

## NUMERICALS BASED ON CONVEX LENS

1. A convex lens of focal length 10cm is placed at a distance of 12cm from a wall. How far from the lens should an object be placed so as to form its real image on the wall?
2. If an object of 7cm height is placed at a distance of 12cm from a convex lens of focal length 8cm, find the position, nature and height of the image.
3. An object 4 cm high is placed at a distance of 10cm from a convex lens of focal length 20cm. Find the position, nature and size of the image.
4. A small object is so placed in front of a convex lens of 5 cm focal length that a virtual image is formed at a distance of 25cm. Find the magnification.
5. Find the position and nature of the image of an object 5cm high and 10cm in front of a convex lens of focal length 6cm.
6. Calculate the focal length of a convex lens, which produces a virtual image at a distance of 50cm of an object placed 20cm in front of it.
7. An object is placed at a distance of 100 cm from a converging lens of focal length 40cm. What is the nature and position of the image?
8. A convex lens produces an inverted image magnified three times of an object at a distance of 15 cm from it. Calculate focal length of the lens.
9. An object placed 4cm in front of a converging lens produces a real image 12cm from the lens. What is the magnification of the image? What is the focal length of the lens? Also draw the ray diagram to show the formation of the image.
10. A lens of focal length 20cm is used to produce a ten times magnified image of a film slide on a screen. How far must the slide be placed from the lens?
11. Determine how far an object must be placed in front of a converging lens of focal length 10cm in order to produce an erect image of linear magnification 4.
12. A convex lens of focal length 6cm is held 4cm from a newspaper, which has print 0.5cm high. By calculation, determine the size and nature of the image produced.
13. A convex lens of focal length 0.10m is used to form a magnified image of an object of height 5mm placed at a distance of 0.08m from the lens. Find the position, nature and size of the image.
14. An erect image 2cm high is formed 12cm from a lens, the object being 0.5cm high. Find the focal length of the lens.
15. The filament of a lamp is 80 cm from a screen and a converging lens forms an image of it on a screen, magnified three times. Find the distance of the lens from the filament and the focal length of the lens.
16. An object 2cm tall is placed on the axis of a convex lens of focal length 5cm at a distance of 10cm from the optical centre of the lens. Find the nature, position and size of the image formed. Which case of image formation by convex lenses is illustrated by this example?
17. A converging lens of focal length 5cm is placed at a distance of 20cm from a screen. How far from the lens should an object be placed so as to form its real image on the screen?
18. An object 5cm high is held 25cm away from a converging lens of focal length 10cm. Find the position, size and nature of the image formed. Also draw the ray diagram.
19. At what distance should an object be placed from a convex lens of focal length 18cm to obtain an image at 24cm from it on the other side? What will be the magnification produced in this case?
20. The magnification produced by a spherical lens is +2.5. What is the nature of image and lens?
21. What is the nature of the image formed by a convex lens if the magnification produced by a convex lens is +3?
22. What is the nature of the image formed by a convex lens if the magnification produced by a convex lens is -0.5?
23. What is the position of image when an object is placed at a distance of 10cm from a convex lens of focal length 10cm?

24. Describe the nature of the image formed when an object is placed at a distance of 30cm from a convex lens of focal length 15cm.
25. At what distance from a converging lens of focal length 12cm must an object be placed in order that an image of magnification 1 will be produced?

### NUMERICALS BASED ON CONCAVE LENS

1. A concave lens produces an image 20cm from the lens of an object placed 30cm from the lens. Calculate the focal length of the lens.
2. The magnification of a spherical lens is +0.5. What is the nature of lens and image?
3. If an object is placed at a distance of 50cm from a concave lens of focal length 20cm, find the position, nature and height of the image.
4. An object is placed at a distance of 4 cm from a concave lens of focal length 12cm. Find the position and nature of the image.
5. An object is placed at a distance of 50cm from a concave lens produces a virtual image at a distance of 10 cm in front of the lens. Draw a diagram to show the formation of image. Calculate focal length of the lens and magnification produced.
6. A 50 cm tall object is at a very large distance from a diverging lens. A virtual, erect and diminished image of the object is formed at a distance of 20 cm in front of the lens. How much is the focal length of the lens?
7. A concave lens of focal length 15cm forms an image 10cm from the lens. How far is the object placed from the lens? Draw the ray diagram.
8. An object 60cm from a lens gives a virtual image at a distance of 20cm in front of the lens. What is the focal length of the lens? Is the lens converging or diverging? Give reasons for your answer.
9. A concave lens of 20 cm focal length forms an image 15cm from the lens. Compute the object distance.
10. A concave lens has focal length 15 cm. At what distance should the object from the lens be placed so that it forms an image at 10 cm from the lens? Also find the magnification produced by the lens.
11. Calculate the image distance for an object of height 12 mm at a distance of 0.20 m from a concave lens of focal length 0.30m and state the nature and size of the image.
12. A concave lens has focal length of 20cm. At what distance from the lens a 5cm tall object be placed so that it forms an image at 15cm from the lens? Also calculate the size of the image formed.
13. An object is placed 20cm from (a) a converging lens and (b) a diverging lens of focal length 15cm. Calculate the image position and magnification in each case.
14. A 2.0 cm tall object is placed 40cm from a diverging lens of focal length 15 cm. Find the position and size of the image.
15. Find the position and size of the virtual image formed when an object 2 cm tall is placed 20cm from (a) diverging lens of focal length 40cm and (b) converging lens of focal length 40 cm.
16. The magnification produced by a spherical lens is +0.75. What is the nature of image and lens?
17. The magnification produced by a spherical lens and a spherical mirror is +0.8. What is the nature of lens and mirror?
18. The magnification produced by a spherical lens and a spherical mirror is +2.0. What is the nature of lens and mirror?
19. The lens A produces a magnification of  $-0.6$  whereas lens b produces magnification of  $+0.6$ . What is the nature of lens A and B.
20. An object is 2m from a lens which forms an erect image one-fourth (exactly) the size of the object. Determine the focal length of the lens. What type of the lens is this?