Goa Board
Class X Science
Term II
Sample Paper – 8 Solution

SECTION A

1. Red deviates the least, Violet deviates the most.

2. When soap is dissolved in water, the solution is alkaline in nature due to the formation of alkali NaOH or KOH. The solution changes the colour of red litmus to blue but, colour of blue litmus remains unchanged.

3. Pollen grain germinates only if it has fallen on the stigma of the same plant species; otherwise, it gets decomposed.

4. Water harvesting is the practice of collecting rain water in safe storage places from where it can be used throughout the year both for drinking and irrigation purposes.

i. Khadin System in Rajasthan
ii. Kullhs in Himachal Pradesh.

5. A human being has a horizontal view of about 150^0 with one eye open but with two eyes open, the field of view becomes 180^0. Thus, having two eyes gives a wider field of view. So that, with two eyes open, we can see a much larger area in front of us.

6.

(a) The metallic character of an element is expressed in terms of electron releasing tendency of its atom. As a result, a positive ion is formed. Metals are hence, electropositive in nature.

(b) Noble gases like helium, neon and argon were discovered very late because they are very inert and present in extremely low concentrations in our atmosphere. Hence, they were placed in a new separate group without disturbing the existing order.

7.

(a) Bacteria and fungi are examples of decomposers.

(b) Decomposers are essential components of the ecosystem. They decompose dead remains of plants and animals and their waste organic products into simpler, inorganic substances. The latter are released into the environment for their reuse as raw material by producers. These, therefore, provide space for new life to settle in the biosphere.

8. Given:

Object distance, u=-20 cm

Image distance, v=-40 cm

Height of object (h_0)=2 cm

Mirror formula,

$$\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$$

$$\frac{1}{-40}+\frac{1}{-20}=\frac{1}{f}$$

$$\frac{1}{f}=\frac{-1-2}{40}$$

$$f=-\frac{40}{3}=-13.33 \text{ cm}$$

magnification, $m=-\frac{v}{u}=\frac{h_i}{h_0}$

$$m=-\frac{-40}{-20}=\frac{h_i}{2}$$

$$h_i=-4 \text{ cm}$$

9.

(a) Presbyopia is the defect of vision in which the eye loses its power of accommodation due to old age.

(b) Rods are the rod-shaped cells present in the retina of an eye which are sensitive to the intensity of light. Cones are the cone-shaped cells present in the retina of an eye which are sensitive to the colour of light. Our night vision is relatively poor compared to the night vision of an owl due to the presence of relatively smaller number of rod cells in the retinas of our eyes.

10. Reflection

Explanation - Refraction is the change in the path of light in going from one medium to another.

The light rays coming from the fish bend away from the normal when they pass from water into the air. As a result, the fish appears to be higher in the water than it actually is.

Precautionary measure - Never try to catch or hold anything in deep water, as it appears nearer than its actual position.

11.

(a) For a normal eye, the image distance in the eye is fixed, being equal to distance of retina from the eye lens. When we increase the distance of an object from the eye, the focal length of eye lens is changed on account of accommodating power of the eye, so as to keep the image distance constant.

(b) A person who is blind to red-green colours may be deficient in cone shaped cells having red and green pigment in the retina of his eyes. It is a genetic disorder and not a refractive defect of vision. That is why, the person has normal vision.

12.

i. ^{18}Ar and ^{2}He (Noble gases) are very stable because of completely filled shells.

ii. ^{20}Ca and ^{4}Be belong to group 2 since they have two shells only.

iii. ^{8}O and ^{16}S belong to group 16 since they both have 6 valence electrons in their outermost shell.

13.

(a) Both, Li and Na are active metals since their atoms have only one electron in their valence shells. They readily lose their single electron to attain a stable configuration of the nearest noble gas.

(b) Mg is placed after Na in the same period. The atomic size decreases along a period due to increased nuclear charge that, results in a stronger pull of the outer electrons towards the nucleus.

(c) Both, F and Cl belong to group 17. Since fluorine is more electronegative than chlorine, it is more reactive than chlorine.

14.

(a) Modern periodic law states that "properties of elements are periodic functions of their atomic numbers".

(b)

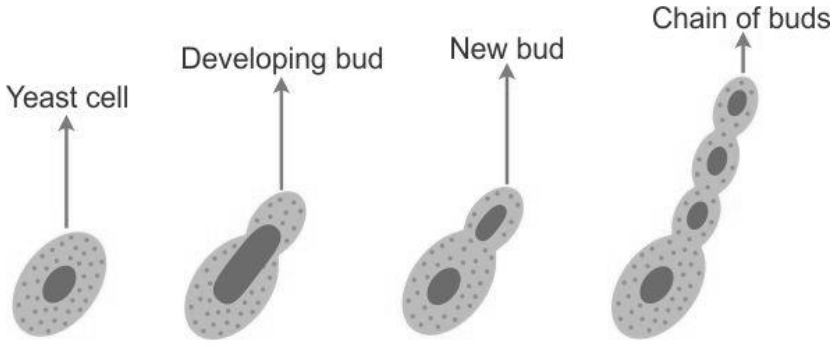
i. Tendency to lose electrons decreases because the effective charge acting on the valence shell of electron increases.

ii. Valency increases from 1 to 4 and then decrease to zero.

