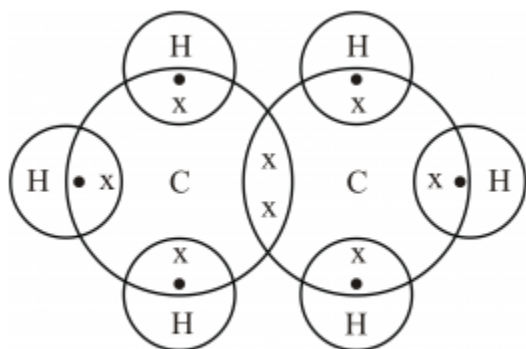


CBSE–CLASS –X–Science–Solution

1. **Solution:** The various steps in a food chain are called trophic levels.
2. **Solution:** The ozone layer prevents the harmful UV rays from entering into the earth's atmosphere.
3. **Solution:** The electron dot structure of ethane molecule, C_2H_6 .



4. **Solution:** The earth's atmosphere is heterogeneous as it typically consists of 21% oxygen, 78% nitrogen, 0.93% argon and 0.03% CO_2 with other gases making up the remaining percentage.
5. **Solution:**
 - I. It should possess low Ignition temperature.
 - II. It should not leave residue after burning, i.e., it should burn completely.
 - III. It should burn without producing too many pollutants.
 - IV. It should be easily available and accessible
 - V. It should be economical.
 - VI. It should be easy to store and transport.

(Any four of the above six will solve the purpose).

6. **Solution:** Non – renewable resources of energy are those energy resources that are consumed at a rate faster than the rate at which they are replenished. Two examples of non-renewable resources are coal and petroleum.
7. **Solution:**
- (i) Number of valence electrons ≤ 4 : valency = number of valence electrons
Number of valence electrons > 4 : valency = $8 -$ number of valence electrons.
 - (ii) The electronic configuration of element x with atomic number 9 is 2,7.
Its valency = $8 - 7 = 1$ Hence, the valency of element with atomic number 9 is 1.
8. **Solution:** If the number of valence electron is 1 then the element is said to be the first element of a period, if the number of valence electrons are 8, the element is said to be the last element of a period.
9. **Solution:** The two laws of reflection can be stated as follows:
- i. The angle of incidence is equal to the angle of reflection.
 - ii. The incident ray, the reflected ray and the normal to the mirror, all lie in the same plane.
10. **Solution:** Stars appear slightly higher from the horizon due to atmospheric refraction. The atmosphere bends the starlight towards the normal. This apparent positioning is not stationary but keeps changing.
11. **Solution:** The planets being closer to the Earth do not appear as point sources of light. The planet covers a small circular area in space, when viewed from Earth. So, even if light from one point in the circular disc is blocked, light from other points reaches our eyes. As the light from the planets are not completely blocked from our sight and they do not twinkle. Stars on the other hand are point sized objects and twinkle by atmospheric refraction of light.
12. **Solution:** Two differences between binary fission and multiple fission are as follows:

Binary Fission	Multiple fission
In binary fission, the single cell divides into halves.	In multiple fission, a single cell divides into many daughter cells simultaneously.
Binary fission is of two types; along any plane or longitudinally. Example: Amoeba (along any plane), Leishmania (longitudinally)	Multiple fission occurs along only one plane Example: Plasmodium

13. **Solution:** DNA copying is an important process that ensures that when cell multiplies, through the mechanisms of mitosis or meiosis, the equal amount of DNA (genetic material) passes in to the new cell. The DNA replicates so that there will be an extra copy of DNA when the cell multiplies.

14. **Solution:** (i) **Speciation** – Speciation is an evolutionary phenomenon by which new species are formed. There are three models of speciation:

- (1) When the groups that evolve to be separate species are in different geographic locations and are isolated geographically from each other.
- (2) When the groups that evolve to be separate species are geographic near and the individuals can move one species area to others.
- (3) When the groups that evolve to be separate species occur together in the same geographic area.

