

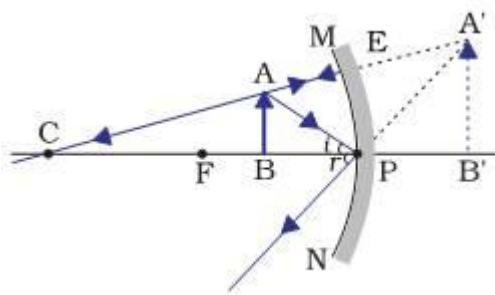
**Goa Board
Class X Science
Term II
Sample Paper – 2 Solution**

SECTION A

1. Covalent bonding.
2. When light is passing through a prism, it undergoes deviation and dispersion. This splits the white light into its 7 spectral colours.
3. Monohybrid cross is a kind of breeding experiment that considers only one character or trait at a time.
4.
 - (a) Atomic size decreases along a period from left to right. It is due to increased nuclear charge because of which the force of attraction between the nucleus and the valence electrons increases and therefore, the atomic size decreases, so Na is bigger in size than Mg.
 - (b)
 - i. Most metallic element: Na
Metallic character decreases along a period due to decrease in tendency to lose electrons.
 - ii. Most non-metallic element: Cl
Non-metallic character increases along a period from left to right due to an increase in the tendency to gain electrons.
5. The importance of watershed management system is –
 - i. It results in conservation of both water and soil.
 - ii. It is helpful in increasing the production of biomass.
 - iii. It controls excess of droughts and floods.
 - iv. It maintains ecological balance in nature.

(Any two)
6. Ciliary muscles can contract or relax. Owing to this, they can change the thickness of the eye lens, which also changes its focal length. With changes in the focal length, the eye lens can make images of nearby objects and also far away objects. So, power of accommodation of the eye is due to the function of the ciliary muscles.

7. Ozone depletion generally refers to the process in which the ozone layer undergoes thinning continuously over a period of time. The major cause of depletion of ozone layer is the release of harmful chlorofluorocarbons like methane and oxides of nitrogen into the atmosphere. These particles are released from vehicles, air conditioners etc. and produce active chlorine which in the presence of UV rays destroys the ozone and thus, causes ozone depletion.
8. The category stakeholders include:
 - i. Firstly, all those people who either live in forests or near forests and are dependent on them to meet each and every requirement.
 - ii. Second is the Forest Department, run by the Government and hence, is responsible for controlling land and other resources of forests.
 - iii. Third category includes all industrialists who are dependent on trees to obtain raw material.
 - iv. Lastly, come all those people who actively take part in conservation of wild life and natural resources.
9.
 - (a) Chemical reactivity of metals increases on going down in a group and chemical reactivity of non-metals decreases on going down in a group.
 - (b) It is not possible to have an element with atomic number 1.5 because atomic number is the number of protons in an atom which is always a simple whole number (it can be either 1 or 2 but not 1.5).
 - (c) Potassium is larger in size than lithium because as we move down the group, the atomic size of the element increases.
10. Dentists use a concave mirror to see an enlarged image of the teeth for examining it. If an object is placed close to a concave mirror, it forms an erect and enlarged image of the object. So, the dentist holds the mirror in such a way that the tooth lies within its focus.



Convex mirror will result in virtual image which is erect but diminished than the actual size. Diminished image of the teeth will not help the dentist in identifying the tooth problem.

11.

(a) To calculate the Position of the image,

Given:

Position of the image, $u = 16$ cm

Height of the object $h_1 = 2$ cm

Height of the image $h_2 = 3$ cm

$$\text{Magnification, } m = \frac{h_1}{h_2}$$

In this, height of the image will be taken as negative because it is a real image.

$$\therefore m = \frac{-3}{2} = -1.5$$

$$m = -\frac{v}{u} = -1.5$$

$$\therefore -1.5 = -\frac{v}{u}$$

$$v = -1.5 \times 16 = -24 \text{ cm}$$

(b) To calculate Focal length,

Given:

$u = -16$ cm,

$v = -24$ cm,

Focal length, $f = ?$

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

$$\frac{1}{-24} + \frac{1}{-16} = \frac{1}{f}$$

$$\frac{1}{f} = \frac{-5}{48}$$

$$f = -9.6 \text{ cm}$$

12.

