Std.: K.G. to 12 Com. Eng. & Guj. Medium

17. Curd and sour substances are acidic in nature, which react with brass and copper vessels and form toxic substances which are harmful to the human body. Therefore, curd and other sour substances should not be kept in brass and copper vessels.

18. Sodium is highly reactive metal. It releases hydrogen gas, when it reacts with air or moisture in air. Hydrogen gas is highly combustible and it catches fire. To prevent accidental fire, sodium is kept immersed in kerosene.

19. On moving down a group, the atomic radii of elements increase gradually.

Reason : On moving down a group, a new shell of electrons is added. As a result, the distance between the nucleus and the valence shell increases. In a group, the distance between the valence electron and nucleus increases with increase in nuclear charge. So atomic radii increase.

OR

19. Give two points of difference between Mendeleev's periodic table and Modern periodic table :

[**Please Note :** In Model Question Paper 6, Please read Q. No. 19 (OR) as above]

Mendeleev's periodic table	**Modern periodic table**
1. Mendeleev's periodic table consists of seven periods and eight groups.	1. Modern periodic table consists of seven periods and eighteen groups.
2. Transition elements are not separated in the Mendeleev's periodic table.	2. Transition elements are placed in a separate groups in the Modern periodic table.
3. In Mendeleev's periodic table, elements are arranged in increasing order of their atomic masses.	3. In the Modern periodic table, elements are arranged in increasing order of their atomic numbers.
4. Period number and group number of an element cannot be predicted.	4. Period number and group number of an element can be predicted easily.

[**Note :** Write any *two* points.]

20.

Autotrophic nutrition	Heterotrophic nutrition
1. It is seen in green plants and some bacteria.	1. It is seen in animals and fungus.
2. Food is synthesised by using inorganic substance CO_2 and H_2O.	2. Food is obtained from other organisms.
3. For this photosynthesis process is important.	3. For this digestion of food is important.

[Note : Write any *two* points.]

OR

20. Lymph is a colourless fluid involved in transportation. Lymph is similar to the plasma of blood but contains less protein.

Functions :

(1) Lymph carries digested and absorbed fat from intestine.

(2) It drains excess fluid from intercellular space back into the blood.

21. Secondary sexual changes seen in girls are as follows :

→ Ovary starts secreting female sex hormones.

→ Ovaries start producing ova.

→ Development of reproductive organs and breasts develop with darkening of the skin of the nipples.

→ Menstrual cycle starts.

22.

Concave mirror	Convex mirror
1. Its inner surface is reflecting.	1. Its outer surface is reflecting.
2. It forms a real or virtual image of an object depending on the position of the object.	2. It always forms a virtual image.
3. The virtual image is always bigger than the object.	3. The image is always smaller than the object.
4. This mirror is used in a torch, headlight of vehicles, search-light, solar cooker, etc.	4. This mirror is used as a rear-view (wing) mirror in vehicles.

24. For answer, refer Question Paper **4**, Q. **39** last part (Characteristics of magnetic field lines.)

25. Through a food chain energy and nutrients move to upper trophic levels sequentially. If any non-biodegradable substance enters in biotic factor of an ecosystem, its concentration progressively increases at higher trophic level.

The uncontrolled use of pesticides and other chemicals increases the amount of these chemicals in the soil or water bodies. From soil or water they enter in the body of plants and then in the bodies of herbivores and carnivores. As these chemicals are not degradable, they get accumulated progressively at each trophic level. This phenomenon is known as Biological magnification.

As human beings occupy the top level in any food chain, the maximum concentration of pesticides gets accumulated in human body. Therefore, though for increase of crop production we use such chemicals; we need to control their use.

26. Approaches towards conservation of forests are as follows :

(1) Indiscriminate felling of trees for the purpose of timber must be reduced.

(2) The forest ecosystem must be protected from fuel starved villages, fodder-starved cattles and commercial exploitation.

(3) Replantation of trees and also plantation of indiginous species to develop forests in all available land.

(4) Participation of local people and villagers must be taken in conservation of forests.