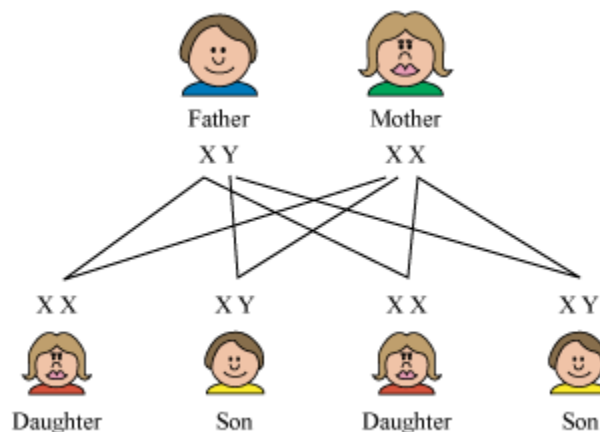
(iii) **Natural selection** – Natural selection is a key mechanism in evolution.

It is a process that results in an increased survival and reproductive success of individuals that are well adjusted to the environment. The theory of natural selection was given by Charles Darwin.

15. **Solution.**

The genetic material of a cell is stored in the DNA. During sexual reproduction, the genetic material from both the parents is transferred to the offspring. All human beings have 23 pairs of chromosomes out of which two chromosomes are sex chromosomes. These sex chromosomes are responsible for determining the sex of a child.

- (i) The sex chromosomes are represented by X and Y. Females have two X chromosomes (XX) and males have one X and one Y chromosome (XY).
- (ii) The gametes receive half of the chromosomes so the male gametes would be 22 + X or 22 + Y and since females have X chromosomes their have 22 + X chromosomes.
- (iii) So the sex of the baby is determined by the type of male gamete which fuses with the female.



16. **Solution:**

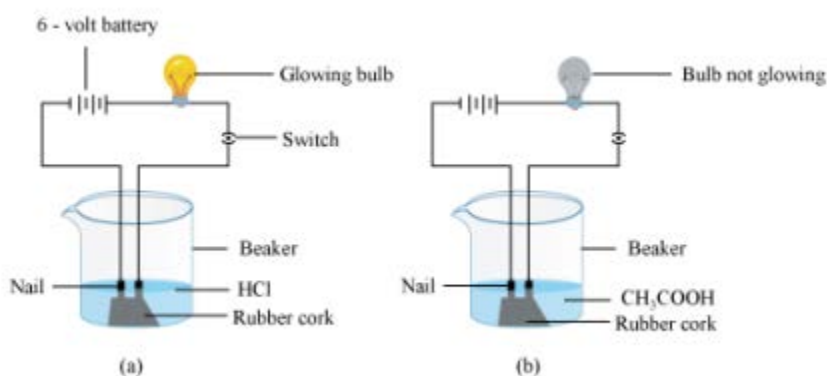
CH_3COOH is a weak acid when compared to HCl because HCl completely dissociates into ions in solution whereas CH_3COOH being weak acid is partially dissociated into ions in solution.

This can be proved by the following activity:

Two iron nails are fitted on a cork and are kept in a 100 mL beaker. The nails are then connected to the two terminals of a 6 – volt battery through a bulb and a switch. Some dilute HCl is poured in the beaker and the current is switched on. The same experiment is then performed with CH_3COOH .

Observations:

It will be observed that the bulb glows in the HCl solution and does not glow in the CH_3COOH solution.



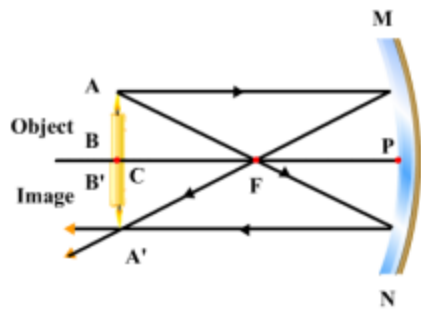
Inference:

HCl , being a strong acid dissociates into H^+ and Cl^- ions. These ions conduct electricity in the solution resulting in the glowing of the bulb. On the other hand, the CH_3COOH is a weak acid. It does not dissociate into ions completely in solution. Therefore, it does not conduct electricity.

