedure : Take four dry cells, put them in a cell holder so that the cells are joined together to produce a larger current. Take two thick copper wires and scratch them with a sand paper. Connect them to the battery made by you as shown in the figure below, using ordinary connecting wires. Take two teaspoons of refined wheat flour and make a thin paste by mixing it in water. Put the ends of the two copper wires in this paste and leave the setup for about 30 minutes. You will find a bluish-green appearance near the wire connected to the negative terminal of the battery. This change in colour of the wheat flour paste is due to a chemical change caused in it, due to the passage of electric current in it.

2. (a) Applications of Electrolysis

Discovery of electrolysis by Johann Wilhelm Ritter brought another breakthrough in the technological development. Nowadays, electrolysis is widely used in the chemical and commercial industries for the following purposes.

Refining impure metals, into pure ones.

Extraction of metals from their ores.

Electroplating.

(b) Electroplating : Electroplating in the important use of electrolysis. The process of electroplating is employed to coat one metal with another metal. It is done either for protection or for the purpose of decoration.

(c) During electrolysis, at least one of the following phenomena may occur, in the electrolyte and the electrodes.

Gas bubbles get deposited at the electrodes.

Colour of the electrolyte solution change.

A metal gets deposited at the negative electrode or cathode.

These are called as the chemical effects of current. Electrolysis causes decomposition of the chemical compounds present in the electrolyte, which may result into the different behaviour

3. Some of the uses of electroplating are listed below :

1. The bumpers of cars are plated with chromium to protect them from getting corroded.
2. Iron is coated with tin. For example, the iron sheets used for making tin cans are coated with tin so as to prevent them from rusting.
3. A stainless steel spoon is plated with silver to make it look attractive.
4. Electroplating technique is used by jewellers to make artificial jewellery. They prepare ornaments from some cheap metals and then electroplate them with gold or silver.

5. Metals such as nickel and chromium are also used to electroplate various metallic automobile parts.

**Section III : Activities Assessment (CCE Pattern)**

Do yourself

## Formative Assessment-3

**A. Answer the following questions orally : 2**

**Ans.**
1. Johann Wilhelm Ritter will increase electrolysis.
2. Two
3. Rolling frictions is put to good use because slinding an objects is more difficult than rolling it.
4. Differences between noise and music :

| Music | Noise |
|---|---|
| (i) It is a pleasant sound. | (i) It is an unwanted sound. |
| (ii) It is produced by systematic vibration. | (ii) It is produced by irregular vibrations. |

**B. Multiple Choice Questions (MCQs) :**

**Tick (✓) the correct answer : 4**

**Ans.** 1. (b) 2. (c) 3. (b) 4. (c)

**C. Fill in the blanks :**

**Ans.**
1. The impurities that settle down below the anode are known as **gang**.
2. To move a loaded trolley we have to **roll** it.
3. Sole of the shoe is usually grooved to **reduce** friction.
4. The frequency of a sound determines its **pitch**.

**D. Write True or False for the following statements : 4**

**Ans.** 1. True 2. False 3. False 4. True

**E. Match the following :**

**Ans.**

| COLUMN-I | COLUMN-II | COLUMN-III |
|---|---|---|
| 1. Friction | (a) Wear and tear | (i) Lubrication |
| 2. Desirable friction | (b) Opposes motion | (ii) Loss of energy |
| 3. Undesirable | (c) Streamlining | (iii) Writing on paper |
| 4. Decreasing friction | (d) Gripping objects | (iv) Helps motion |

**F. Tick (✓) the odd-one out giving reason : 4**

**Ans.**
1. Larynx, eardrum, auditory nerve. ✓
2. Vocal cords, windpipe, pinna. ✓

# Lightning

13

## Exercise

### Section 1 : Formative Assessment (CCE Pattern)

**A. Answer the following questions orally :**

**Ans.**
1. The process of transfer of charges from a charged object to the Earth is called earthing or grounding.
2. We should not stand under a tree during lightning because the tree can catch fire.
3. Benjamin Franklin is famous for his kite and key experiments.
4. Lightning conductor is the device which saves building from lightning.

**B. Multiple Choice Questions (MCQs) :**

**Tick (✓) the correct answers :**

**Ans.** 1. (a) 2. (c) 3. (d) 4. (b) 5. (c)

**C. Fill in the blanks :**

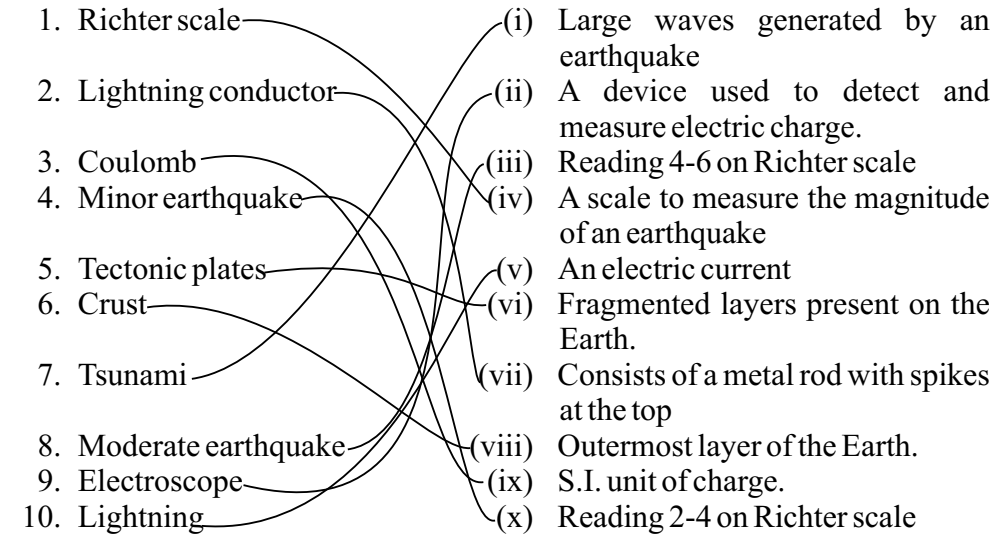
**Ans.**
1. The flow of electricity from clouds to the ground is called **earthing**.
2. A **lightning conductor** protects a building from the harmful effects of lightning.
3. The metal leaves of an electroscope move away from each other due to **discharge**.
4. A positively charged object has a deficiency of **electrones**.
5. The place where two plates of the Earth meet together is called a _____.
6. The device which can detect and record seismic waves is called a **seismograph**.
7. Earthquakes of magnitudes 0-3 on Richter scale are completely **minor**.
8. Moving **electrones** constitute electric current.

