

DPP – 4**Light**

1. A convex lens and a concave lens are placed flat on a table. How will you distinguish between the two, without touching?
2. In the diagram given below is shown an object AB, and its image I, formed by a lens. Copy the diagram, draw the position of lens and mark its focal length.



3. Show by a diagram the refraction of two incident rays parallel to the principal axis passing through a convex lens by treating it as a combination of a glass block and two triangular prisms.
4. Show by a diagram the refraction of at least three rays of light parallel to the principal axis of a concave lens by treating it as a combination of a glass block and two triangular prisms.
5. Define the term principal axis of a lens.
6. Explain the term optical centre of a lens.
7. Define the term focal length of a lens.
8. Define the term focal length of a convex lens.
9. Define the focal length of a concave lens.
10. What do you understand by the term first focal point of a convex lens? Illustrate your answer by drawing a diagram. Also show first focal plane.
11. What do you understand by the term first principal focus (first focal point) of a concave lens. Illustrate your answer by drawing a diagram. Also show first focal plane.
12. By drawing neat diagram, define second focal point (second principal focus) of a convex lens. Also show the second focal plane.
13. What do you understand by the term second focal point of a concave lens? Illustrate your answer by drawing a neat diagram. Also show the second focal plane.
14. Draw diagram for the following situations for a single ray of light for convex lens showing clearly the positions $2F_1$, F_1 , O, F_2 and $2F_2$.
 - (a) When a ray of light is initially travelling parallel to principal axis.
 - (b) When a ray of light initially passes through F_1 .
 - (c) When a ray of light initially passes through optical centre.
15. What do you understand by the term focal plane of a lens?

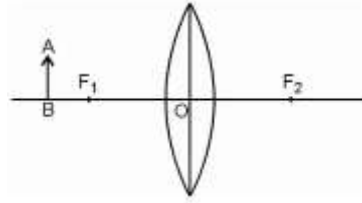
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Light

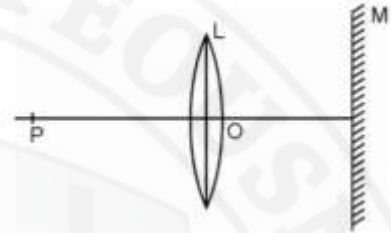
1. Where do the following parallel beams of light meet on passing through a convex lens when:
 - (a) the beam is parallel to the principal axis.
 - (b) the beam is not parallel to the principal axis.
2. Copy and complete the diagrams given below. In the diagram indicate the focal length of lens.



3. Draw a ray diagram to show how lens can be used as magnifying glass.
4. A convex lens forms a real, inverted and diminished image of an object. Illustrate by drawing a neat diagram.
5. An image is formed by a convex lens which is real, inverted and same size as object. Draw a neat diagram to illustrate it.
6. An image is formed by a convex lens which is real, inverted and enlarged. Draw a neat diagram to illustrate.
7. An object is placed at the first principal focus of a convex lens. Draw a diagram for the formation of image and state its characteristics.
8. An object is placed anywhere between the infinity and optical centre of a concave lens. Draw a diagram for the formation of image.
9. What do you understand by the real image? State its characteristics.
10. What is a virtual image? State its characteristics.
11. State the position of object, position of image; nature of image, when:
 - (i) Convex lens is used as burning glass.
 - (ii) Convex lens is used as objective lens of photographic camera.
 - (iii) Convex lens is used as an erecting lens in terrestrial telescope.
 - (iv) Convex lens is used in the cine projector.
 - (v) Convex lens is used in search light.
 - (vi) Convex lens is used in observing biological specimens.
12. An object AB is placed on the principal axis of a convex lens as shown in the figure below. Copy the diagram. Using three rays, starting from point A and the properties of the points F_1 ; O and F_2 , obtain the image formed by the lens. [F_1 and F_2 are the first and second principal foci of lens]



13. Does convex lens always forms real image? Give reason for your answer.
14. How can you determine the focal length of a convex lens using an optical pin and a plane mirror?
15. In the figure below a point source of light P, a convex lens L and a plane mirror M are placed in such a way that light starting from P, returns back to same point after refraction and reflection.



1. What is the distance OP called?
2. To which point (left of P, on P or right of P) will the rays return, if the plane mirror is made to touch convex lens?

DPP – 6**Light**

1. An object of height 7.5 cm is placed at a distance of 35 cm from the converging lens whose focal length is 15 cm
 - (a) What is the height of the image formed?
 - (b) What is the magnification produced by the lens?
 - (c) What is the nature of the image by the lens?
2. A convex lens of focal length 0.10 m is placed at a distance of 12 cm from a wall. How far from the lens should an object be placed so as to form its real image on the wall?
3. If an object of 7 cm height is placed at a distance of 12 cm from a convex lens of focal length 8 cm find the position, nature and height of the image formed
4. An object is placed at a distance of 0.5 m from a concave lens of focal length 0.2 m. find the nature and position of the image.
5. An object placed 50 cm from a lens produces a virtual image at a distance of 10 cm in front of the lens. What is the focal length of lens? Is it converging or diverging lens?
6. An object placed at a distance of 4 cm from a concave lens of focal length 12 cm find the position and nature of the image formed
7. A diverging or concave lens of focal length 15 cm forms an image 10 cm from the lens .draw a scale diagram and prove that the object is placed 30 cm away from the lens. Use a scale of 1.5
8. An object 5 cm high is kept 25 cm from a converging lens of focal length $f= 10\text{cm}$ draw a suitable scale of 1: 5 and find the position and size of the image formed. Is the image real or virtual?
9. An object 4 cm high is placed at a distance of 15 cm in front of a concave lens of power $- 10$ dioptre find the size of the image
10. Two lenses of focal length $+25$ cm and $- 10$ cm (convex and concave) respectively are placed in contact find the power of the combination
11. An object of 4.5 cm height is placed 20 cm from a convex lens of focal length 12 cm find the nature , position and height of the image
12. Find the position and nature of the formed by the concave lens of the focal length 15 cm of an object placed at a distance of 5 cm in front of it what its magnification?
13. A real image, exactly $1/5$ th size of the object is formed at a distance of 18 cm from lens find the focal length of the lens
14. What is the power of the convex lens whose focal length is 150 cm?
15. An object 2 cm high is placed at a distance of 15 cm from a concave lens of focal length 10 cm find the position and size of the object