(5) Scientific research, monitoring and spreading awareness about conservation of forests through education.

OR

26. Advantages of water harvesting are :

(1) It provides water for recharging underground water reservoir.

(2) It provides water for potable use.

(3) It provides water for irrigation.

(4) It provides water for vegetation to grow.

27. Chemical reaction in which a substance (atom or molecule) gains oxygen or loses hydrogen is called an **oxidation reaction**.

Examples :

$$C + O_2 \xrightarrow{\text{Heat}} CO_2$$

$$2Mg + O_2 \xrightarrow{\text{Heat}} 2MgO$$

$$2Cu + O_2 \xrightarrow{\text{Heat}} 2CuO$$

In above reactions, C, Mg and Cu gain oxygen, and undergo oxidation reactions.

→ Chemical reaction in which a substance (atom or molecule) loses oxygen or gains hydrogen is called **reduction reaction**.

Examples :

$$CuO + H_2 \longrightarrow Cu + H_2O$$

$$CO_2 + H_2 \longrightarrow CO + H_2O$$

$$MgO + H_2 \longrightarrow Mg + H_2O$$

In above reactions, CuO, CO_2 and MgO lose oxygen. Hence, these are reduction reactions.

OR

28. The common properties of metals are as follows :

(1) Metals possess shining on their surface (lustre) in their pure form.

(2) Metals are solid and hard.

(3) Metals possess properties of malleability and ductility.

(4) Metals are good conductors of heat and electricity.

(5) Metals have high melting points and boiling points.

(6) Metals are sonorous.

29. Human brain has three major regions or parts : (1) Fore-brain, (2) Mid-brain and (3) Hind-brain.

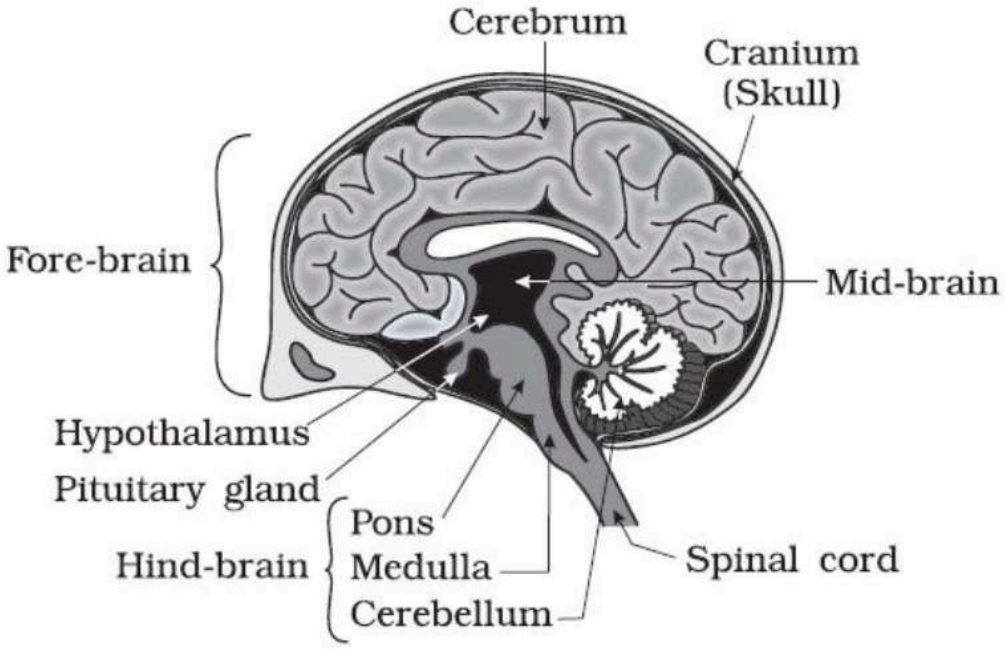
(1) Fore-brain : The fore-brain has separate areas specialised for hearing, smell, sight and so on.

→ There are separate areas of association where sensory information is interpreted by putting it together with information from other receptors as well as with information already stored in the brain.

→ Based on all this, a decision is made about how to respond.