17. **Solution:**

- (i) The number of valence electrons in element X is 1 while in element Y is 2.
- (ii) The valency of element X is 1 and that of element Y is 2.
- (iii) Element X is more metallic than element Y.
- (iv) The size of atom X is more than that of atom Y.
- (v) The formula of oxide of element X is X_2O and that of element Y is YO .
- (vi) The formula of chloride of element X is XCl and that of element Y YCl_2 .

18. **Solution:**



Position of the image: at the centre of curvature

Size of the image: Enlarged

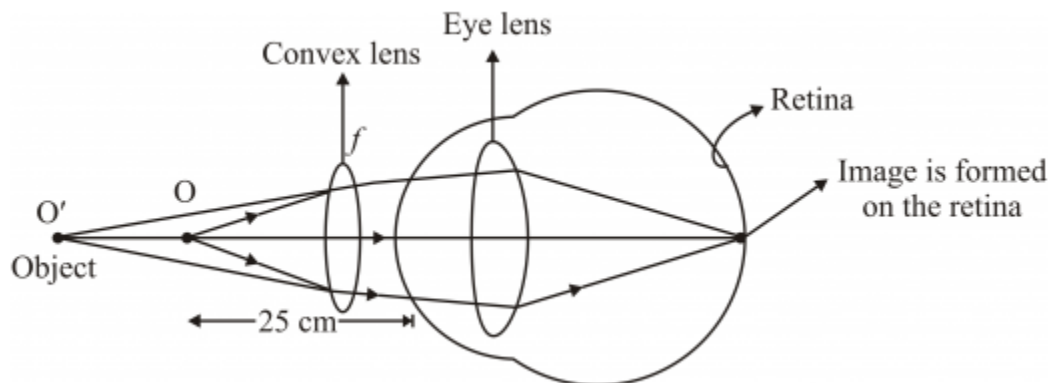
Nature of the image: Real and inverted

19. **Solution:**

- (i) "The refractive index of diamond is 2.42." This means the ratio of sine of angle of incidence to the sine of angle of refraction is equal to 2.42.
- (ii) Kerosene has refractive index of 1.44, its mass density is less than that of water but it is optically denser than water (kerosene: 1.44 and water: 1.33).

20. **Solution:**

Hypermetropia is a defect of vision in which a person cannot see nearby objects clearly, but has no problems in seeing distant objects. Corrected vision for a hypermetropic eye by using a convex lens:



21. **Solution:**

- (a) Two sexually transmitted disease in each of the following cases are:
 - (i) Bacterial infections: syphilis, Gonorrhoea
 - (ii) Viral infections: AIDS, Genital Herpes

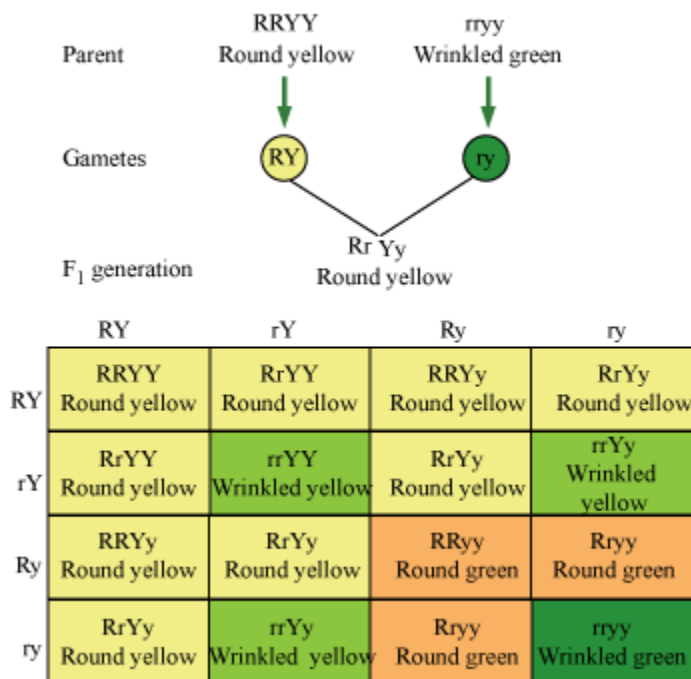
- (b) The spread of sexually transmitted diseases can be prevented by using condoms and avoiding multiple partners.

