

- | 15. (a) Aerobic respiration | Anaerobic respiration |
|---|--|
| (i) In this process, oxygen is utilized by breaking respiration substrate. | In this process, oxygen is not required. |
| (ii) Glycolysis takes place in cytoplasm and krebs cycle takes place in mitochondria. | It takes place in cytoplasm only. |
| (iii) 38 molecules of ATP are formed. | Only 2 molecules of ATP are formed. |
| (b) Some anaerobic organisms are butyric acid bacteria, lactic acid bacteria, <i>Bacillus phosphorescence</i> , <i>Clostridium</i> etc. | (1 mark) |
16. The point on principal axis where beam of rays parallel to principal axis, meet after reflection from the mirror is called principal focus. (1 mark)

OR

When the focal length of a lens is one metre then the power of lens is called one dioptre. (1 mark)

17. Given, focal length of concave lens, $f = -2\text{m}$ (1 mark)

$$\text{Power of lens, } P = \frac{1}{f} = \frac{1}{-2} = -0.5\text{D}$$

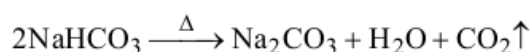
18. (b) Refractive index is inversely proportional to temperature $\mu \propto \frac{1}{T}$. (1 mark)
19. (a) Because H_2SO_4 is a strong acid, it readily forms Hydronium ions when dissolved in water which is responsible for its corossive action. (1 mark)
20. (c) Dark reaction occurs in the stroma region of the chloroplast and Mitochondria is involved in the synthesis of ATP. (1 mark)
21. When resistors are connected in parallel,
- the voltage across each resistor is same and equal to the voltage across the whole group considered as a unit.
 - current gets distributed in different resistors in such a way that sum of currents flowing through different resistors is equal to the total current.
22. (a) Fuel oil has higher calorific value than coal.
 (b) Fuel oil produces less smoke than coal.
 (c) Fuel oil is more efficient than coal.

OR

The property due to which an element exists in two or more forms, which differ in their physical and some of the chemical properties is known as "Allotropy" and the various forms are called "Allotropes".

Carbon exists in two allotropic form (i) crystalline (ii) amorphous. The crystalline forms are diamond and graphite whereas the amorphous forms are coal, charcoal, lamp black etc.

23. Compound X is baking soda. Its chemical formula is NaHCO_3 .



24. (a) Alkali metals: Group 1 or IA
 (b) Halogens: Group 17 or VIIA
 (c) Alkaline Earth metals : Group 2 or II A
25. In order to clean the blood of the metabolic waste and to maintain the normal level of water and mineral ions in the body fluids, an artificial kidney is used. It is based on principle of dialysis. The matching kidney from another person can be transplanted instead of artificial dialysis.

26. The various theories of evolution are as follows-
- Lamarck's theory of evolution. i.e. Theory of inheritance of acquired characters.
 - Darwin's theory of evolution i.e. The theory of natural selection.
 - Synthetic theory of evolution.
27. (a) Focal length = $\frac{\text{Radius of curvature}}{2}$
- (i) within focus, (virtual) (ii) at focus, (real) (iii) between C and F, (real)
 - Convex mirror has wider field of view as it forms virtual erect and diminished images and hence covers wider field of view.

OR

- Medium in which speed of light is less is known as optically denser medium and the medium in which speed of light is more is optically rarer medium.
 - They are reciprocal of each other i.e. ${}_1n_2 = \frac{1}{{}_2n_1}$
 - In medium B as ray of light bends towards the normal with least angle, hence medium B is more denser than medium A and C. (speed of light is higher in a rarer medium).
28. CaOCl_2 is chloride of lime whereas calcium chloride is CaCl_2 . Chloride of lime gradually loses its chlorine because it reacts with CO_2 to form CaCO_3 and Cl_2 .

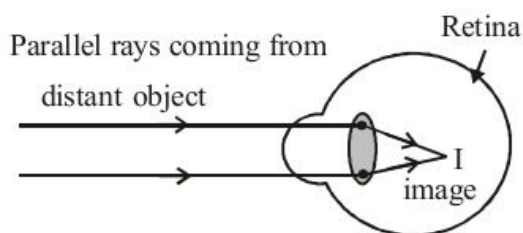


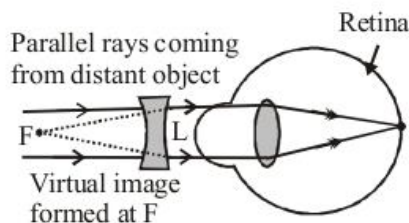
29. Parent : $\boxed{\text{AaBb}}$
- Gametes : AB Ab aB ab
- So, 4 types of gametes are formed.