- i. Sania has been facing difficulty in reading the black-board text from the last desk. Hence, she is suffering from Myopia or short sightedness.
- ii. Two possible causes –
 1. Excessive curvature of the eye lens
 2. Elongation of the eyeball.
- iii. Friendship and concern for each other

13.

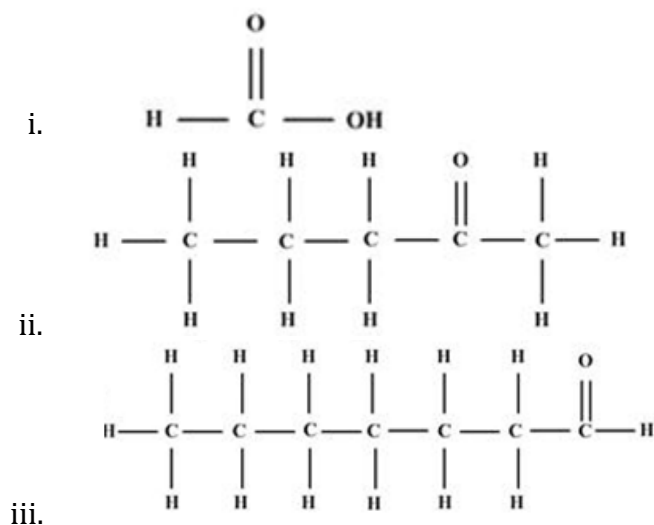
- (a) White light is composed of seven spectral colours which are of different wavelengths. They travel with different speeds when passed through a medium like glass. As a result of difference in speeds of constituent colours of light while passing through a medium, their refractive indices are also different, and hence, the white light splits into respective spectral colours. This splitting of colours of white light is known as dispersion of white light.
- (b) Range is: 4×10^{-7} m to 8×10^{-7} m.

14.

- (a) Physical and chemical properties of elements are determined by their atomic numbers which is equal to the number of electrons.
By using the number of electrons, we can find out the number of valence electrons and hence, the physical and chemical properties.
- (b) According to Modern Periodic Law, elements are arranged in the Modern Periodic Table in the increasing order of their atomic numbers. Isotopes have the same atomic number and different atomic mass. So, though they have different atomic masses still they are given the same position in the Modern Periodic Table.

15.

(a)



(b)

- Methan-1-al
- 2-bromo butane
- Hex-3-ene

16.

- (a) The testes are located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than the normal body temperature.
- (b) The aim of the mechanical barrier of contraception is to prevent the sperms from reaching the egg.

An example of this contraceptive is condoms worn on the penis.

17.

- (a) The pink colour of the flowers is the dominant trait whereas the recessive trait is the white colour.
3:1 (pink:white)
- (b) On the basis of presence of feathers in both birds and reptiles, both are said to be closely related. Initially, feathers performed the function of protection from cold as in case of reptiles but later on, in birds they adapted to help them fly.

18.

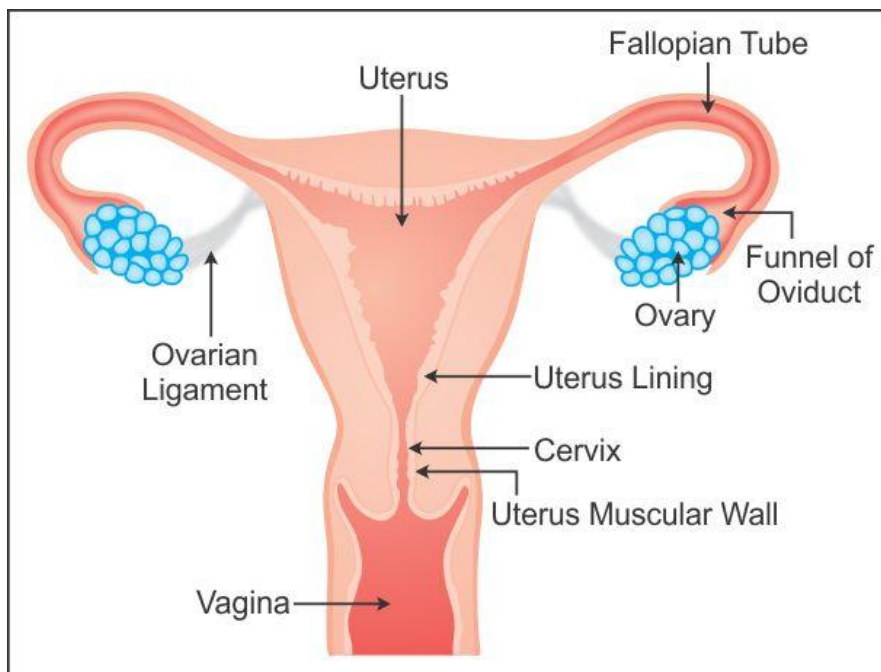
- (a) Mendel chose a pea plant because:
 - i. Pea plant completes its life cycle in a very short interval of time.
 - ii. Pea plant has several distinct and contrasting characters that can be easily studied.
- (b) No, experiences of a person will not be transferred to the next generation because it is an acquired trait.