**D. Write True or False for the following statements :**

**Ans.** 1. False 2. False 3. False 4. False 5. True 6. True

**E. Match the following :**

**Ans.**




## Section 2 : Summative Assessment (CCE Pattern)

**F. Define the following terms :**

**Ans.**

1. Lightning : Sudden electric from one closed to another or from the clouds to the Earth.
2. Electroscope : A device called electroscope which is used to detect and measure electric charge.
3. Lightning conductor : Lightning conductor are installed on tall buildings, poles, etc. to protect them from lightning.
4. Epicentre : It is the point vertically above the seismic focus.
5. Richter Scale : The scale which is used to measure the measure the magnitude of an earthquake.

**G. Differentiate between the following :**

**Ans.**

1. Electric charge : Electric charge is the electric energy produced in a body.
   Electric current : The flow of charges constitutes an electrical current.
2. Ground waves caused due to earthquakes may cause landslide and waves caused due to a underground nuclear test cause less damage than earthquakes.

**H. Answer the following question in short :**

**Ans.**

1. In the normal stage, an atom has an equal number of electrons and protons and it carries no charge so it is neutral.
2. In the activity, the two foils repel each other because they receive the same charge from the plastic scale. Now touch the end of the paper clip slightly with your hand. You will observe that they will come back to their original state. Repeat charging of foil strips and touching the paper clip with your hand. You will find that every time you touch the paper clip, the foil strips lose charge and come back to their original state. This happens

because the strips lose charge to the Earth through your body as human body is a good conductor. We can also say that foil strips get discharged on touching. This process of transfer of charges from a charged object to the Earth is called earthing or grounding.

3. Earthquakes generate seismic waves which can be detected with a sensitive instrument called a seismograph. Advances in seismograph technology have increased our understanding of both earthquakes and the Earth itself.

4.

| Magnitude on the Rich -ter scale | Type | Effects | Frequency of occurrence |
|---|---|---|---|
| < 2.0 | Micro | Not felt. | About 8,000 per day |
| 2.0-2.9 | Minor | Not felt, but recorded. | About 1,000 per day |
| 3.0-3.9 | Minor | Often felt, but rarely causes damage. | 49,000 per year (est.) |
| 4.0-4.9 | Light | Noticeable shaking of indoor items, rattling noises, significant damage likely. | 6,200 per year (est.) |
| 5.0-5.9 | Moderate | can cause major damage to poorly constructed build -ings over small regions. At most slight damage to well-designed buildings. | 800 per year |
| 6.0-6.9 | Strong | Can be destructive in areas upto about 100 miles across in populated area. | 120 per year |
| 7.0-7.9 | Major | Can causes serious damage over large areas. | 18 per year |
| 8.0-8.9 | Great | Can cause serious damage in areas several hundred miles across. | 1 per year |
| 9.0-9.9 | Great | Devastating in areas several thousand miles across. | 1 per 20 years |

| | | | |
|---|---|---|---|
| 10+ | Great | Never recorded. | Extermely rare (unknown) |

**I. Answer the following question in detail :**

**Ans.** 1. We already know that atoms are made of protons, neutrons and electrons. Protons are positively charged, neutrons have no charge and electrons are negatively charged. In the normal stage, an atom has an equal number of electrons and protons and it carries no charge. Hence, it is electrically neutral. However, any disbalance in the number of protons and electrons creates an electric charge. The charge on the body is positive if the number of protons exceeds the number of electrons. If the number of protons is lesser than the number of electrons, the charge on the body is negative.

2. The way to protect a building that is out in the open such as those on farms is to attach a lightning rod to the building. It is a sharp pointed metal rod on the top of a house or building that runs down into the ground.
When lightning strikes near the building, it would hit the highest part of the structure, which is the lightning rod. Since the rod is made of metal, the current would quickly flow through the rod into the ground, where it would be dissipated. In this way, damage to the house would be minimal.

3. Lightning is an electric current. Within a thundercloud way up in the sky, many small bits of ice (frozen raindrops) bump into each other as they move around in the air. All of these collisions create an electric charge. After a while, the whole cloud fills up with electrical charges. The positive charges or protons form at the top of the cloud and the negative charges or electrons form at the bottom of the cloud. Since opposite charges attract, that cause a positive charge to build up on the ground beneath the cloud. The ground's electrical charge concentrates around anything that sticks up, such as mountains, people, or single trees.
The charge coming up from these points eventually connects with a charge reaching down from the clouds and - zap - lightning strikes!
Lightning can occur between a charged cloud and the Earth also. In some neutral clouds the positive charged particles stay light and rise to the top of the cloud. The negative charged particles get heavier and collect at the bottom of the cloud. The negatively charged bottoms of the clouds induce positive charge on the ground below them. When these charges become powerful enough, they discharge, causing a stroke of lightning.
Lightning can be defined as electric discharge between rain clouds or between a rain cloud and the Earth.

4. We cannot prevent lightning from striking tall buildings, trees, poles, etc. But we can surely adopt some measures to protect our buildings from lightning. This can be done by installing a lightning conductor. This was developed by Benjamin Franklin.
A lightning conductor consists of a long metal rod having sharp, pointed

spikes at its upper end. Generally, the metal rod is made of copper. The spikes at the upper end of the rod are fixed at some higher point from the building. The metal rod runs down along the height of the building (outside the structure). The lower end of the rod is attached to a large, metal (copper) plate buried deep inside the Earth.

Whenever lightning strikes a building, it is captured by the sharp spikes. Immediately, an opposite charge is induced by the spikes. The electric discharge which is developed, flows through the rod and reaches the Earth, hence saving the building from possible damage. In this way, a lightning conductor protects our houses and buildings.

5. The Earth consists of three distinct layers. These parts are
   (i) The crust (ii) The mantle (iii) The core

   The Crust : It is the outermost layer of the Earth with a non-uniform thickness of 6 kilometres to 40 kilometres. (Under land the thickness of the Earth is 20 kilometres to 40 kilometres, whereas under the ocean the crust is only 10 kilometres thick).

   The Mantle : It extends to a depth of 2800 kilometres below the crust, the central region between the core and the crust is called mantle. As the depth increases, the pressure inside the mantle increases. Due to extreme temperature and pressure, some of the rocks near the bottom of the mantle melt and remain as a thick dense fluid.

   The Core : It is the innermost part of the Earth and extends to a depth of around 3500 kilometre. The core itself can be divided into two parts, the outer core (2300 kilometre) of molten iron and nickel and the inner solid core (1200 km) of highly compressed iron and nickel in solid form.
6. The crust of the Earth is throughout not in one layer. In fact, it consists of many layers, one above the other. The layers are fragmented. Each fragment is called a tectonic plate. Earthquakes happen along the edge of the tectonic plates. The plates move and push against each other. Sometimes these plates snap at the weakest point along a fault line. Big shock waves go out from the focus where the shock waves start. This can be up to 700 km underground. The epicentre is on the surface right above the focus. Some of the major earth's tectonic plates are as shown.
7. Steps to protect during earthquake : If you are indoor during an earthquake, drop, cover and hold on. Get under a desk, table or bench. Hold on to one of the legs and cover your eyes. If there's no table or desk nearby, sit down against an interior wall. An interior wall is less likely to collapse than a wall on the outside shell of the building.