OR

Speciation is the evolution of reproductive isolation among population that was once interbreeding. Following are the factors which can lead to speciation –

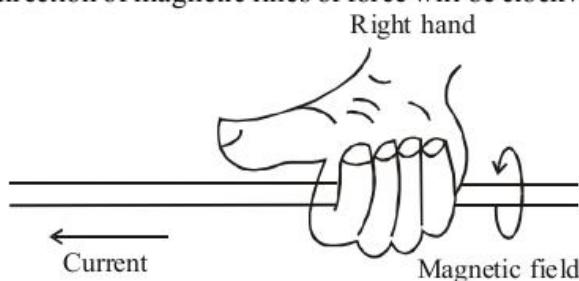
- Genetic drift**– Genetic drift may accumulate over generation which leads to speciation.
 - Natural selection** may work differently in various locations which may give rise to speciation.
 - Severe **DNA change**.
 - A **variation may** occur which does not allow sexual act between two groups.
30. (a) Defect of vision – Myopia or short sightedness or near sightedness.
- Causes of myopia :
- Excessive curvature of eye lens/eye lens becomes more converging
 - Elongation of eye ball
- Methods of correction: By the use of concave lens of suitable power or focal length the defect is corrected.





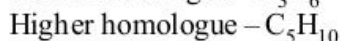
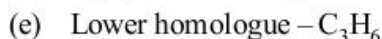
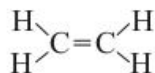
- (b) Due to atmospheric refraction
The density of different layers of air keeps on changing due to which the apparent image of the stars keeps on changing. This changing position of stars appears as twinkling of stars.

31. (a) According to this rule, if we imagine that we are holding a wire carrying current and thumb is stretched in the direction of current then the direction in which fingers will be wrapped gives the direction of magnetic lines of force. It means if the current is flowing in the upward direction then the direction of magnetic lines of force will be anticlockwise and if current is flowing in the downward direction then the direction of magnetic lines of force will be clockwise.



- (b) The earth wire connects a given appliance to the earth. It is used as a safety measure especially for electric appliances having a metallic body. Whenever the live wire touches the body of the appliance, the current passes to the earth and the user doesn't suffer a severe electric shock.

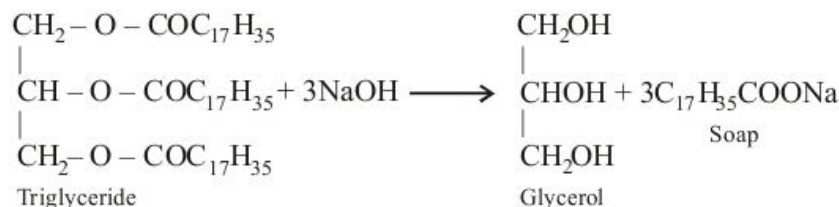
32. (a) n indicates number of carbon atoms and $2n$ indicates number of hydrogen atoms.



OR

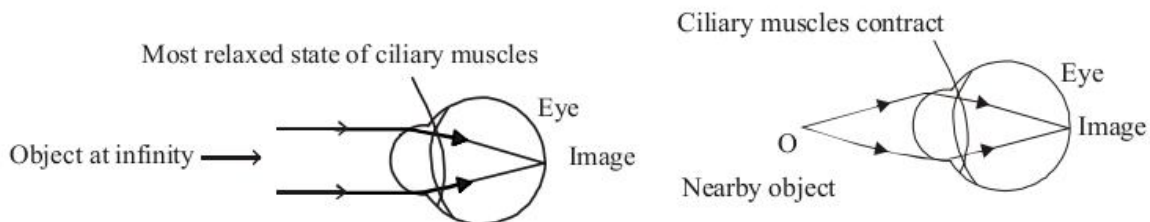
- (a) Soaps are sodium or potassium salts of fatty acids while detergents are sodium salts of sulphonic acid.

