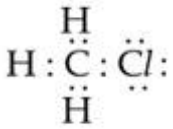
Goa Board
Class X Science
Term II
Sample Paper – 7 Solution

SECTION A

1. A bi-focal lens is required for this defect. It is also known as Presbyopia. This defect is common in old age.

2.



3. In plants, the fusion of male and female gamete takes place in the embryo sac.

4.

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

5. Four characteristics of an image formed by a plane mirror are:

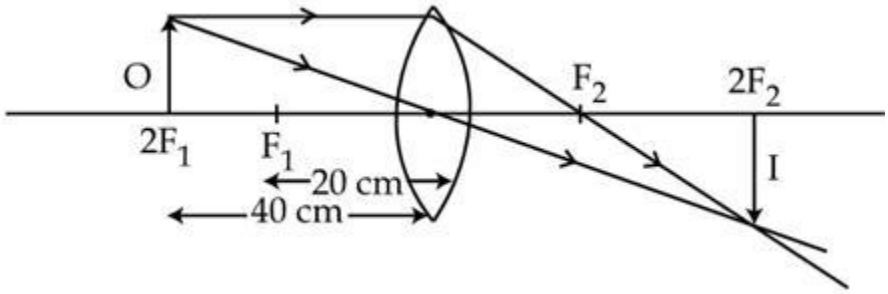
i. Image is always erect and virtual.
ii. Image size is same as object size.
iii. Image is laterally inverted.
iv. Image distance is same as the object distance.

6. Electronic configuration of A: 2, 5
Electronic configuration of B: 2, 8, 5
A will be more electronegative in nature due to small size and highly effective nuclear pull.

7.

(a) Incineration is the process of disposing off domestic and industrial (chemical) waste safely without polluting the environment.
(b) It is considered as a safe method of waste disposal because in this process, waste materials are burnt at a very high temperature of 1000^{o} C so that, they can be converted into gases and water vapours. The ash, thus, left behind is also devoid of any harmful particles.

8. Object should be placed at 2F (i.e. 40 cm) distance from the optical centre of the lens.



The image formed is real, inverted and of the same size as the object.

9. The ratio of the height of image to the height of object is known as linear magnification

$$\text{Magnification} = \frac{\text{height of the image}}{\text{height of the object}}$$

or $m = \frac{h_2}{h_1}$

$m = \text{magnification}$

$h_2 = \text{height of image}$

$h_1 = \text{height of object}$

(a) When the image is real, it lies below the principal axis; hence, the height of the image is negative as per New Cartesian Sign Convention. As height of object is always positive, therefore,

Magnification, $m = \frac{h'}{h} = \text{negative}$

(b) When the image is virtual, it lies above the principal axis; hence, height of the image is positive as per New Cartesian Sign Convention. As height of object is always positive, therefore,

Magnification, $m = \frac{h'}{h} = \text{Positive}$

10. Given:

F=-20 cm

i. For real image,

m=-3

m=-v/u

or v=3u

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

$$\frac{1}{-20}=\frac{1}{3u}+\frac{1}{u}=\frac{4}{3u}$$

$$u=-\frac{80}{3}=-26.27 \text{ cm}$$

ii. For virtual image,

M = +3

M = -v/u

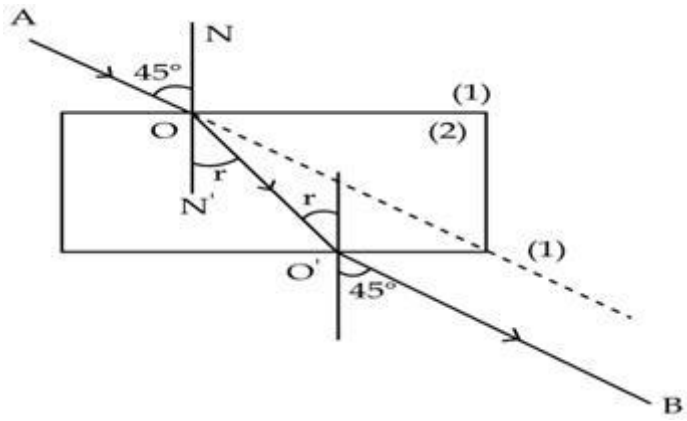
or v = -3

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

$$\frac{1}{-20}=\frac{1}{-3u}+\frac{1}{u}=\frac{2}{3u}$$

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

11.