22. Solution:

Mendel's law of independent assortment states that

When two pairs of traits are combined in a hybrid, one pair of character segregates independent of the other pair of character.

In a dihybrid cross between two plants having round yellow (RRYY) and wrinkled green seeds (rryy), four types of gametes (RY, Ry, rY, ry) are produced. Each of these segregate independent of each other, each having a frequency of 25% of the total gametes produced.



23. Solution:

- (a) If the image formed by a lens is diminished in size and erect, for all positions of the object, then the lens is a concave lens.
- (b) The point on the lens through which a ray of light passes undeviated is known as Pole.
- (c) $\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \Rightarrow \frac{1}{v} = \frac{1}{f} + \frac{1}{u} \Rightarrow v = \frac{u \times f}{u+f}$; $f = 20\text{cm}$, $u = -30\text{cm}$

(i)
$$v = \frac{(-30) \times 20}{20 - 30} = 60\text{cm}$$

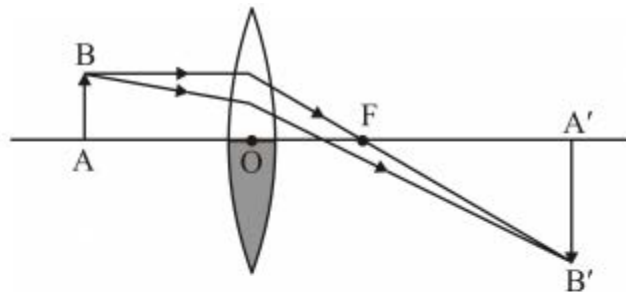
The image is formed at a distance of 60 cm on the other side of the optical centre

(ii)
$$m = -\frac{v}{u} = -\frac{60}{-30} = 2$$

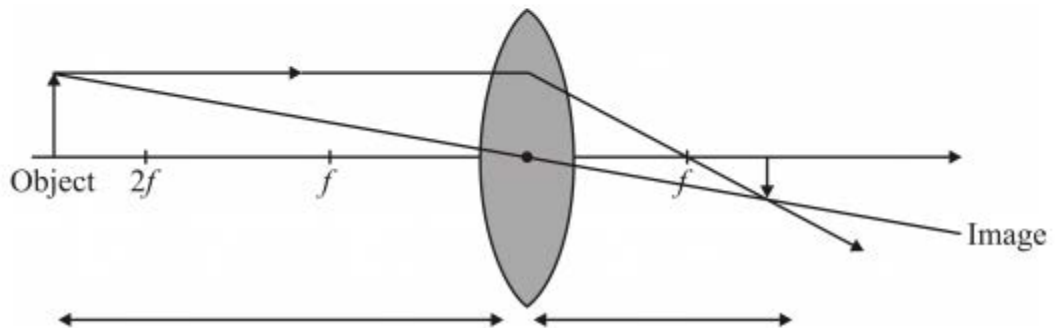
(iii) Image formed is inverted.

OR

(a) The image is formed by a large number of rays from the object. So, even if one half of the lens is darkened, the image will form. However, the brightness of the image will be less as compared to that of the image formed without wrapping the lens.