19.

- (a)
 - i. **Haploid:** A single set of impaired chromosomes is called haploid.
 - ii. **Diploid:** The paired condition of chromosomes is known as diploid.
- (b) Genes are segments of DNA on a chromosome occupying specific positions. Every chromosome contains DNA and the chromosomes are the carriers at the genes. Genes have a specific sequence of nucleotides which determines their functions.
- (c) It occurs due to change in gene frequency leading to expression of one type of trait in a geographically isolated population.

20.

(a)



Female reproductive system

(b)

- i. It produces female gametes called ovum.
- ii. It secretes female sex hormones.

21.

(a) Nitrogen has valency 3. So, it needs 3 electrons to complete its outermost shell. It requires a lot of energy to gain three electrons or lose five electrons. Hence, two atoms of nitrogen share three electrons to form a triple bond. Therefore, in each molecule of nitrogen, two atoms are joined by a triple bond.

(b)

Saturated hydrocarbons	Unsaturated hydrocarbons
<ol style="list-style-type: none"> 1. In these hydrocarbons, carbon atoms are linked by single bond only. 2. They burn in air with a clean, non-sooty flame. 3. They undergo substitution reactions. 	<ol style="list-style-type: none"> 1. In these hydrocarbons, double and/or triple carbon bonds are also present. 2. They burn with a yellow flame producing a large amount of smoke. 3. They undergo addition reactions.

22.

- (a) Image distance (v), object distance (u) and focal length (f) of a lens are related to each other by the following formula

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

This is called lens formula.

Where v=image distance

u=object distance

f=focal length

Focus of a convex lens lies on the right side of the lens, hence, according to sign convention, the distances measured to the right are taken as positive. So, the focal length for convex lens is taken as positive.

Similarly, the focus of a concave lens lies on the left side of the lens; hence, according to sign convention, the distances measured to the left are taken as negative. So, its focal length is taken as negative.

- (b) Given:

Object distance, u = -20cm (It is to the left of the lens)

Focal length, $f = \frac{r}{2} = +10 \text{ cm}$

Image distance = ?

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

$$\frac{1}{v} = \frac{1}{10} - \frac{1}{20}$$

$$\frac{1}{v} = \frac{1}{20}$$

v = 20 cm

The image is formed at a distance of 20cm. It is real and inverted.