   Pick a safe place where things will not fall on you, away from windows, bookcases, or tall, heavy furniture.

   It is dangerous to run outside when an earthquake happens because bricks, roofing, and other materials may fall from buildings during and immediately following earthquakes, injuring persons near the building.

Wait in your safe place until the shaking stops, then check to see if you are hurt. You will be better able to help others if you take care of yourself first, then check the people around you.

Move carefully and watch out for things that have fallen or broken, creating hazards. Be ready for additional earthquakes called "aftershocks".

Be on the lookout for fires. Fire is the most common earthquake related hazard, due to broken gas lines, damaged electrical lines or appliances, and previously contained fires or sparks being released.

If you must leave a building after the shaking stops, use the stairs, not the elevator. Earthquakes can cause fire alarms and fire sprinklers to go off. You will not be certain whether there is a real threat of fire. As a precaution, use the stairs.

If you are outside in an earthquake, stay outside. Move away from buildings, trees, streetlights, and power lines. crouch down and cover you head. Many injuries occur within 10 feet of the entrance to buildings. Bricks, roofing, and other materials can fall from buildings, injuring persons nearby. Trees, streetlights, and power lines may also fall, causing damage or injury.

If you are in a car or a bus, do not come out. Ask the driver to drive slowly to a clear spot. Do not come out till the tremors stop.

8. Hazards of Earthquakes :

(i) Earthquake can damage the buildings.

(ii) It can be destructive for the properties.

(iii) Earthquake may be the cause of death of many people and animals.

(iv) It may damage the infrastructure of the area.

**Section III : Activities Assessment (CCE Pattern)**

Do yourself

# Light and Vision

14

**Exercise**

**Section 1 : Formative Assessment (CCE Pattern)**

**A. Answer the following questions orally :**

**Ans.** 1. We observe regular reflection in rippling water.

2. Beam of light : Beam of light is a group of light rays coming from the same source in the same direction.

3. The three necessary conditions four us to be able to see :

(i) Persistence of vision (ii) Accomodation
(iii) Near point of eye

4. There are 63 symbols or characters in Braille. Each symbol is represented by a cell which consists of two vertical rows of three dots.

## B. Multiple Choice Questions (MCQs) :

**Tick (✓) the correct answers :**

**Ans.** 1. (d) 2. (d) 3. (b) 4. (a)

## C. Fill in the blanks :

**Ans.**
1. The bouncing back of the light in the same medium is called **reflection**.
2. In regular reflection, the reflected rays remain **equal** to each other.
3. The leading cause of blindness is **damage of ratina**.
4. The coloured, disc-shaped diaphragm in the eye is called the **iris**.
5. The set of colours formed on splitting of white light is called the **dispersion** of white light.

## D. Match the following :

**Ans.**

| | |
|---|---|
| 1. Optic nerve | (i) Tape recorders, compact discs (CDs) |
| 2. VIBGYOR | (ii) The angle between the incident ray and the normal |
| 3. Cataract | (iii) Carries visual messages to the brain |
| 4. Auditory aids | (iv) Produced when white light splits |
| 5. Divergent beam of light | (v) Eye lens become cloudy or opaque |

## E. Tick (✓) the odd-one giving reason :

**Ans.**
1. Diffused reflection, Regular reflection, formation of image. ✓
2. Kaleidoscope, Periscope, Mirror. ✓
3. Cones, Retina, Iris. ✓
4. Iris, Cornea, Retina. ✓

## Section 2 : Summative Assessment (CCE Pattern)

## F. Define the following terms :

**Ans.**
1. Light : A form of energy which gives us the sensation of seeing objects.
2. Reflected ray : The ray of light that gets reflected from the mirror.
3. Angle of reflection : The angle formed between the reflected ray and the normal.
4. Accomodation : The ability of the eye to alter the focal length of its lens so that it can clearly see all objects with in a certain range.
5. Visually challenged people : People whose vision is extremely poor or they are blind.

## G. Answer the following questions in short :

**Ans.** 1. A shiny metal utemile forms an image, but the image is not as dear as that

formed by a mirror because the surface of shiny metal utemile reflects the light irregularly.

2. Laws of Reflection
   When light falls on a plane smooth surface, it follows certain laws, called the laws of reflection. There are two laws of reflection :
   When a ray of light falls on a plane smooth surface, it reflects in the same medium in such a way that the angle of reflection is just as the angle of incidence.
   The incident ray, the reflected ray and normal always lie in the same plane.
3. The image formed by a plane mirror is virtual, erect, laterally inverted, of the same size as the object, and at the same distance from the mirror as the object.
4. In a plane mirror the left of the object appears to be the right of the image and vice versa. This phenomenon is called Lateral Inversion.
5. The light entering the eye is controlled by the iris.

**H. Answer the following questions in detail :**

**Ans.** 1. Aim : To verify the laws of reflection.
Procedure : Take a plane mirror and fix it in a slit made in a small thermocol cube, so that the mirror can stand vertically straight on a table. Take a 5 cm × 5 cm piece of black chart paper. Make a 1 mm wide and 1 cm long slit in the centre of the black paper and use this to cover the front of a torch. Now, when you light the torch, light will come out only from the slit on the black paper. Now, take an A-4 size of white paper, mark a 10 cm long straight line in its centre, with a sharp pencil. Shade one side of the line. This line will represent the mirror. Place the plane mirror just over this line. Keep the torch in front of the mirror, at an angle, as shown in the figure and light it. Very carefully, mark the positions of the incident light and the reflected light. Put off the torch and remove the torch and mirror.
With the help of a scale and pencil, produce the incident ray (position of incident light) and the reflected ray (position of the reflected light) to make them meet at the line representing the mirror. The point where the incident and reflected rays meet at the line representing the mirror, is called the point of incidence and also, the point of reflection. Draw a perpendicular to the line of mirror, at the point of incidence. This is the normal. Take a protractor and measure the angle of incidence (angle between the incident ray and the normal). Also, measure the angle of reflection (the angle between the reflected ray and the normal). Compare the measurements of the angle of incidence and the angle of reflection. Do you find them equal?
The fact that you could trace and draw the incident ray, the normal and the reflected ray on the same sheet of paper, verifies the first law of

reflection.
The equal measures of the angles of incidence and reflection verifies the second law of reflection.