It has motor areas which control the movement of voluntary muscles.

→ It has a separate centre associated with hunger.



(2) Mid-brain : Corpora quadrigemina is a part of mid-brain. Centres for visual and auditory reflexes are located there.

(3) Hind-brain : Pons, medulla and cerebellum are the parts of hind-brain.

Involuntary actions including blood pressure, salivation and vomiting are controlled by the medulla.

Cerebellum is responsible for precision of voluntary actions and maintaining the posture and balance (equilibrium) of the body.

30.

Asexual reproduction	Sexual reproduction
1. In asexual reproduction, a single individual is involved, whose certain body part forms the new individual of the same kind.	1. In sexual reproduction, two gametes of opposite sex fuse to form a fertilized egg (zygote) that develops into a new individual.
2. The sex of an organism does not play any role.	2. The organisms involved are either bisexual or the two individuals are of opposite sex.
3. The new organism has all the characters of the parent organism without any change in the hereditary characters.	3. The new individual follows laws of inheritance and therefore, differs from its parent organisms.
4. With changing environment asexual reproduction is not sufficient to sustain life.	4. With changing environment, sexual reproduction is essential to sustain life.

[Note : Write any *two* points.]

→ When a single parent is involved in the formation of new generations, without the fusion of gametes it is called asexual reproduction. Where as, a mode of reproduction in which both sexes, male and female are involved to produce new generations is known as sexual reproduction.

31. The organs having common origin and structural similarity but different functions are called homologous organs. It can be said from their structural similarity that they have been evolved from a common ancestor. For example the forelimbs of frogs (amphibians), the forelimbs of lizards (reptiles), wings of birds (aves), the hands of human beings (mammals), etc. are homologous organs having similar structure.

The basic structure of the limbs is similar though it has been modified to perform different functions in various vertebrates.

Such a homologous characteristics helps to identify an evolutionary relationship between apparently different species.

OR

31. Cellular DNA is the information source for making proteins in the cell.

→ Gene is a section of DNA that provides information for specific protein.

→ Such protein may act as an enzyme.

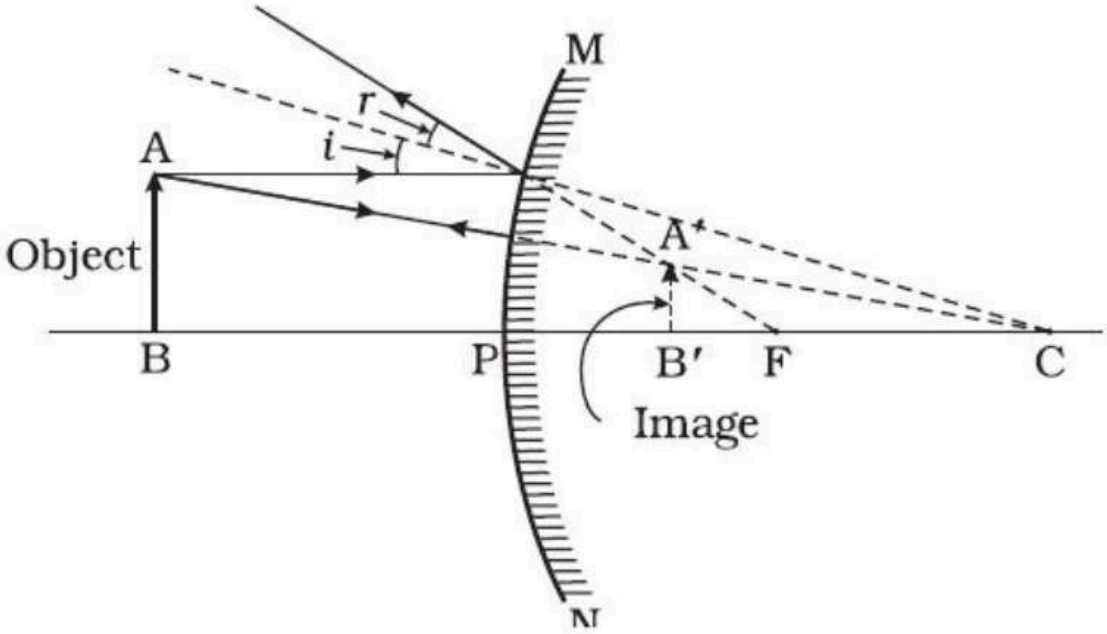
→ Enzyme stimulates specific reaction in an organism.