(b)



(i)
$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \Rightarrow \frac{1}{v} = \frac{1}{f} + \frac{1}{u} \Rightarrow v = \frac{u \times f}{u + f}; f = 10\text{cm}, u = -25\text{cm}$$

(ii)
$$v = \frac{(-25) \times 10}{10 - 25} = 16.67\text{cm}$$

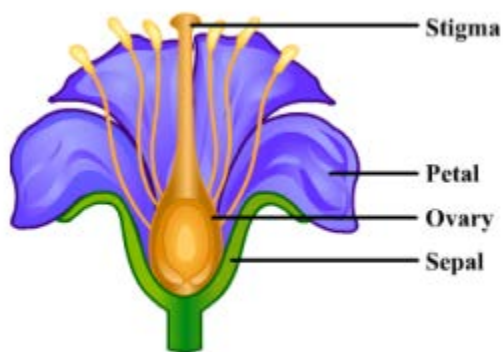
$$m = -\frac{v}{u} = -\frac{h_i}{h_o}$$

$$\Rightarrow h_i = \frac{v \times h_o}{u} = \frac{16.67 \times 5}{(-25)} = -3.34\text{cm}$$

(iii) Negative sign indicates that the image is real and inverted.

24. **Solution:**

(a)



Longitudinal Section of flower

- (b) The male reproductive part of flower is called stamen that consists of filaments and anthers. The female reproductive part of the flower is pistil that consists of stigma, style and ovary.

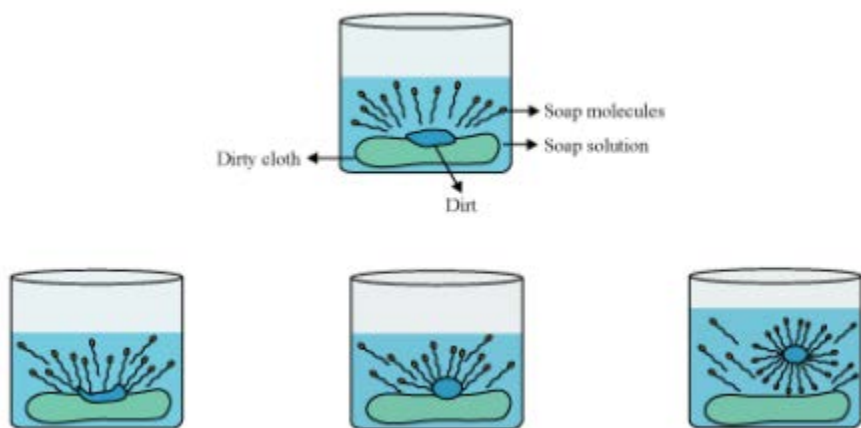
OR

- (a) Fragmentation is a mode of asexual reproduction. It is the unintentional cutting up of the body of an organism. Each fragment develops into a new individual. Example: Spirogyra
- (b) Regeneration: Regeneration involves the capacity of an organism to give rise to an entire individual from a portion. This type of regeneration occurs in Planaria. When Planaria gets cut unintentionally, the cut fragments give rise to a new individual. In this type, active cell division occurs before the replacement. The newly formed mass undergoes differentiation to form specialized cells.

from the soap molecules forming an insoluble substance called scum. A lot of soap is wasted in the process.

(b) Cleaning action of soaps:

The oily spot present on clothes is organic in nature and insoluble in water. Therefore, it cannot be removed by only washing with water. When soap is dissolved in water, its hydrophobic ends attach themselves to the oily spot and remove it from the cloth. Then, the molecules of soap arrange themselves in the form of micelle and trap the dirt at the centre of the cluster. These micelles remain suspended in the water. Hence, the oily spots are easily rinsed away by water.



26. **Solution:**

(2) Presence of two nuclei in centrally constricted amoeba, one in yeast cell and one in its bud.

27. **Solution:**

- (1) A
- (2) B
- (3) C
- (4) D

28. **Solution:**

(3) 2 to 3 hours

29. **Solution:**

(1) A filter paper

30. **Solution:**

(4) All of the above steps.

31. **Solution:**

(1) I

32. **Solution:**

(2) B

33. **Solution:**

(1) a blurred image on the wall of the laboratory.

34. **Solution:**

(1) A well lit distant tree

35. **Solution:**

(3) the sun

36. **Solution:**

(4) Colourless

37. **Solution:**

(5) Prepare solution of copper sulphate and hang strip of zinc into it

38. **Solution:**

(2) vinegar

39. **Solution:**

(1) Blue litmus red

40. **Solution:**

(2) Calcium carbonate

41. **Solution:**

(1) One bud cell