2. Structure of the Eye
The eye is enclosed in a nearly spherical eyeball. A protective white membrane called the sclera covers most of the eyeball. The eyeball has a small bulge at the front, which has a transparent membrane over it, called the cornea. Behind the cornea lies a coloured, disc-shaped diaphragm called the iris. The iris has a small opening called the pupil. Light entering through the pupil falls on a flexible lens, which is attached to a set of ciliary muscles. The space in front of the lens is filled with a watery fluid called the aqueous humour. And the space behind the lens is filled with a jellylike fluid called the vitreous humour. Light entering the eye finally falls on the retina, which is at the back of the eyeball. There an image is formed.
3. Vitamin A helps in protecting us against the eye diseases. Milk, butter, curd, egg, carrot, papaya, fish oil, spinach, mango are the good sources of vitamin A. Lack of vitamin A may cause night blindness.

**Section III : Activities Assessment (CCE Pattern)**

Do yourself

# Heavenly Bodies

15

**Exercise**

**Section 1 : Formative Assessment (CCE Pattern)**

**A. Answer the following questions orally :**

**Ans.**
1. The Sun is made of many gases.
2. The inner planets are so dense because there planets consist of a thin rockey crust. They have a mantle rich in iron and magnesium, have a core of molten metal, have a thin atmosphere.
3. The rings around the Saturn are well developed but thin. They extend to about 140,000 km from the surface of Saturn. They are not visible with the naked eyes.
4. Stars appear to move from east to west because the Earth rotates on its axis from west to east.

**B. Multiple Choice Questions (MCQs) :**

**Tick (✓) the correct answers :**

**Ans.** 1. (a) 2. (c) 3. (d) 4. (a) 5. (c)

**C. Fill in the blanks :**

**Ans.**
1. **Carriopeia** is a constellation with a group of five bright stars arranged in the form of a W or an M.
2. The large red spot on the surface of Jupiter is actually a giant **storm**.
3. The **Sun** is the source of almost all energy on the Earth.
4. **Celestial** bodies are also called heavenly bodies.
5. Asteroids can only be seen through a powerful **telescopes**.

**D. Write True or False for the following statements :**

**Ans.** 1. True 2. True 3. True 4. False
5. True 6. False 7. True 8. False

**E. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Planet having density less than that of water | (i) the Earth |
| 2. A star | (ii) Uranus |
| 3. A constellation resembling a hunter | (iii) Ursa Major |
| 4. Constellation | (iv) Orion |
| 5. Planet that rolls around the Sun | (v) Saturn |
| 6. A planet | (vi) Pole star |

## Section 2 : Summative Assessment (CCE Pattern)

**F. Define the following :**

**Ans.**
1. Heavenly bodies : The Sun, the moon, stars, planets, comets and meteors are all called heavenly or celestial bodies.
2. Asteroids : Large number of small objects revolving around the Sun between the orbit of Mars and Jupiter.
3. Meteors : A small heavenly object moving around the Sun.
4. Meteorite : A meteor which enters into the Earth's atmosphere.
5. Constellations : A group of star which appear in the form of closed groups and form recognizable shape and patterns.

**G. Answer the following questions in short :**

**Ans.**
1. Venus is visible in the North as an evening star.
2. When a meteor enters Earth's atmosphere, the object heats up from friction and starts to glow. As it falls further into denser atmosphere, it begins to trail hot gases and burn intensely for a very short time. When it becomes visible from the Earth's surface it appears as a streak of light and is now called a Meteor.
3. Planets are seen only in night because the Sun sets and the planets reflect the light of the Sun.
4. We always see the same face of the moon because the half of the Moon's face reflects the light of the Sun.

5. To show the position of the pole star.
   Procedure : Take an umbrella and open it. Make about 15-20 stars out of white paper. Paste one of these paper stars very close to the central rod of the umbrella and others at different places on the cloth near the end of each spoke. Now holding the umbrella, rotate it in your hand. Observe the starts on the umbrella. Do you find a star which does not seem to move? Where is this star located? If there were a star located exactly on a line joining the axis of the earth to the sky, could this star also be stationary? This stationary star is the polar star

**H. Answer the following question in detail :**

**Ans.** 1. The Moon's appearance from the Earth changes during its monthly journey; it has different phases. Moon does not give off light of its own, but shines by reflecting sunlight. As it travels around the Earth, we see more or less of its surface lit up. We see the moon because the sunlight falling on it gets reflected towards us. We, therefore, see only that part of the moon, from which the light of the Sun is reflected towards us. It all depends upon the position of the moon in relation to the Sun. From the Earth it appears that the moon is changing its shapes.
   Thus the moon waxes (lit up portion increases in size) and wanes (lit up portion decreases in size) as it moves around the Earth. This waxing and waning of the moon is called phases of the moon.
   In the New phase (New Moon), the Moon is between the Sun and the Earth and the side
   facing the Earth, being unlit, is not visible from the Earth.
   A thin 'new' crescent appears along one edge as it travels in its orbit, gradually increasing until at the First Quarter phase; half of the Moon's face can be seen.
   At Full Moon it is on the opposite side of the Earth from the Sun and appears as a complete circle. Thereafter it wanes through the Last Quarter until only the old crescent can be seen.
2. In the New Phase (New Moon), the moon is between the Sun and the Earth and the ride facing the Earth, being unlit, is not visible from the Earth.
   At Full Moon it is on the opposite side of the Earth from the Sun and appears as a complete circle. There after it wanes through the Last Quarter until only the old crescent can be seen.
3. All the stars in the Universe do not move. All the stars appears, except the pole star, to move from east to west. This is because the Earth rotates on its axis from west to east. The stars rise at the same places but not always set at the same time.
4. The name Ôplanet' is derived from a Greek word meaning wanderer. There are eight planets in our solar system. Mercury is nearest to the Sun and Neptune the farthest. The planets revolve around the Sun in elliptical

orbits.

Planets are classified in two ways :

(i) On the basis of their position with respect to the Earth.

(ii) On the basis of their features.

Inferior planets : Those planets whose orbit lies within the orbit of the Earth are called inferior planets. Mercury and Venus which lie within the orbits of the Earth are called inferior planets.

Superior planets : Those planets whose orbits are bigger than that of the Earth are called superior planets. Mars, Jupiter, Saturn, Uranus and Neptune which lie outside the orbit of the Earth are called Superior planets.

Planets are also classified as JOVIAN (Jupiter like) and TERRESTRIAL (Earth like).

Jovian, Planets

The planets which lie outside the orbit of Mars like Jupiter, Saturn, Uranus and Neptune are called Jovian planets because of their similarity of structure with that of Jupiter. These planets are much farther away than the terrestrial planets. Essentially these planets consist of gases like hydrogen and helium i.e., they are gaseous planets, are large, have low density, have a large number of satellites and have rings around them.