Size of image can be found out by

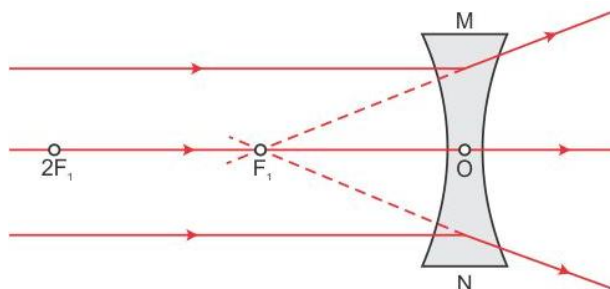
Magnification, $m = \frac{v}{u}$

$$m = \frac{20}{-20} = -1$$

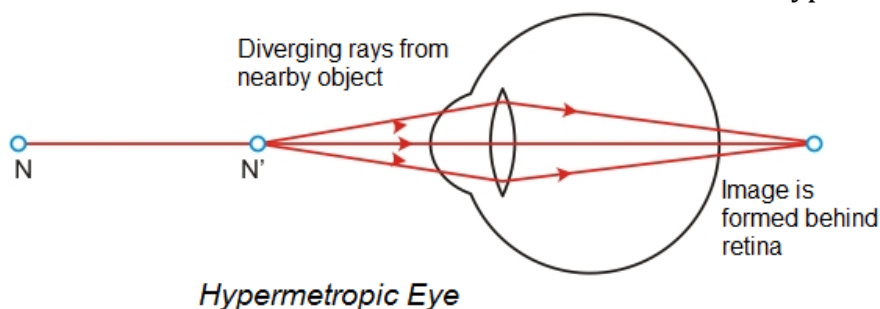
This implies that the image is of the same size as the object and is real and inverted.

23.

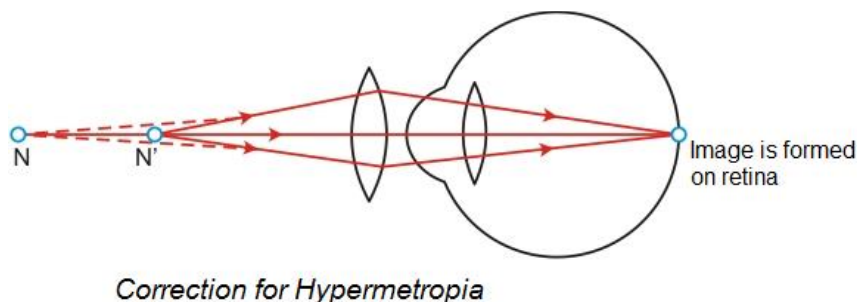
- (a) Diagram of concave lens showing that it is a diverging lens.



- (b) Diagram below shows how convex lens corrects the defect of hypermetropia.



In a hypermetropic eye, the image of the nearby object lying at normal near point N' is formed behind the retina.



Correction of hypermetropia.

The convex lens forms a virtual image of the object at the near point N of this eye.

- (c) It means that the image is real and inverted.

24.

- (a) Tallness of a plant is a characteristic. Height of a plant depends on the amount of hormone secreted by the plant responsible for its tallness. The gene has the coding for the amount of hormone released. If the gene for that hormone has an alteration and makes its efficiency low, then the plant will be short. Thus, this shows that the traits are controlled by genes.

(b)

- i. In a turtle, high incubation temperature results in the development of female progeny.
- ii. In a lizard, high incubation temperature results in the development of male progeny.

SECTION B

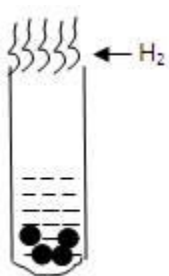
25. (c) $f_3 > f_2 > f_1$

The image gets blurred and enlarged (or shortened) when the lens is moved farther (or nearer) from (to) the screen.

26. (c) Z

Sun is at infinite distance. So, rays coming from the sun can be treated as parallel beams of light which get reflected from the concave mirror and form a point sized image on the screen

27. (d)



This test tube produces a pop sound on bringing a burning matchstick close to the tube because hydrogen burns in air to produce a pop sound.

28. (c) Spirogyra

Spirogyra can grow a new individual from each fragment of their body.

29. (c) 40%

40% is the correct percentage of water absorbed by the resins as the increase in weight is 2 gm.

30. (a) Yellow sooty flame

On combustion, saturated carbon compounds give a clean flame while unsaturated carbon compounds give a yellow flame with lots of black soot.

31. (a) Carbonyl group

Aldehydes and ketones have Carbonyl group ($C=O$) in common.

32. (c) Ethene

The concentrated sulphuric acid causes the dehydration of ethanol to ethene.

33. (a) A

The potato with eyes (A) will give rise to a plant as potato's show vegetative reproduction by means of eye-spots.

34.(c) (III)

When light goes from rarer medium to denser medium; it bends towards the normal and vice-versa. This condition is fulfilled in figure (III).

35.(b) iii, iv, i, ii

iii, iv, i, ii is the correct sequence to depict the process of binary fission in amoeba.

36.

(a) Sulphuric acid being a strong dehydrating agent removes water from the reaction mixture of ethanoic acid and ethanol. As a result, the reaction proceeds only in the forward direction to form ester.

(b) Esters are used in making artificial perfumes.