The refractive index of medium (2) with respect to medium (1) is given as,

Using snell's law

$$n_{21}=\frac{\sin i}{\sin r}=\frac{\sin 45^0}{\sin 30^0}=\frac{1/\sqrt{2}}{1/2}=\sqrt{2}=1.414$$

If second medium is water in place of medium (2), angle of refraction will decrease because water is rarer than medium (2).

12.

i. Atomic radius decreases in moving from left to right along a period
Reason: It is due to increase in nuclear charge which tends to pull the electrons closer to the nucleus.

ii. Atomic size increases down the group.
Reason: It is because new shells are being added. This increases the distance between the outermost electrons and the nucleus.

13. Alkali metals have one electron in their respective valence shells. They have a strong tendency to lose this electron and acquire a stable configuration of the nearest noble gas. Thus, the reactivity of alkali metals depends upon their ability to lose electrons. Since their tendency to lose electrons increases down the group, their reactivity increases down the group.

In contrast, halogens have seven electrons in their respective valence shells and thus, have a strong tendency to acquire or gain one electron to achieve the stable electronic configuration of the nearest noble gas. Thus, reactivity of halogens depends upon their ability to attract electrons. Since this tendency to gain electrons decreases down the group due to increase in size, the reactivity decreases down the group.

14.

i. Element 'b' is the most reactive.
ii. 'd' has 4 shells.
iii. Elements 'e' and 'g' have valency 2.
iv. 'j' has zero valence electrons.
v. Element 'h' is more non-metallic.
vi. Element 'e' is bigger in size.

15.

i. It helps to recharge the ground water beneath.
ii. The stored water does not evaporate, but spreads to recharge wells and provides moisture for vegetation over a wide area.
iii. It does not provide breeding grounds for mosquitoes like stagnant water collected in ponds or artificial lakes.

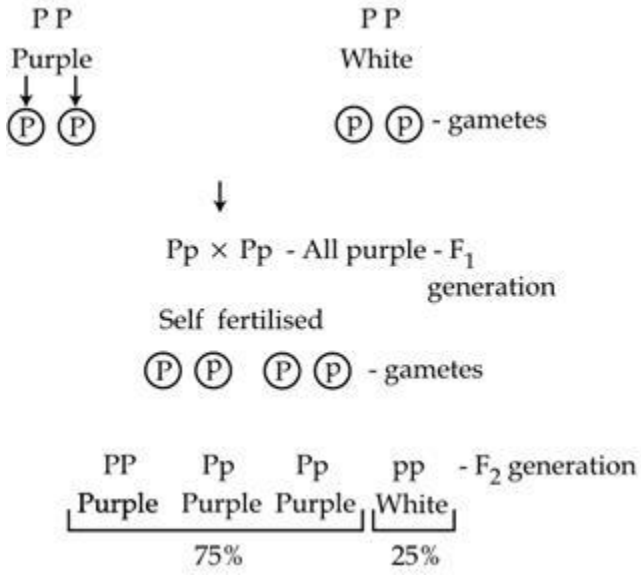
16. All of these are similar in fundamental structures but perform different functions. It indicates that the more the similarity in the fundamental structure, the closer is the relationship among the species.

Functions of forelimbs are:

i. Fore limbs of human beings - Eating and writing
ii. Forelimbs of birds - flying.

17. Fossils are the impressions or remains of ancient life preserved in sedimentary rocks. When organisms die, their bodies get decomposed and lost. Yet, every once in a while, the entire body or at least some parts may be in an environment, that does not let it decompose completely. If a dead insect gets caught in hot mud, it will not decompose quickly and the mud will eventually harden and retain the impression of the body parts of the insect. All such preserved traces of living organisms are called fossils.

18.



In F_2 generation, 75% of the progeny will be Purple and 25% will be white.