Terrestrial Planets

The four nearest planets to the Sun are called terrestrial planets or Earth like planets because of their similarity of structure with that of Earth. These planets are Mercury, Venus, Earth and Mars. Essentially these planets consist of a thin rocky crust, are dense, have a mantle rich in iron and magnesium, have a core of molten metal, have a thin atmosphere and have very few satellites.

A planet revolves around the Sun in a definite path called an orbit. The time taken by a planet to complete one revolution is called its period of revolution. For our Earth it is one year. The period of revolution increases as the distance of the planet from the Sun increases.

Planets also rotate on their own axis like a top. The time taken by a planet to complete one rotation is called its period of rotation. For the Earth it is about 24 hours. All planets except Venus and Uranus rotate about their axis from west to east. Venus and Uranus rotate about their axis from East to West. This east to west rotation is called retrograde.

5. GROUP OF STARS; CONSTELLATIONS

When we look at the night sky, we can easily tell the difference between a planet and star. The planets present a definite globe like disc. Stars appear as twinkle points of light. Early man found he could pick out shapes and patterns in the heavens which looked like things around him. A group of stars reminded him of a hunter, another of a lion. The Romans gave these stars patterns, which we now call constellations, they give them Latin

names with which we are not familiar. The stars which appear in the form of closed groups and form recognizable shape and patterns are known as constellations. About 88 constellations (Indian name nakshatras) are known so far. These constellations are assigned names signifying, animals, human beings or some other objects, which it appears to resemble.

Some of the important constellations are :

| | | |
|---|---|---|
| 1. | Orion (or Hunter) | Vyadha or Mirga |
| 2. | Scorpio | Vrichika |
| 3. | Ursa Major (or great bear) | Saptarishi |
| 4. | Ursa Minor (or little bear) | Laghu Saptarishi |
| 5. | Pleiades | Kruttika |
| 6. | Cassiopeia | Sarmishtha |

The Sun crosses through 12 of these constellations. These 12 constellations are called the Signs of Zodiac. These constellations are

| | | | | | |
|---|---|---|---|---|---|
| (i) | Aries | (ii) | Taurus | (iii) | Gemini |
| (iv) | Cancer | (v) | Leo | (vi) | Virgo |
| (vii) | Libra | (viii) | Scorpio | (ix) | Sagittarius |
| (x) | Capricorn | (xi) | Aquarius | (xii) | Pisces |

**Section III : Activities Assessment (CCE Pattern)**

Do yourself

Do yourself

**Unit 7 : Natural Resources**

# 16 Fossil Fuels

**Exercise**

**Section 1 : Formative Assessment (CCE Pattern)**

**A. Answer the following questions orally :**

**Ans.**

1. Fossil fuels : Fossil fuels, primarily coal and petroleum are formed from the dead remains of plant and animals by the exposure to heat and pressure when buried inside the Earth's crust over millions of years.
2. Coal : Coal is called a fossil fuel because it was formed from the remains of vegetation that grow as long as 400 million years ago.
3. Hydrocarbons decomposes into carbon and hydrogen on strong heating.
4. Judicious use of fossil fuels is necessary because these fuels are limited on the Earth.

## B. Multiple Choice Questions (MCQs) :

**Tick (✓) the correct answers :**

**Ans.** 1. (c) 2. (d) 3. (c) 4. (d)

## C. Fill in the blanks :

**Ans.**
1. **Coal** is an exhaustible natural resource.
2. **Sunlight** is an inexhaustible natural resource.
3. **Coal, liquid petroleum** and **natural gas** are fossil fuels.
4. The slow conversion of dead trees and other plants into coal is called **carbonisation**.
5. **Recycling** of paper is the process of recovering waste paper and remaking it into new **paper** products.
6. The various constituents of petroleum are separated by a process called **fractional distillation**.
7. Paraffin wax is used for making **blocks**.
8. The main gas found in natural gas is **hydrogens**.
9. The full form of CNG is **Compressed Natural Gas**.
10. **Hydrogen** gas was used for street lighting for many years.

## D. Write True or False for the following statements :

**Ans.** 1. True 2. False 3. True 4. False 5. False

## E. Match the correct following :

**Ans.**

| | |
|---|---|
| 1. Light oil | (i) Motor fuel |
| 2. Gasoline | (ii) Fuel for heavy motor vehicles |
| 3. Residue | (iii) Domestic fuel, jet engine fuel |
| 4. Kerosene | (iv) Lubricating machinery |
| 5. Heavy oil | (v) Used for obtaining organic chemicals |

## Section 2 : Summative Assessment (CCE Pattern)

## F. Define the following :

**Ans.**
1. Natural resources : The resources provided by the nature are called natural resources.
2. Exhaustible natural resources : On the other hand, some resources are present in limited amount in nature and cannot be continually replenished. Such resources are likely to be exhausted by various human activities and are called exhaustible natural resources. Petroleum, coal, natural gas, minerals, forests are exhaustible natural resources.
3. Inexhaustible natural resources : Some resources are present in unlimited amount in nature and can be continually replenished. Such resources are not likely to be exhausted by various human activities and are called inexhaustible natural resources. Air, sunlight, water and soil are inexhaustible natural resources.
4. Fossil fuels : Fossil fuels are the fuels derived from dead remains of living matter when buried inside Earth for millions of years.

5. Conservation of energy : Saving the fuels and fossil fuels is called conservation of energy.

**G. Answer the following questions in short :**

**Ans.** 1. Peat, lignite, bituminous and anthracite are obtained on the destructive distillation of coal.

2. Renewable resources can be obtained again but non-renewable resources cannot be obtained again.

3. The benefits of using energy wisely :

(i) It saves the fossil fuels or fuels for future use

(ii) It saves money

(iii) It creates less pollution.

4. **Fossil Fuels** **Places**

(a) Coal ——— Jharkhand, Odisha, Madhya Pradesh

(b) Petroleum ——— Mumbai High

(c) Natural Gas ——— Assam

5. Recycling of paper is the process of recovering waste paper and remaking it into new paper products.

Paper recycling saves trees and minimizes pollution. It also helps to reduce the problem of waste by utilizing waste material like used paper, cotton rags and unwanted biomass. The major steps in recycling of paper have been summarized below.

(i) Sorting : Paper is first sorted and any plastic, metallic or other contaminants are removed from it.

(ii) Making pulp : The sorted paper is sent to the pulper where it is heated with warm water and chemicals. Here the paper breaks down into tiny pieces and strands of cellulose fibres which are free from lignin.

(iii) Filtering and deinking : The pulp obtained from the pulper has only 1.0 to 1.5% fibre. Kaolin and other additives are added to the pulp to enhance the properties of paper. The pulp is then filtered through a number of sieves to remove impurities such as coatings, contaminants, etc. Sometime, the pulp is then bleached to make the end product white.

