



11. Reproduction is a process by which a living organism is able to produce more of its own kind.
- (i) It provides stability to the population of species
  - (ii) It replenish the lost species of the population
  - (iii) It provide advantageous character to struggle for its survival.

**Regeneration** : The ability of living organism to repair themselves or restore their lost part is called regeneration.

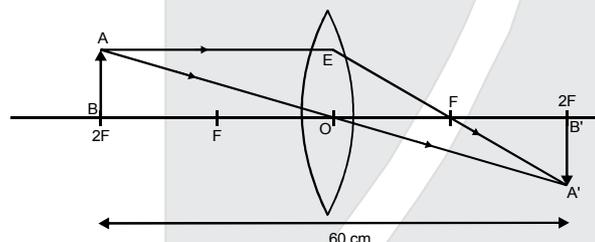
**Regeneration of Hydra** : All body column cells are continuously undergoing mitosis. They migrate to the extremities where they are eventually shed. Therefore, the Hydra is constantly regenerating.

12.

FISSION	FRAGMENTATION
It is division produces two or more separate cells, species etc. which are Identical to each other	It is division where more than two cells are found depending upon the number of fragments.
Cell are same in size & shape	Cells do not have same size and Shape.
Occurs in unicellular organisms e.g. Amoeba	Occurs in multicellular organisms e.g. Amoeba

13. (a) (i) Progeny formed by sexual reproduction is the results of combination of the genetics material from different individual.  
(ii) Crossing over is the process occur during gametes production in which DNA is exchanged.
- (b) (i) Pollen grain  
(ii) Pollination  
(iii) It provide pathway to pollen tube  
(iv) Embryo formed after fertilization
14. Every species or organism has tendency for genetic variation which play important role in the origin of new species and form basis for evolution. Classification involve organizing them in different groups based on the similarities and differences of characteristics. It tells us about resemblances and relationship between various organism facilitating studies or research. Classification of species a reflection of their evolutionary relationship. Thus we can say that the area of study evolution and classification are interlinked.
15. Mendel's experiment traits are inherited independently-
- (i) When  $F_1$  Generation is self fertilized then various type of traits are seen in  $F_2$  generation.
  - (ii) In  $F_2$  generation, alleles get independently separated from each other without contamination showing their own traits.
  - (iii) Their traits show specific features when inherited to next generation.

16.



Given  $m = -1$ , negative sign shows that image is real and inverted.  
 $\therefore |m| = 1$ , it means that  $h_i = h_o$

and this is only possible in convex lens.

$\Rightarrow$  object and image both will be at  $2F$

so,  $v = u$

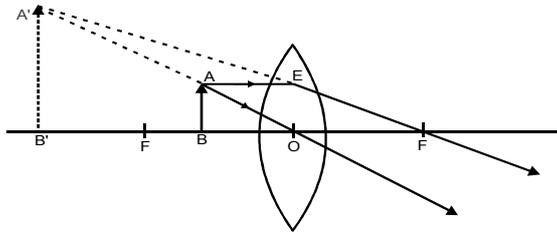
$u = -30 \text{ cm}$

$v = +30 \text{ cm}$

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

$$\frac{1}{f} = \left(\frac{1}{30}\right) - \left(-\frac{1}{30}\right)$$

$f = 15 \text{ cm}$

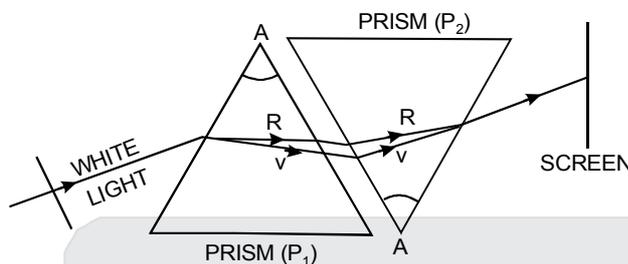


Now, object is moved 20 cm towards the lens.