- (b) Soaps do not work well with hard water, acidic and saline water while detergents work well. Glycerol is the byproduct of soap industry.



33.	Endocrine Gland	Location	Hormones	Functions
1.	Hypothalamus	Brain	Regulates the secretion of hormones from pituitary gland.	Regulates body temperature and responsible for the direct control of endocrine system through pituitary gland.
2.	Pituitary (Master gland)	At the base of brain	Regulates tissue and bone growth. Trophic Hormones Prolactin	Hypothalamic-releasing hormones Regulates the secretion of hormones from endocrine gland like adrenal, thyroid, testes and ovary. Stimulates milk production from mammary glands.
			Vasopressin (ADH anti-diuretic hormone) Oxytocin	Controls the amount of water reabsorbed by kidney (osmoregulation). (i) Regulates ejection of milk from mammary glands. (ii) Regulates metabolism of carbohydrate, fat and proteins neck and growth rate.
3.	Thyroid	Just below the Adam’s apple	Thyroxine	(iii) Too much of hormone leads to thinness and over activity. (iv) Too little of it causes over weight and sluggishness. (v) Deficiency causes goitre.
4.	Parathyroid	Near the thyroid gland	Parathormone	Calcium and phosphorous metabolism or calcitonin.
5.	Thymus	On the chest close to heart	Thymosin	Production of antibodies and immune response.
6.	Adrenal	Just above kidneys	Adrenaline & Cortisone	Helps in regulation of blood pressure, heart rate, carbohydrate metabolism and mineral balance.
7.	Pancreas too	In the abdomen near stomach	Insulin	Regulates sugar metabolism, little insulin leads to high sugar level in blood, causing diabetes. Glucagon Increases blood glucose.
8.	Testes	Outside the lower abdomen in scrotum	Testosterone	(i) Sperm production. (ii) Regulation of male accessory sex organs and secondary sexual characters like beard, and voice.
9.	Ovary	In the lower abdomen	Estrogen and Progesterone	(i) Egg production. (ii) Development of sexual characters like mammary glands, hair pattern, voice, maintenance of pregnancy.

34. (a) **Working of human eye:** When we look at an object, light rays from the object enter into the eye through cornea by aqueous humour which also acts as lens to refract maximum light. This light then passes through pupil which allows the required amount of light to pass through it. When this light falls on eye lens, image is formed on retina. This is a real and inverted image. This image is sent to the brain through optical nerves in the form of electric signal and brain interpret the image into erect image.



- (b) Person is suffering from long-sightedness or hypermetropia hence, lens to be used is a convex lens of suitable focal length.

Here, $u = -25 \text{ cm}$, $v = -1.5 \text{ m} = -150 \text{ cm}$, $f = ?$, $P = ?$

By lens formula,

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{-150} + \frac{1}{25} = \frac{-1+6}{150} = \frac{5}{150} = \frac{1}{30}$$

$$\therefore f = +30 \text{ cm} = 0.3 \text{ m}$$

$$\text{Power } (P) = \frac{1}{f \text{ (in m)}} = \frac{1}{0.3} = \frac{10}{3} = +3.33 \text{ D.}$$

35. (a) Mercury (Hg) (b) Aluminium
(c) Amphoteric (d) No, its a neutral gas
(e) Acidic

36. **Cause of Concern:** Ozone layer present in the stratosphere has thinned out by about 8% over the equator and more over the Antarctica where a big ozone hole appears every year. This has increased the level of UV-B radiations reaching the earth by 15-20%. These radiations are causing increased number of skin cancers, cataracts and reduced immunity in human beings. There is increased incidence of blinding of animals, death of young ones, reduced photosynthesis, higher number of mutations and damage to organisms.

Steps to limit damage:

- (i) Ban on production and use of halons.
(ii) Ban on production and use of chlorofluorocarbons.

OR

- (a) An aquarium is an artificial system which is also incomplete due to absence of producers, food chains and decomposers. There is no recycling and self-cleaning. However, a pond or a lake is a self-sustained, natural and complete ecosystem where there is perfect recycling of nutrients.
(b) An improper disposal of wastes means addition of pollutants into environment-air, water, soil. They will harm living beings, human assets and human beings. For example, passage of sewage into water body will cause eutrophication, stink development of sludge, killing of animals and source of water borne pathogens.