(iv) Rolling and drying : The pulp, now free from any contaminant, is mixed with wood fibre also called virgin fibre to provide strength and smoothness. It is then passed through wire screens where water is drained out and sheets of paper start forming. These sheets are passed through a series of rollers and dryers which squeeze, press and smoothen the watery sheets to get the desired finish.

**H. Answer the following questions in detail.**

**Ans.** 1. Fossil fuels, primarily coal and petroleum (liquid petroleum or natural gas), are formed from the dead remains of plants and animals by the exposure to heat and pressure when buried inside the Earth's crust over millions of years. Modern large-scale industrial development is based on

the use of fossil fuels as well as the combustion of wood or coal for heat. Fossil fuels are used for various purposes like cooking food, generating electricity in industries, running automobile engines, etc.

The various fossil fuels are coal, petroleum and natural gas.

2. DESTRUCTIVE DISTILLATION OF COAL

The destructive distillation of coal is done by heating coal strongly at about 1000°C in the absence of air. It breaks coal into its constituents and various useful inorganic and organic products are obtained which include the following.

1. Coke
2. Coal gas
3. Coal tar
4. Ammonium compounds

Coke

The black residue left after the destructive distillation of coal is called coke. It is a tough, porous, black substance and almost 98 per cent pure. It is used as a fuel and burns without smoke. It is also used in the extraction of many metals and for manufacturing steel. It is also used in producing water gas (a mixture of hydrogen and carbon monoxide gases) and producer gas (a mixture of nitrogen and carbon monoxide gases).

Coal Gas

The gas obtained on destructive distillation of coal is called coal gas. It is a mixture of hydrogen, methane, carbon monoxide and other gases. It can be used for domestic cooking and lighting, but is not very widely used nowadays.

Coal Tar

The thick black coloured liquid which is obtained from coal on its destructive distillation is called coal tar. It has an unpleasant odour. It is a mixture of several carbon compounds. Coal tar can be separated by fractional distillation into many chemical substances like benzen, toluene, napthalene, phenol, etc., which are used to make medicines, dyes, explosives, paints, varnishes, plastics, synthetic fibres, pesticides, perfumes, etc.

Ammonium Compounds

The volatile compounds formed by the destructive distillation of coal, which when dissolved in water forms liquor ammonia and are called ammonium compounds. They are used for making nitrogenous fertilisers.

3. With rapid growth and development, the requirement of energy has increased by many folds. The increasing consumption of energy has a harmful impact on the environment and has led to an energy crisis. Some of the main causes for energy crisis are given below.

1. The tremendous increase in population.
2. The growth and development demands more energy since all big industries, refineries, etc., need energy to run.

3. The new and fast means of transportation like trians, airplanes, ships, vehicles, etc., consume a huge amount of energy.
4. The new shopping malls, IT parks, etc., require more energy.
5. We have developed many gadgets for our comfort like refrigerators, air conditioners, washing machines, televisions, etc., that consume a large amount of energy.
6. The new means of agriculture like tube wells, tractors, saw mills, etc, also consume energy.

All the above and many more are the reasons that are contributing to the energy crisis. Electricity is the main form in which energy is consumed. A large amount of fuel gets consumed for the production of electricity. The world is today facing a huge shortage of electricity which is limiting our growth and development.

4. In India, the Petroleum Conservation Research Association (PCRA) is the agency which takes the responsibility of making people aware about saving petrol, diesel and natural gas/LPG. Since the energy conserved is energy produced, it is very essential for all of us to understand the importance and need of saving fossil fuels from which we obtain our energy.

We can follow the following measures to save energy.

1. Use efficient smokeless chulhas in houses instead of using traditional methods of cooking.
2. Soak pulses overnight or for some time before cooking, and perform cooking with covered vessels.
3. As far as possible, try to use public transport instead of private vehicles.
4. Try to increase the use of pressure cookers for cooking.
5. Use room coolers, air conditioners, heaters, geysers, etc., only when required.
6. Switch off lights, fans and other electrical appliances when not in use.
7. Drive at constant and moderate speed as far as possible. A speed of 45-50 km per hour gives the best fuel economy.
8. Switch off the engine while waiting for somebody and at the traffic signals.

5. Natural gas, a fossil fuel, is often found in association with petroleum. It contains mainly methane and is used as domestic and industrial fuel. Compressed Natural gas (CNG) is also used as motor fuel as it is comparatively clean and does not cause pollution. It is supplied directly from the gas fields through pipelines. Such a network of pipelines exists in Vadodara Delhi.

Advantages of Natural Gas

Natural gas has many advantages over the traditional fuels. Some of them are listed below :

1. Being a gas, it is a cleaner fuel and causes less pollution.
2. Its calorific value is higher than the other fuels.
3. It can be easily transported through pipelines to homes and industries.
4. Its by-products are not poisonous.
5. It is a starting material for the preparation of many other substances like chemicals and fertilisers.
6. The Compressed Natural Gas (CNG) is used as fuel for generating power and running vehicles.

Uses of Natural Gas

1. CNG is used for power generation.
2. CNG is used as a fuel for vehicles, since it causes less pollution.
3. It is used as a domestic and industrial fuel.
4. It is the source of hydrogen gas needed in fertiliser industry and for many other chemicals.

**Section III : Activities Assessment (CCE Pattern)**

Do yourself

Do yourself

Do yourself

# Pollution of Air and Water 17

**Exercise**

**Section 1 : Formative Assessment (CCE Pattern)**

**A. Answer the following questions orally :**

**Ans.**

1. Carbon monoxide is mainly produced by burning fuels in industries, automobiles, factories etc. carbon monoxide is a very poisonous gas. When inhaled, it combines with the haemoglobin present in the blood and lowers the amount of oxygen that enters the blood. It slows our reflexes and too much carbon monoxide can cause death.
2. Chlorofluorocarbons (CFCs)
   These are the gases which are released from air conditioners, refrigerators, aerosol sprays, etc. CFC's on being released into the air rise to the stratosphere (upper layer of the atmosphere). Here they come in contact with other gases and damage the ozone layer. This allows harmful ultraviolet rays to reach the Earth's surface. This can lead to skin cancer, diseases of the eye and can even cause damage to plants.
3. Overuse of fertilizers leads to Eutrophication. The excess fertilizers used

by farmers would be carried by rain or irrigation water to neraby lakes and rivers. The presence of fertilizers in these water bodies would promote profuse growth of algae. The algae would use most of the dissolved oxygen in water thereby depriving the aquatic animals the life supporting oxygen. This would lead to their death. This is known as Eutrophication.

