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Answers Key:

Long Answers

1. **(i) Simple Microscope :** Simple microscope has a convex lens of short focal length. It is held near the eye to get enlarged image of small objects.
(ii) Let an object (AB) is placed at a point within the principal focus (u < f) and the observer's eye placed just behind the lens.
(iii) As per this position the convex lens produces an erect, virtual and enlarged image (A'B). The image formed is in the same side of the object and the distance equal to the least distance of distinct vision (D) (D = 25 cm for normal human eye)

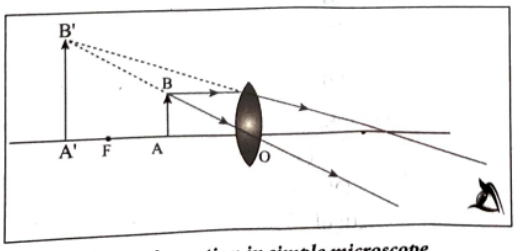
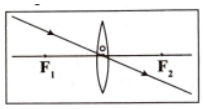


Image formation in simple microscope

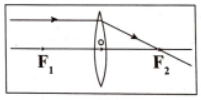
Short Answer

2. (i) Light is a form of energy.
(ii) Light always travels along a straight line.
(iii) Light does not need any medium for its propagation. It can even travel through vacuum,
(iv) The speed of light in vacuum or air is, $c=3x10^8\ ms^{-1}$
(v) Different coloured light has different wavelength and frequency.
(vi) Violet light has the lowest wavelength and red light has the highest wavelength.
(vii) When light is incident on the interface between two media, it is partly reflected and partly refracted.
3. When an object is placed in front of a lens, the light rays from the object fall on the lens.
Rule-1: When a ray of light strikes the convex lens obliquely at its optical centre, it continues to follow its path without any deviation.



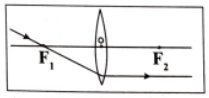
Rays passing through the optical centre

Rule-2: When rays parallel to the principal axis strikes a convex lens, the refracted rays are converged to (convex lens) the principal focus.



Rays passing parallel to the optic axis

Rule-3: When a ray passes through (convex lens) the principal focus strikes a convex lens, the refracted ray will be parallel to the principal axis.



Rays passing through or directed towards the principal focus

4.

	Myopia	Hypermeteropia
(i)	It is also known as short sightedness.	It is also known as long sightedness.
(ii)	It occurs due to the lengthening of eye ball.	It occurs due to the shortening of eye ball.
(iii)	Nearby objects can be seen clearly but distant objects cannot be seen clearly.	Distant objects can be seen clearly but nearby objects cannot be seen clearly.
(iv)	The focal length of eye lens is reduced or the distance between eye lens and retina increases.	The focal length of eye lens is increased or the distance between eye lens and retina decreases.
(v)	Image of distant objects are formed before the retina.	Image of nearby objects are formed behind the retina
(vi)	It can be corrected using a concave lens.	It can be corrected using a convex lens.

5. $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$
$\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$
$= \frac{1}{-15} + \frac{1}{-10}$
$\frac{-10-15}{150} = \frac{-25}{150}$
$v = \frac{150}{25} = -6$ cm
$\frac{1}{v} = \frac{-1}{6} \Rightarrow v = -6$ cm
Magnification $m = \frac{\text{Distance of the image}}{\text{Distance of the object}}$

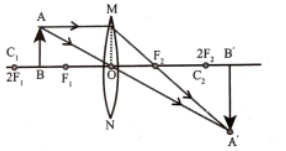
$m = \frac{v}{u} = \frac{h_2}{h_1}$

$m = \frac{-6}{-10} = \frac{h_2}{3}$

$= \frac{-18}{-10} = h_2$

∴ Size of the image h_2 = 1.8 cm

Very Short Answer

6. 

7. When a beam of white light or composite light is refracted through any transparent media such as glass or water, it split into its component colours. This phenomenon is called as dispersion of light.

8.

No.	Convex Lens	Concave Lens
1.	Thicker in the middle than at edges	Thinner in the middle than at edges.
2.	It is converging lens,	It is diverging lens.
3.	Produces mostly real images.	Produces a virtual image.
4.	Used to treat hypermetropia,	Used to treat myopia.

9. The ability of the eye lens to focus nearby as well as the distant objects is called power of accommodation of the eye.
10. Snell's law states that, the ratio of the sine of the angle of incidence and sine of the angle of refraction is equal to the ratio of refractive indices of the two media.

$\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1}$

11. The amount of scattering of light is inversely proportional to the fourth power of the wavelength. This is called as Rayleigh scattering law

Amount of scattering 'S' $\propto \frac{1}{\lambda^4}$

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