19.

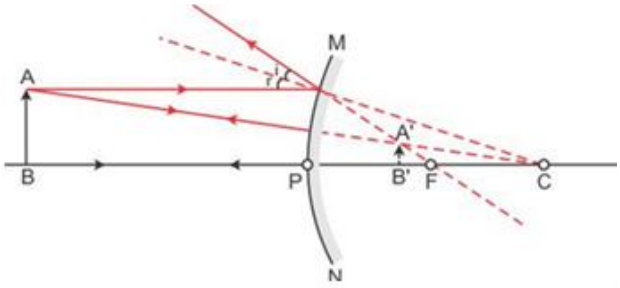
(a)

Menarche	Menopause
(i) It is the start of menstruation in human females.	(i) It is the stoppage of menstruation in human females.
(ii) It occurs at the age of 10-12 years.	(ii) It occurs at the age of 50 years.
(iii) It marks the beginning of reproductive life in a human female.	(iii) It is the end of reproductive life in a human female.

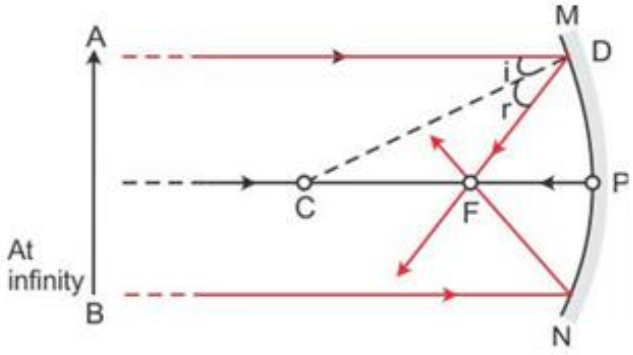
(b) Placenta is the nutritive connection between mother and embryo. It allows the diffusion of carbon dioxide and urea from embryo to mother's blood; thus, it acts as an excretory organ. From the mother's blood it is sent to the excretory system for excretion.

20.

i. Convex mirror is used to get a virtual and diminished image of an object.
Here, position of the object is between infifnity and the pole of the mirror and position of the image is between P and F behind the mirror. Hence, we get a diminished image which is vritual and erect.



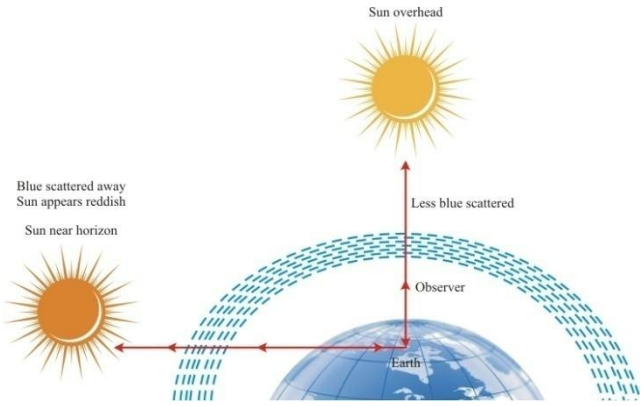
ii. Concave mirror is used to get a real and diminished image of an object.
Here, posistion of the object wiil be at infinity and position of the image will be at focus 'F'. Hence, we het highly diminished, point sized image which is real and iverted.



21.

(a) When a beam of light strikes fine particles of smoke, dust, water droplets etc. the beam of light is visible. This phenomenon of the scattering of light by colloidal particles is known as the Tyndall effect.

(b)



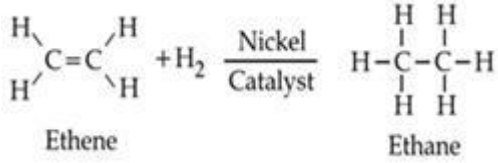
- Light from the Sun near the horizon passes through a thicker layer of air and a larger distance in the earth's atmosphere before reaching our eyes.
- However, light from the Sun overhead has to travel a lesser distance.
- At noon, the Sun appears whitish or yellowish as only little blue and violet light are scattered. However, near the horizon, most of the blue light and shorter wavelengths are scattered. Thus, the Sun appears reddish in colour.