$u = -10\text{cm}$ ,  $v = ?$ ,  $f = +15\text{ cm}$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \quad \Rightarrow \quad \frac{1}{v} = \frac{1}{15} - \frac{1}{10} = \frac{2-3}{30} \quad \Rightarrow \quad v = -30\text{ cm}$$

17. **Activity** : For this experiment, two prisms  $P_1$  and  $P_2$  of the same material and of the same refracting angle  $A$  are arranged as shown in figure. Sunlight from a narrow slit  $S$  falls on the first prism  $P_1$  with its base downwards and gets dispersed into constituent colours (VIBGYOR) and the bending takes place downwards. Now this dispersed light falls on the second prism  $P_2$  with its base upwards so that it deviates the light upwards.

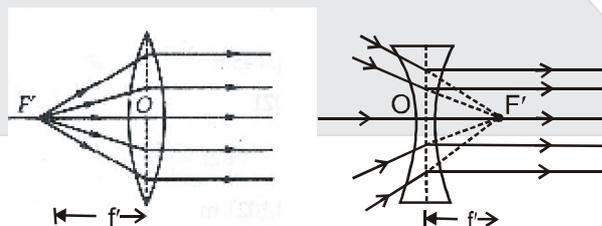


It is found that the light coming out of the second prism  $P_2$  is almost white and is in direction parallel to the direction of light incident on the first prism  $P_1$ . In fact, the two prisms  $P_1$  and  $P_2$  combined together effectively acts like a parallel sided glass slab. This shows that the prism  $P_1$  simply disperses the white light into its constituent colours and the prism  $P_2$  recombines these colours to form white light. The prism  $P_1$  is called **dispersing-prism** and the prism  $P_2$  is known as **recombination-prism**.

18. (a) It is necessary to conserve environment for protecting our atmosphere and living habitat from degradation.  
 (b) Green dust-bin contain biodegradable waste or compostable material waste from landfills.  
 (c) Spread awarness in people to save environment.  
 He is also working hard for preventing environmental degradation of the sorrounding.

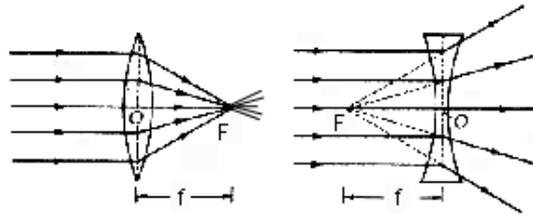
19. (a) **Principal fos focal length :**

**First principal focus and first focal length :** It is a fixed point on the principal axis such that rays starting from this point (in convex lens) or appearing to go towards this point (concave lens), after refraction through the lens, become parallel to the principal axis. It is represented by  $F_1$  or  $f'$ . The plane passing through this point and perpendicular to the principal axis is called the first focal plane. The distance between first principal focus and the optical centre is called the first focal length. It is denoted by  $f_1$  or  $f'$ .



**Figure : Ray diagram showing First principal focus**

**Second principal focus and second focal length :** It is a fixed point on the principal axis such that the light rays incident parallel to the principal axis, after refraction through the lens, either converge to this point (in convex lens) or appear to diverge from this point (in concave lens). The plane passing through this point and perpendicular to principal axis is called the second focal plane. The distance between the second principal focus and the optical centre is called the second focal length. It is denoted by  $f_2$  or  $f$ .