Group No. 1, 2, 13, 14, 15, 16, 17, 18

Valency 1, 2, 3, 4, 3, 2, 1, 0

15. Yeast is a unicellular organism which reproduces by asexual method called budding. A small protuberance appears on the upper part of the adult cell which grows in size. From this new bud cell, another bud appears at the tip. It results in a long chain of yeast cells.



Reproduction in Yeast by budding

16. Forests are renewable natural resources which are essential for ecological balance of ecosystems. They maintain biological diverstiy, preserve foods and safeguard future of tribals, besides providing valuable product for human welfare and raw materials for industries.

Two causes for deforestation are:

i. Indiscriminate felling of trees for the purpose of timber, fuel and industrial demand for wood.
ii. Over-grazing by large population of livestock.

17. Traits arise due to variations which occur due to sexual reproduction of inaccuracies during DNA copying or environmental factors.

The individuals with a particular trait may increase in a population due to the following factors:

i. Natural Section: Individuals in a species show a wide range of variation.
ii. Genetic drift: It occurs due to change in gene frequency due accumulation of a particular type of genes.
iii. Geographical isolation: It leads to change in gene frequency leading to expression of one type of traits in a geographically isolated population.

18. Dissimilar structures evolved from a common ancestral design like wild cabbage and generated different varieties from it by selection are called artificial selection.

(a) Farmers wanted short distances between leaves so they produced cabbage.
(b) When farmers opted for arrested flower development, it led to the production of Broccoli.
(c) Some farmers went in for sterile flowers and developed another variety of cabbage called cauliflower.
(d) When farmers opted for the swollen parts of wild cabbage, it led to the evolution of kohlrabi.

19.

(a) Analogous Organs: The organs having similar function but different structures are called analogous organs.

Homologous Organs: The organs having similar structures but different functions are called homologous organs. They give the indication of a common ancestor.

(b) Homologous Organs: Forelimbs of a frog and forelimbs of a human.

Analogous Organs: Wings of an insect and wings of a bat.

(c) In humans, the females have XX sex chromosome while the males have XY chromosome. When X chromosome of female unites with the X chromosome of male, a girl will be born and when X chromosome of female unites with the Y chromosome of male, a boy will be born. Thus, the Y chromosome of male (father) determines the sex of the child.

20.

(a) The degree of convergence or divergence of light rays achieved by a lens is expressed in terms of its power.

The power of lens is defined as the reciprocal of its focal length. The power P of a lens of focal length f is given by,

$P = \frac{1}{f}$ (in meters)

(b) The SI unit of power of a lens is 'dioptre'.

1 dioptre is the power of a lens whose focal length is 1 metre. $1D = 1m^{-1}$.

(c) Focal length of convex lens = 25 cm

Power of convex lens, $P_1 = \frac{100}{25} = 4$ D

Focal length of concave lens = 10 cm

Power of concave lens, $P_2 = \frac{100}{10} = 10$ D

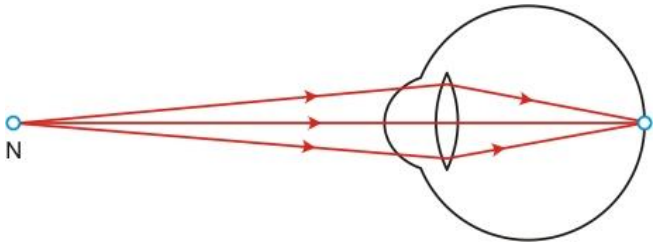
We know that, power of a convex lens is taken as positive and that of a concave lens is taken as negative.

Hence, combination power = $P_1 + P_2$ = (+4D) + (-10 D) = -6D

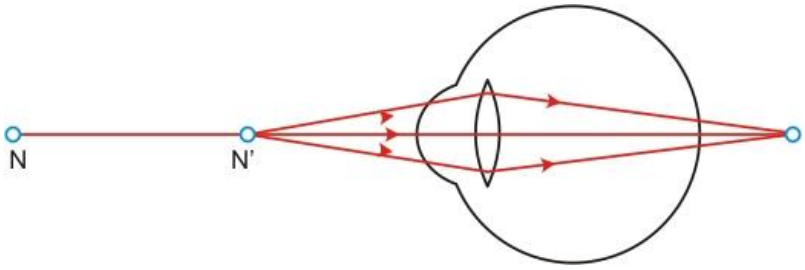
21.

i. A person with hypermetropia can see distant objects clearly but cannot see nearby objects distinctly.

ii. A person with this defect has the near point farther away from normal near point of 25 cm. Such a person has to keep the reading material farther than 25 cm.