22.

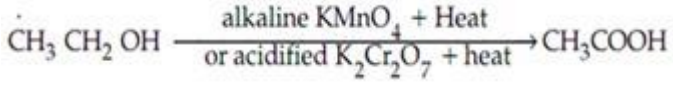
i. (a) Pentanal (b) Butyne

ii.

(a)



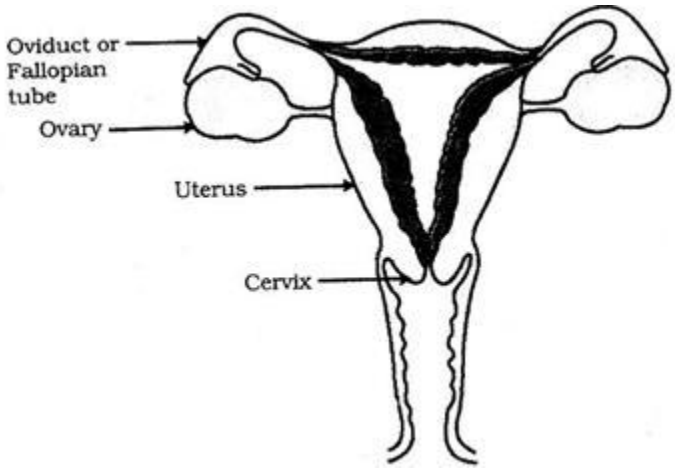
(b)



(c) $Na_2CO_3 + 2CH_3COOH \rightarrow 2CH_3COONa + CO_2 + H_2O$

23.

(a)



(b) Breast size begins to increase.

(c) They do not allow entry of sperms into the female genital tract at the time of copulation.

24. Double fertilization occurs when one male nucleus fertilizes with an egg cell to form a zygote cell and the other male nucleus fuses with two polar nuclei to cause triple fusion. As these two types of fertilizations take place at the same time in the ovule of the plant, it is known as double fertilization.

After fertilization:

i. Ovary develops into a fruit.

ii. Ovules develop into seeds.

Vegetative propagation is used in methods such as layering or grafting to grow many plants like sugarcane, roses or grapes for agricultural purposes.

SECTION B

25. (b) (15 cm, 15 cm) and (inverted, inverted)

In each case, the distances l_1 and l_2 give the focal length of the mirror and lens respectively. Also, the image formed in both cases is real and inverted.

26. (b) (C), (D), (B), (A)

To determine the focal length of a convex lens, the correct sequence of steps is as follows:

1. Select a suitable distant object.
2. Hold the lens between the object and screen with its faces parallel to the screen.
3. Adjust the position of the lens to form a sharp image.
4. Measure the distance between the lens and the screen.

27. (a) Conc. sulphuric acid

Alkaline potassium permanganate is used for oxidising alcohols to acids.

28. (c) I and II both

Acetic acid ionizes in water, forming both, acetate and hydronium ions.

29. (b) Hydrochloric acid is stronger than ethanoic acid.

Hydrochloric acid (inorganic acid) is stronger than ethanoic acid (organic acid).

30. (b) II

Diagram II shows enlargement of nucleus and constriction in Amoeba.

31. (b) Hydrochloric acid is stronger than ethanoic acid.

As in the given diagram, a yeast cell is shown with an outgrowth or bud on it.

32. (d) IV

Acetic acid is completely miscible with water and forms a clear solution when dissolved in water.

33. (c) Swollen in both

Solution in both A and B are hypotonic to raisins and hence, they swell.

34. (a) II, III, IV, I

II is Amoeba, III shows enlargement of nucleus, IV shows constriction and I shows two daughters Amoeba.

35. Ethanoic acid reacts with carbonates to give salt, carbon dioxide and water.

Reaction:

$2CH_3COOH + Na_2CO_3 \longrightarrow 2CH_3COONa + H_2O + CO_2$

36. **(d)** complete image is formed but of decreased intensity

A Complete image of the object is formed but the intensity of image is reduced.