**Figure :** Ray diagram showing Second principal focus

- (b) Given : divergent lens (concave lens)  
 $f = -30 \text{ cm}$ ,  $v = -15 \text{ cm}$ ,  $u = ?$ ,  $h_o = 5 \text{ cm}$

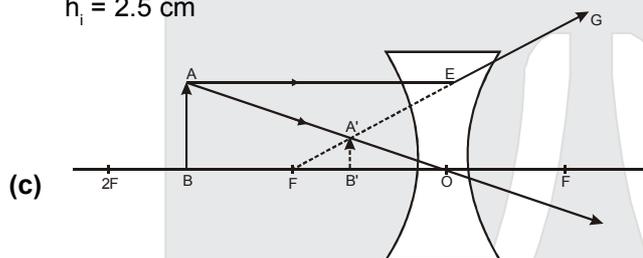
$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$-\frac{1}{30} = -\frac{1}{15} - \left(\frac{1}{u}\right)$$

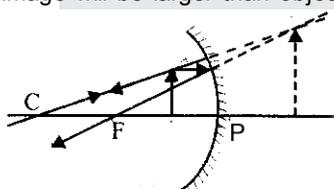
$$u = -30 \text{ cm}$$

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

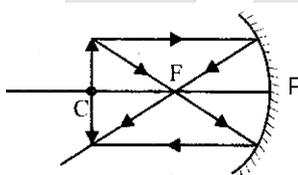
$$h_i = 2.5 \text{ cm}$$



20. (i)  $f = -12 \text{ cm}$ , range to obtain erect image  $\Rightarrow 0 < u < 12$   
(ii) Image will be larger than object



- (iii)



Given :  
 $f = -12 \text{ cm}$ ,  $u = -24 \text{ cm}$ ,  $v = ?$

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

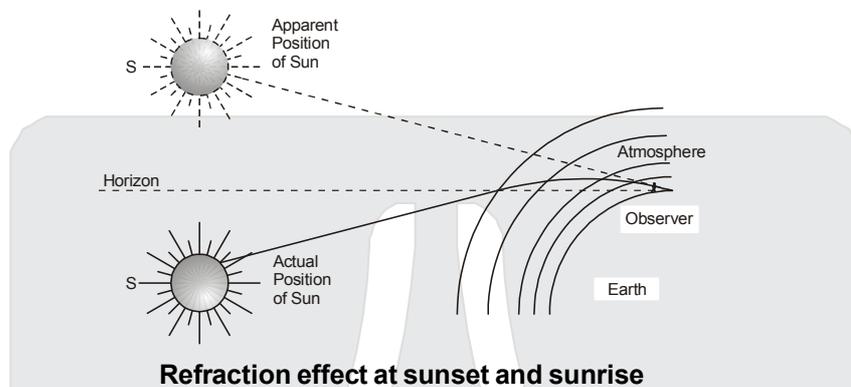
$$v = -24 \text{ cm}$$

21. **Atmospheric Refraction** : The density of the atmosphere, as we know goes on decreasing as the distance above the sea level increases. The refractive index of a layer of air at a particular level goes on changing. Due to this change in density the refraction take place when light passes through the Earth atmosphere, this phenomena is called as atmpspheric refraction.

(a) **Twinkling of stars** : On a clear night, you might have observed the twinkling of a star, which is due to an atmospheric refraction of star light. The density of the atmosphere, as we know goes on decreasing as the distance above the sea level increases. For the sake of simplicity, air can be supposed to be made up of a very large number of layers whose density decreases with the distance above the surface of the earth. Therefore, the light from a heavenly body, such as a star, goes on gradually bending towards normal as it travels through the earth's atmosphere. As the object is always seen in the direction of the light reaching the observer's eye, the star appears higher up in the sky than its actual position. Further, the densities of the various layers go on varying due to the convection currents set up in air by temperature differences. Thus, the refractive index of a layer of air at a particular level goes on changing.

Due to these variations in the refractive indices of the various layers of air, the light from a star passing through the atmospheric air changes its path from time to time and therefore, the amount of light reaching the eye is not always the same. This increase or decrease in the intensity of light reaching the eye results in the change in apparent position or twinkling of the star.

(b) **Advanced sun-rise and delayed sun set** : Due to the atmospheric refraction, the sun is visible before actual sunrise and after actual sunset.