4. By putting the crystans of alum into the water of the well and the pond, warter is purified.

**B. Multiple Choice Questions (MCQs) :**

**Tick (✓) the correct answers :**

**Ans.** 1. (a) 2. (a) 3. (b) 4. (d)

**C. Fill in the blanks :**

**Ans.**
1. Excessive use of **fertilizers** leads to Eutrophication.
2. Nitrogen dioxide in the air contributes in the formation of **smog**.
3. BOD stands for **Biochemical** oxygen **Demand**.
4. Water which is suitable for drinking is called **potable water**.
5. Water pollutants are classified into **chemical, physical** and **biological**.
6. The ultraviolet radiation from the Sun is prevented from entering the Earth by **the ozone layer**.

**D. Write True or False for the following statements :**

**Ans.** 1. False 2. True 3. False 4. True

**E. Tick the odd-one out giving reason :**

**Ans.**
1. Water pollution, Air pollution, Soil pollution, Home pollution.
2. Green House, White house, Global warming, Trapping of heat.
3. Smoke, Smog, Dust, Oxygen.
4. Oxygen, Carbon dioxide, Methane, Nitrogen, Sulphur dioxide.

## Section 2 : Summative Assessment (CCE Pattern)

**F. Define the following :**

**Ans.**
1. Air pollution : Contamination of air with smoke, dust and harmful gases
2. Greenhouse effect : The phenomenon of trapping of the Sun's radiation by the gases present in the earth's atmosphere.
3. Global warming : The increase in average temperature of the Earth's atmosphere that causes corresponding changes in climate
4. Water pollution : The contamination of water with unwanted and harmful substances
5. Potable water : The water which is suitable for drinking.

**G .Answer the following questions in short :**

**Ans.**
1. Sulphur dioxide is produced by the industries. Sulphur dioxide dissolves in rainwater causing acid rain. Acid rain may damage the beauty of movement like Taj Mahal.

2. Increasing carbon-dioxide in the air causes global warming.
3. Water gets contaminated due to :
   (a) Industrial wastes (b) Oil spills
   (c) Domestic waste and sewage (d) Water from mines
   (e) Agricultural waste
4. The increased levels of nutrients consume the oxygen dissolved in water. The aquatic plants and animals derive their oxygen from dissolved oxygen of water.
5. The waste released after production process may containacids, alkalies, salts, poisonous chemicals. This is called chemical contamination of water.

**H. Answer the following questions in detail :**

**Ans.** 1. The waste gases which is produced by the industrial firms are called green house gases. Carbon Monoxide, sulphur dioxide, nitrogen dioxide, carbon dioxide and chlorofluorocarbon are green house gases. Green house effect is a process in which the Earth's atmosphere traps the heat from the Sun and prevents it from escaping into the outer space, leading to the warming of the Earth's surface. Greenhouse effect has led to many adverse consequences such as global warming and increase in the sea level.

2. Global Warming : The increase in average temperature of the Earth's atmosphere that causes corresponding change in climate. Global warming is caused by the increased level of greenhouse gases. Increased level of carbondioxide is the major cause of global warming. It can be controlled by the following ways :
   (i) By checking of emission level of automobiles and industries.
   (ii) By using smokeless fuels such as LPG and CNG.
   (iii) By promoting afforestation, i.e. planting of trees.
   (iv) By using the catalytic converts in vehicles. It helps prevent the exhaust of toxic carbon monoxide and nitorgen dioxide by converting them into nitrogen and carbon dioxide.

3. POTABLE WATER
   The total water found on Earth, only 0.01% is available for human consumption. Sea water is salty and unfit for drinking and water in frozen form is not accessible either.
   Water which is suitable for drinking is called potable water. It should have the following characteristics.
   It should be colourless, odourless and transparent.
   It should have sufficient amounts of dissolved salts and oxygen in it.
   It should be free from harmful chemicals and micro-organisms.
   Generally, fresh and groundwater is fit for drinking, but with the growth in global population and industrialization, most of the fresh water resources have got contaminated due to pollutants and need purification

before consumption.

PURIFICATION OF WATER

The water we use at home is mainly supplied by rivers. This water is contaminated with suspended impurities like sand, silt and clay. Besides these impurities, salts and microorganisms are also found in the river water. Therefore, water must undergo a thorough cleansing process before being supplied to our homes. The cleansing process includes sedimentation, filtration and chlorination.

Impure water is purified on a large scale in treatment plants by both physical and chemical methods.

4. Physical Methods

The methods used to remove contaminants from water without any chemical treatment are known as physical methods. The physical methods of purifying water include boiling, sedimentation, decantation, filtration and distillation.

Boiling

The easiest way to purify water at home is by boiling. Water is boiled at 100°C for at least 10 minutes to kill the pathogens. This method destroys almost all the organic contaminants, except the tough cysts of bacteria which can be destroyed only by chemical treatment.

Sedimentation

Sedimentation is a natural process in which the water is allowed to stand undisturbed in large tanks called settling tanks for a few hours. This allows the mud, sand and other suspended particles to settle down. The solid particles that settle at the bottom of the tanks are called sediments. The clean or pure water is then transferred into a clean container.

Decantation

Decantation is the process of separating a solid from a liquid by transferring the liquid carefully from one container to another, leaving the solid behind.

Filtration

Insoluble impurities can be removed by passing the contaminated water through a filter paper. However, in treatment plants, water is allowed to pass through layers of sand and gravel in the sedimentation tanks. Impure water is also filtered through activated charcoal (a form of carbon having very fine pores) to get better quality water. Activated charcoal holds the impurities strongly.

Distillation

Distillation is one of the most effective methods of water purification. In distillation, the impure water is heated to its boiling point to convert it into steam. Then, the steam is allowed to pass through a condenser. The steam passes through the condenser, leaving the impurities behind. The steam condenses into water, which is fit for use.

Chemical Methods

The methods employed to purify water with the help of chemicals are known as chemical methods. The chemical methods of purification include chlorination and the use of electric water filters.

Electric water filters

Electric water filters have a micro porous filter, which separates the physical impurities present in the water such as dust, dirt and mud. The carbon lids fitted in the water filters absorb the organic impurities and improve the taste and odour of water. The treated water is finally treated by ultraviolet radiation to make it free of germs.

Chlorination

Chlorine tablets are used to purify water. It is effective against many pathogenic bacteria that spread harmful diseases. For instance, the use of chlorine has greatly reduced the instances of water-borne diseases because it is effective against almost all bacteria and viruses.

5. Today, the damaging effects of different air pollutants are well known. Therefore, it must be the duty of all individuals to try to control and prevent air pollution. Although it is a difficult task looking at the growing needs and amenities of modern life yet can be achieved by careful planning, use of better devices or means of transport and use of stuffs like air filters, scrubbers or electrostatic precipitators in industries. If they cannot prevent air pollution, they can at least help reduce the air pollution. The government of India has passed several rules recently to minimize air pollution. These are :

The promotion of afforestation, i.e. planting of trees.

The use of smokeless fuels such as LPG (liquefied petroleum gas) and CNG (compressed natural gas). In Delhi, the commercial vehicles have been ordered to use CNG as fuel to reduce air pollution.