→ The product that is formed in the reaction imparts specific characteristic.

Example : Tallness is a characteristic or trait of garden pea plant.

→ Plant height depends on the amount of a particular plant hormone synthesized, which in turn trigger the growth.

32. Position of the object : At centre of curvature (C) of a convex mirror.



Position of the image : Behind the mirror, between the pole (P) and focus (F)

Nature of the image : Virtual and erect

Size of the image relative to that of the object : Diminished

OR

32. For concave lens : $F = -30$ cm, $u = -20$ cm, $v = ?$

According to lens formula : $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$\therefore \frac{1}{v} - \frac{1}{-20} = \frac{1}{-30}$

$\therefore \frac{1}{v} = -\frac{1}{20} - \frac{1}{30}$

$\therefore \frac{1}{v} = \frac{-3-2}{60} = \frac{-5}{60} = -\frac{1}{12}$

$\therefore v = -12$ cm

v (image-distance) is negative. So image is towards the object.

Moreover, image-distance $v = 12$ cm.

$\therefore$ Image will be formed towards the object at a distance of 12 cm.

33. $R_1 = 5\,\Omega$, $R_2 = 10\,\Omega$ and $R_3 = 30\,\Omega$ are connected in parallel combination.

(1) Potential difference across the battery, $V = 12$ V.

This is also the potential difference across each of the individual resistor; therefore, to calculate the current in the resistors, we use Ohm's law.

The current I_1, through $R_1 = \frac{V}{R_1}$

$$I_1 = \frac{12\text{ V}}{5\,\Omega} = \mathbf{2.4\ A}$$

The current I_2, through $R_2 = \frac{V}{R_2}$

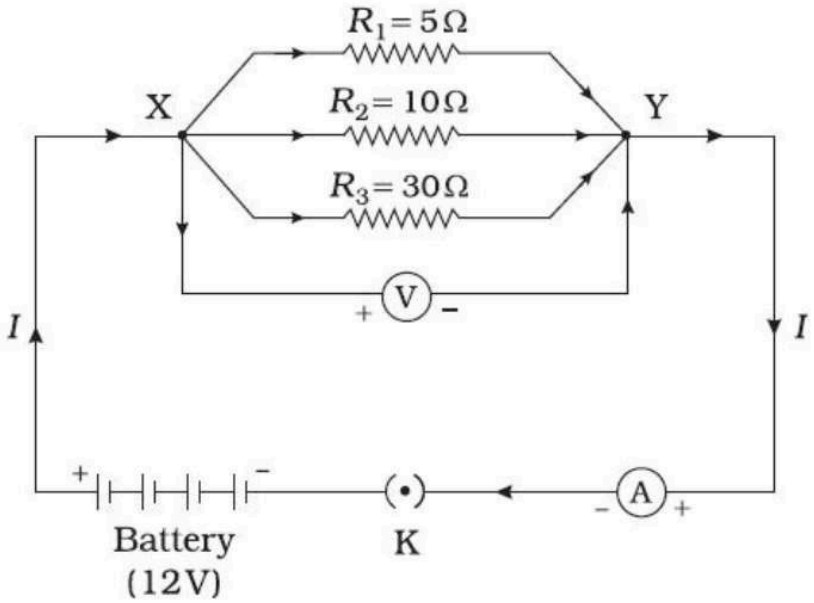
$$I_2 = \frac{12\text{ V}}{10\,\Omega} = \mathbf{1.2\ A}$$