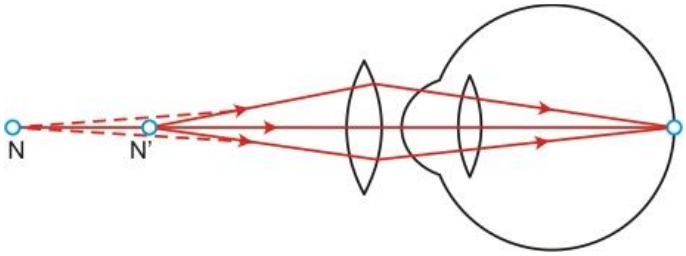


iii. In this case, the image of a nearby object is focused behind the retina



iv. This defect may arise because (i) focal length of the eye lens is too long or (ii) the eyeball has become too small.

v. This defect can be corrected by using a convex lens of suitable power. Eye glasses with converging lenses provide the additional focusing power required for forming the image on the retina.



22.

(a)

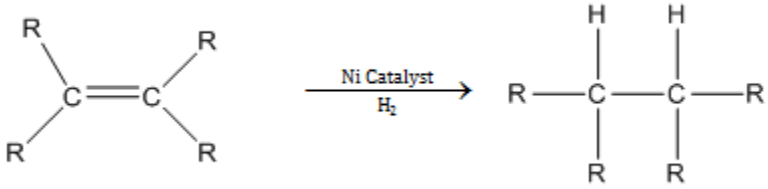
i. Ethanol

ii. 2-Bromopropane

(b) The formula of two successive members of a homologous series differs by -CH_2 unit.

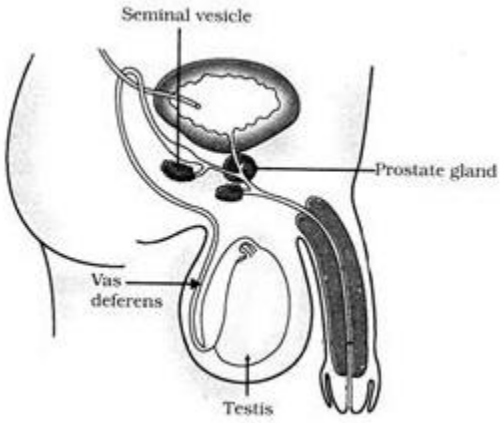
(c) Unsaturated hydrocarbons will give a yellow flame with lots of black smoke.

(d) Hydrogenation of vegetable oils in the presence of nickel as a catalyst is an example of addition reaction.



23.

(a)



(b) Seminal Vesicles and prostate gland are the two glands associated with the male reproductive system in man. These glands produce the fluids or secretions which are an important component of semen and perform the following functions:

a. The transport or motility of sperms is made easier so that they can move towards the egg.

b. These secretions provide nutrients to the sperms and also make the right medium for the sperms to survive.

(c) Testosterone.

It regulates the formation of sperms and also brings about the changes in appearance seen in boys at the time of puberty.

24. Significance of fertilization:

i. The entry of sperm activates the ovum.

ii. After fertilisation, a membrane is formed around the zygote, which does not allow any other sperm to enter.

iii. Fertilisation restores the number of chromosomes.

iv. Fertiliation keeps the number of chromosomes constant in species.

v. It brings two different lines of heredity together.

vi. It brings variation in the offspring.

SECTION B

25. (c) Concave mirror

When an object is at infinity, its image is formed at the focus of concave mirror. The object and the image both are at the same side of the mirror.

26. (b) 11 cm

When an object is at infinity, its image is formed at the focus of concave mirror.

Focal length = 15.6 - 4.6 = 11 cm

27. (c) Flammable and corrosive

Acetic acid is corrosive and flammable in nature.

28. (d) Transverse binary fission in Paramecium.

The cytoplasm separate transversely between two pair of nuclei, forming two unrelated individuals.

29. (b) Hydrogen bonds with water molecules

Acetic acid is miscible in water because of the formation of hydrogen bonds with water molecules.

30. (c) Solid A is $NaHCO_3$ and the gas B is CO_2

Only carbon dioxide can turn lime water milky and acetic acid on reaction with sodium bicarbonate produces carbon dioxide gas.

31. (c) I and IV

I and IV show budding in yeast and Hydra respectively.

32. (b) Ethene

Heating ethanol results in the removal of the water molecule, and thus, the formation of ethene.

$$C_2H_5OH \xrightarrow[170^0\,C]{conc.\,H_2SO_4} CH_2{=}CH_2$$

Ethanol Ethene

33. (d) Bud is wrongly labeled

The parent yeast cell has been incorrectly labeled as the bud.

34. (b) Less in case of A than in B

Increasing the temperature, increases the capacity of absorption of the raisins.

35. Carboxylic acid on reaction with sodium carbonate produces carbon dioxide gas which turns lime water milky whereas alcohols do not give this reaction.
Reaction of Carboxylic acid with sodium carbonate:
$2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + H_2O + CO_2$

36. **(a)** A
The eye should be kept at a distance from the glass slab while placing both the image pins P_3 and P_4; so that, all of them can be seen simultaneously.