The checking of emission level of automobiles and industries.

The establishment of the industries away from the residential areas to minimize the effect of air pollutants on public.

The use of nicely designed smokeless stoves for combusion of coal or kerosene oil.

The use of catalytic converters in vehicles. It helps prevent the exhaust of toxic carbon monoxide and nitrogen dioxide by converting them into nitrogen and carbon dioxide.

## Section III : Activities Assessment (CCE Pattern)

Do yourself

## Formative Assessment-2

**A. Answer the following questions orally :**

**Ans.** 1. Overuse of fertilizers leads to Eutrophication. The excess fertilizers used

by farmers would be carried by rain or irrigation water to neraby lakes and rivers. The presence of fertilizers in these water bodies would promote profuse growth of algae. The algae would use most of the dissolved oxygen in water thereby depriving the aquatic animals the life supporting oxygen. This would lead to their death. This is known as Eutrophication.

2. We should not stand under a tree during lightning because the tree can catch fire.
3. Beam of light : Beam of light is a group of light rays coming from the same source in the same direction.
4. Judicious use of fossil fuels is necessary because these fuels are limited on the Earth.

**B. Multiple Choice Questions (MCQs) :**

**Tick (✓) the correct answer : 4**

**Ans.** 1. (b) 2. (c) 3. (d) 4. (c)

**C. Fill in the blanks :**

**Ans.**
1. A positively charged object has a deficiency of **electrones**.
2. The slow conversion of dead trees and other plants into coal is called **carbonisation**.
3. Earthquake is a sudden **movement** of Earth's surface.
4. Potable water should have high **oxygen** and low **salt** and **impurities**.
5. Asteroids can only be seen through a powerful **telescopes**.

**D. Write True and False for the following statements :**

**Ans.** 1. True 2. False 3. True 4. True 5. False

**E. Match the following :**

**Ans.**

| COLUMN-I | | COLUMN-II | COLUMN-III |
|---|---|---|---|
| 1. Greenhouse effect | (i) | Ozone layer | (a) Using CNG |
| 2. Decreasing pollution | (ii) | Marble cancer | (b) Global warming |
| 3. Acid rain | (iii) | Carbon dioxide | (c) Man-made |
| 4. CFC | (iv) | Planting of trees | (d) Taj Mahal |

**F. Tick (✓) the odd-one out giving reason :**

**Ans.**
1. Orion, Ursa Major, Pluto. ✓
2. Earth, Jupiter, Pluto. ✓
3. Mercury, Venus, Uranus. ✓
4. Sirius, Venus, Pole star. ✓
5. Uranus, Venus, Jupiter. ✓

## Summative Assessment-2

**A. Name the following :**

**Ans.**
1. Contact force
2. Spring balance
3. Light
4. Electric current
5. Conecells
6. Meteor showers

**B. Define the following terms :**

**Ans.**
1. Acid rain : Do yourself
2. Carbonisation : Do yourself
3. Richter scale : The scale which is used to measure the measure the magnitude of an earthquake.
4. Constellations : A group of water which appear in the form of closed groups and form recognizable shape and patterns.
5. Multiple reflections : Do yourself
6. Lighting conductor : Lightning conductor are installed on the tall buildings, poles etc. to protect them from lightning.
7. Electroplating : Do yourself
8. Frequency : The number of oscillations or vibrations made by the vibrating body in one second.

**C. Differentiate between the following :**

**Ans.**
1. Contact force and Non-contact force : Do yourself
2. Music and Noise : Musical sound is a pleasant sound which is produced by systematic vibrations. While noise is an unwanted sound which is produced by irregular vibrations.
3. Regular reflection and Irregular reflection : Do yourself
4. A planet and A star : Do yourself

**D. Give reasons for the following :**

**Ans.** Do yourself

**E. Answer the following questions in short :**

**Ans.**
1. Do yourself
2. Lubricating is a common way to reduce friction by applying a lubricant such as oil, water or grease on the two surfaces.
3. Sound : Sound is something that produces the sensation of hearing in our ears. We can't imagine of a world without sound because sound makes to communicate easily.
4. Do yourself
5. Do yourself

**F. Answer the following questions in detail :**

**Ans.**
1. Do yourself
2. Do yourself
3. Do yourself
4. Do yourself
5. The Earth consists of three distinct layers. These parts are
   (i) The crust (ii) The mantle (iii) The core
   The Crust : It is the outermost layer of the Earth with a non-uniform thickness of 6 kilometres to 40 kilometres. (Under land the thickness of the Earth is 20 kilometres to 40 kilometres, whereas under the ocean the crust is only 10 kilometres thick).
   The Mantle : It extends to a depth of 2800 kilometres below the crust, the central region between the core and the crust is called mantle. As the

depth increases, the pressure inside the mantle increases. Due to extreme temperature and pressure, some of the rocks near the bottom of the mantle melt and remain as a thick dense fluid.

The Core : It is the innermost part of the Earth and extends to a depth of around 3500 kilometre. The core itself can be divided into two parts, the outer core (2300 kilometre) of molten iron and nickel and the inner solid core (1200 km) of highly compressed iron and nickel in solid form.

6. The ear has three major parts, described as the outer ear, middle ear, and inner ear.

   Outer Ear : Sound waves enter the outer ear and travel through the ear canal to the eardrum. The eardrum vibrates due to the incoming sound waves and transmits these vibrations to the middle ear.

   Middle Ear : Three tiny bones called the malleus (hammer), the incus (anvil), and the stapes (stirrup) amplify the sound and send it to the inner ear.

   Inner Ear : The sound vibrations create ripples in the fluid to the cochlea. Projections from tiny hair cells bend, causing electrical impulses that the auditory nerve, or eighth cranial nerve, sends to the brain. The brain translates these impulses into what we experience as sound.
7. Do yourself
8. In India, the Petroleum Conservation Research Association (PCRA) is the agency which takes the responsibility of making people aware about saving petrol, diesel and natural gas/LPG. Since the energy conserved is energy produced, it is very essential for all of us to understand the importance and need of saving fossil fuels from which we obtain our energy.

   We can follow the following measures to save energy.

1. Use efficient smokeless chulhas in houses instead of using traditional methods of cooking.
2. Soak pulses overnight or for some time before cooking, and perform cooking with covered vessels.
3. As far as possible, try to use public transport instead of private vehicles.
4. Try to increase the use of pressure cookers for cooking.
5. Use room coolers, air conditioners, heaters, geysers, etc., only when required.
6. Switch off lights, fans and other electrical appliances when not in use.
7. Drive at constant and moderate speed as far as possible. A speed of 45-50 km per hour gives the best fuel economy.
8. Switch off the engine while waiting for somebody and at the traffic signals.
9. Do yourself

# Notes

# Notes