The current I_3, through $R_3 = \frac{V}{R_3}$

$$I_3 = \frac{12\text{ V}}{30\,\Omega} = \mathbf{0.4\ A}$$

(2) The total current in the circuit,

$$I = I_1 + I_2 + I_3$$
$$= (2.4 + 1.2 + 0.4)\text{ A}$$
$$= \mathbf{4\ A}$$



(3) The total resistance R_p, is given by

$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$
$$= \frac{1}{5} + \frac{1}{10} + \frac{1}{30}$$
$$= \frac{6+3+1}{30} = \frac{10}{30} = \frac{1}{3}$$

Thus, $R_p = 3\,\Omega$

$\therefore$ Equivalent resistance $R_p = 3\,\Omega$

34. Fossil fuels are the major energy source at present day because we continue to be largely dependent on fossil fuels for most of our energy requirements.

Plants and animals which got buried deep under the earth surface millions of years ago was converted into fuel due to excess heat and pressure. These are called fossil fuels.

The growing demand for energy was largely met by the fossil fuels – coal and petroleum.

Disadvantages :

(1) Fossil fuels were formed over millions of years and they are only limited reserves.

(2) The fossil fuels are non-renewable sources of energy.

(3) Air pollution is caused by burning of coal or petroleum products. The oxides of carbon, nitrogen and sulphur that are released on burning fossil fuels are acidic oxides. These can lead to acid rain.

(4) Carbon dioxide produced by burning of fossil fuels leads to greenhouse effects.

35. The chemical properties of acid are as follows :

(1) Reaction of acid with metal : Acid reacts with metal to form the corresponding salt and evolve hydrogen gas.

$Mg(s) + 2HCl(aq) \longrightarrow MgCl_2(aq) + H_2(g)$

(2) Reaction of acid with base : Acid reacts with base to form salt and water. This reaction is called neutralisation.

$NaOH(aq) + HCl(aq) \longrightarrow NaCl(aq) + H_2O(l)$

(3) Reaction of acid with metal oxide : Acid reacts with metal oxide to form salt and water.

$MgO(s) + H_2SO_4(aq) \longrightarrow MgSO_4(aq) + H_2O(l)$

(4) Reaction of acid with metal carbonate : Acid reacts with metal carbonate to form salt, water and CO_2 gas.

$Na_2CO_3(aq) + 2HCl(aq) \longrightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$

OR

35. (1) The strength of acids and bases depends on the number of H^+ and OH^- ions present in the solution.

For example, one molar hydrochloric acid and one molar acetic acid form different amounts of hydrogen ions (H^+). Therefore, in spite of same concentration, their acidic strengths are different.

→ The acid which produces H^+ ions in more quantity in water is called strong acid.
For example, HCl, HNO_3, H_2SO_4, ..., etc.

→ The acid which produces H^+ ions in less quantity in water is called weak acid.
For example, HCOOH, CH_3COOH, HCN, ..., etc.

→ The base which produces OH^- ions in more quantity in water is called strong base.
For example, NaOH, KOH, $Ca(OH)_2$, ..., etc.

→ The base which produces OH^- ions in less quantity in water is called weak base.
For example, NH_3, NH_4OH, ..., etc.

(2) When the pH of the inner side of the mouth is less than 5.5, the decay of teeth starts.

→ The outer layer of teeth is made-up of hard substance enamel like calcium phosphate ($Ca_3(PO_4)_2$). It does not dissolve in water, but gets corroded when pH of inner side of mouth becomes less than 5.5.

→ Acid is produced by decomposition of particles of food and saccharides (sugar) by bacteria inside the mouth after taking food; which is responsible for decay of teeth. Hence, good habit of cleaning mouth should be followed after eating.

→ The toothpastes which are used for teeth cleaning possess basic nature. They neutralise the acid produced inside the mouth and prevent tooth decay.

36. The heteroatoms and the group containing the confer specific properties to the compound. regardless of the length and nature of the carbon chain are called functional groups.

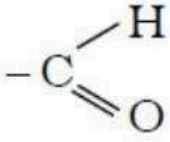
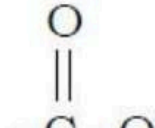
→ Chemical reactions and properties of organic compounds containing different functional groups are different.

→ Free valency or valencies of the group are shown by the single line (–).