With altitude, the density and hence refractive index of air-layers decreases. The light rays starting from the sun S travel from rarer to denser layers. They bend more and more towards the normal. However, an observer sees an object in the direction of the rays reaching his eyes. So to an observer standing on the earth, the sun which is actually in a position below the horizon, appears in the position S', above the horizon. The apparent shift in the position of the sun is by about  $0.5^\circ$ . Thus the sun appears to rise early by about 2 minutes and for the same reason, it appears to set late by about 2 minutes. This increases the length of the day by about 4 minutes.

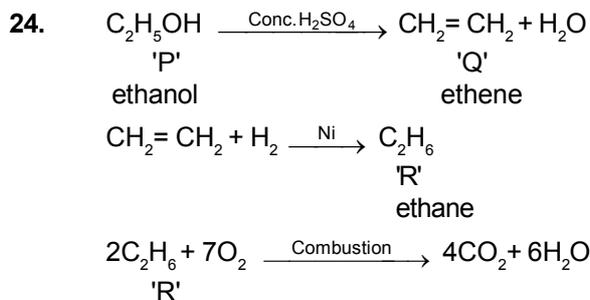
22. • **Placenta** : It is physical barrier connecting the embryo from the mother womb to the uterine wall to allow nutrient uptake, waste removal, etc.  
 • **Structure** : In human Placenta is 22 cm (9 inch) in length 2 - 2.5 cm in thickness, weight 500 gm. it has a dark reddish - blue or crimson color . It is discoidal in shape.  
 • **Functions** : –Provide nutrition to embryo  
 – Helps in excretion.  
 – Provide Immunity to the foetus

23. Evolution is change in the heritable traits of biological populations over successive generation. It occurs due to it occurs due to continued mutation of natural selection.

They provide gradual change in phenotype which respect to shape and size of organism which also indicate adaptation with respect to changing environmental condition.

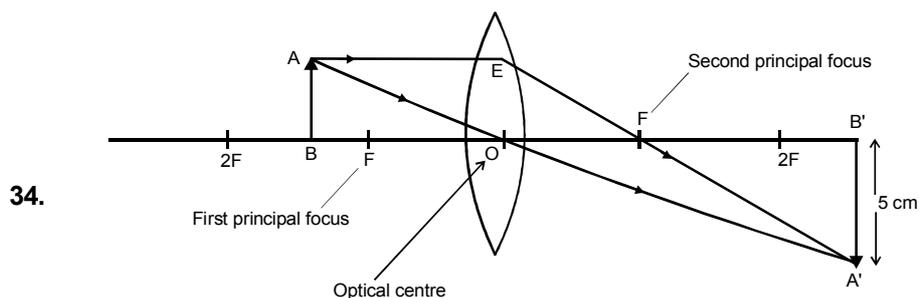
Defination of fossile : The remains or Impression pre-historic plant or animal embedded. In rock and preserved in petrified form. Fossil provide the evidence that present animals and Plants have originated from previously existed ones through the process of continous evolution. e.g. fossile of Archaeopteryx shows characteristics both reptile and birds.

It shows that aves has emerged from phylum reptiles.



**SECTION # B**

25. (d) 26. (a) 27. (b) 28. (a) 29. (d) 30. (c) 31. (c)  
 32. (a) 33. (d)



Given : Convex lens  
 $f = +10 \text{ cm}$ ,  $u = -15 \text{ cm}$ ,  $v = ?$ ,  $h_o = 2.5 \text{ cm}$

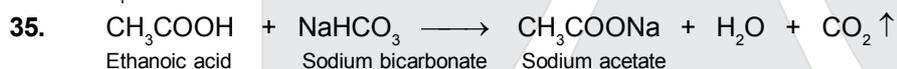
$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{10} = \frac{1}{v} - \left(-\frac{1}{15}\right)$$

$$v = 30 \text{ cm}$$

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

$$h_i = -5 \text{ cm}$$



When sodium bicarbonate is added to ethanoic acid a brisk effervescence due to evolution of  $CO_2$  gas and the temperature of flask increases.

36. The process is known as budding