→ The functional group is attached to the carbon chain by replacing one or more hydrogen atom or atoms.

Example :

Some functional groups in carbon compounds

Functional group	**Formula of functional group**	**Formula of the compound**	**Name of compound**
1. Halo – (Chloro – Bromo)	– Cl, – Br (Substitutes for hydrogen atom)	CH_3Cl C_2H_5Br	Chloromethane Bromoethane
2. Alcohol	– OH	CH_3OH	Methanol
3. Aldehyde		HCHO CH_3CHO	Methanal Ethanal
4. Ketone		CH_3COCH_3	Propanone
5. Carboxylic acid		CH_3COOH	Ethanoic acid **OR** Acetic acid

37. The main processes, that are carried out by all the living organisms in order to sustain their existence as living beings, are called life processes.

Some important life processes are as follows :

(1) Nutrition : A process to transfer a source of energy i.e., food from outside the body of the organism to the inside is called nutrition.

Most of the food sources are carbon based and depending on the complexity of such sources, different organisms can use different kinds of nutritional processes.

(2) Respiration : A process of breakdown of food sources to provide energy for various biological activities is called respiration.

By this, carbon based food source is broken and converted to a uniform source of energy i.e., ATP.

Most of the organisms use oxygen for this and are called aerobic organisms where as some can do this in absence of oxygen and they are called anaerobic organisms.

(3) Transport : In case of a single celled organism, no specific organs for taking food, exchange of gases or removal of wastes are needed because the entire surface of the organism is in contact with the environment.

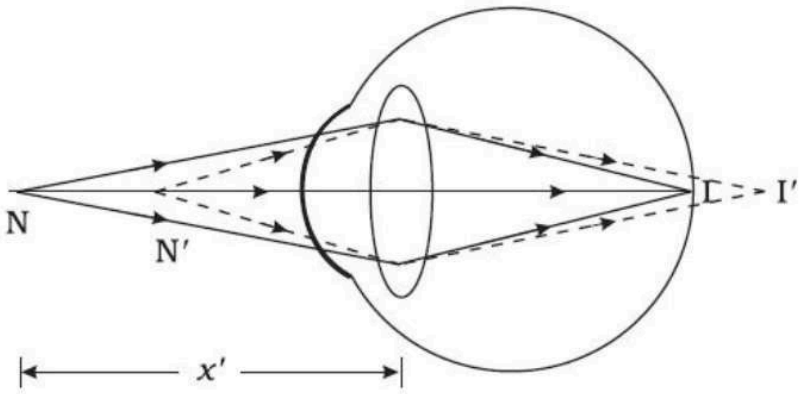
In multicellular organisms all the cells may not be in direct contact with the surrounding environment. The simple diffusion will not meet the requirement of all the cells. So, transport of food and oxygen to all the cells of body and wastes collected from cells to excrete them, a special transportation system is required.

(4) Excretion : Nitrogenous metabolic wastes are discarded from body by this process.

Single celled animals, remove wastes by simple diffusion from the body surface. In multicellular organisms special tissue, organ or system are designed for excretion.

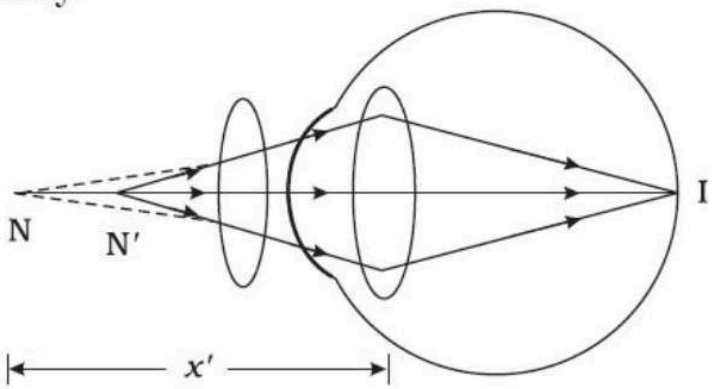
38. The defect of vision due to which a person can see distant-object clearly but cannot see nearyby objects distinctly is called hypermetropia or far-sightedness. This defect is due to the least curvature of eye lens, hence the focal length of the eye lens increases or due to becoming eyeball shorter than normal.

→ Due to these causes, the eye lens is not able to focus rays coming from an object at 25 cm from the eye on the retina.



Correction of the defect : To correct a hypermetropic eye, the person has to wear spectacles with a convex lens of suitable focal length or power.

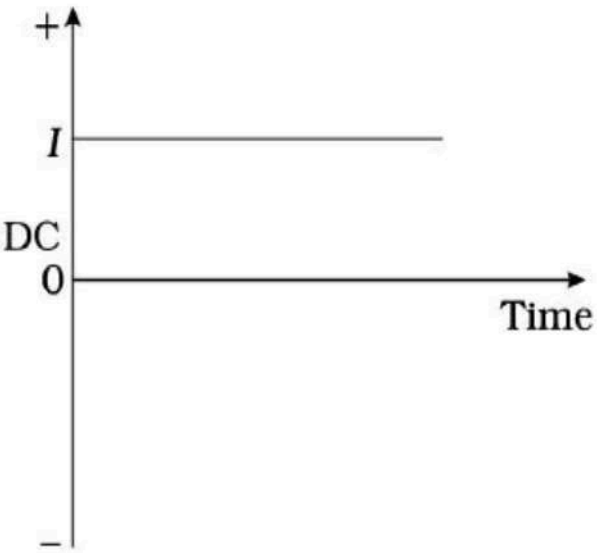
So, that rays of light from the normal near point on passing through the convex lens converge and nearby object is seen clearly.



Near-sightedness	Far-sightedness
1. The eye lens does not become thin as required but remains thick.	1. The eye lens does not become thick as required but remains thin.
2. The distant objects cannot be seen clearly.	2. The nearby objects cannot be seen clearly.
3. This defect can be corrected by using concave lens of appropriate focal length.	3. This defect can be corrected by using convex lens of appropriate focal length.

[Note : Write any *two* points.]

39. DC : This current flows only in one direction. If the voltage does not change with time, the current remains constant. This is shown in figure.



→ When a cell or battery is used to obtain DC, the voltage goes on decreasing as the energy is used. Then the current also decreases with time.

→ In a circuit, the electric current flows from the positive terminal of the cell or battery to the negative terminal in the external circuit, that means it flows only in one direction.

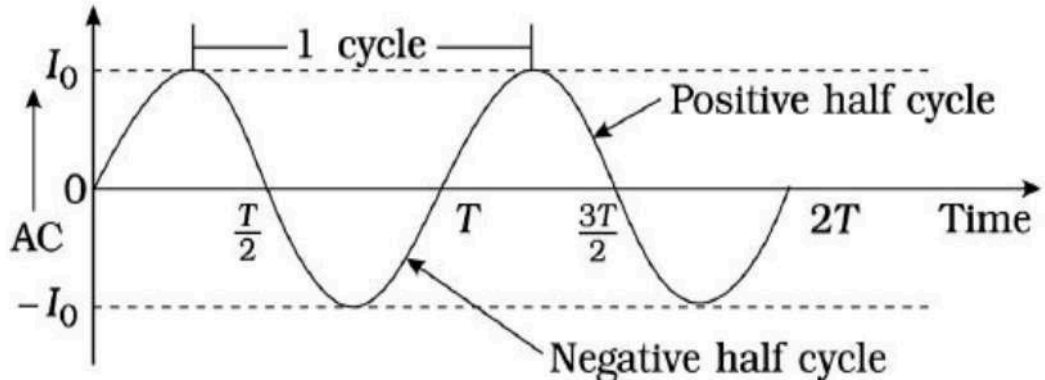
→ Thus, the current obtained due to a cell or battery is unidirectional. It is called direct current (DC).

→ A generator that produces direct current is called a **DC generator** which is also called a **dynamo**.

→ DC is used in radio, cell phone, watch, laptop, etc.

AC : The current whose direction changes periodically with time is called an alternating current (AC).

This is shown in figure.



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