

Class-X Assignment (Chapter-10)

Light-Reflection & Refraction

- Q 1. How does light enable us to see an object?
- Q 2. What is a concave mirror?
- Q 3. What is the relationship between focal length and radius of curvature?
- Q 4. A light ray passes through the principal focus of the concave mirror. What will be its direction of propagation after reflection from the mirror?
- Q 5. What should be the position of the object in front of a concave mirror so that the image and the object have the same size?
- Q 6. What type of image is formed on a cinema screen?
- Q 7. Why do we prefer a convex mirror as a rear-view mirror in vehicles?
- Q 8. Name the type of mirror used in the following situation:
- (1) Headlights of car.
 - (2) Side/rear-view mirrors of vehicles.
 - (3) Solar furnace.
- Support your answer with reason.
- Q 9. What are the uses of the concave mirror?
- Q 10. What are the uses of the convex mirror?
- Q 11. State the laws of reflection of light.
- Q 12. Name a mirror that can give an erect and enlarged image of an object.
- Q 13. Differentiate between real and virtual image.
- Q 14. Hold the concave mirror and the paper in the same position for a few minutes in the sunlight. What do you observe? Why?
- Q 15. Define spherical mirrors, name two types of spherical mirrors.
- Q 16. Suggest a spherical mirror from which the image is always erect, virtual and small.
- Q 17. Which spherical mirror is used as shaving mirror and why?
- Q 18. What is the relation ship between magnification, m , the object distance, x , & the image distance, v , for a spherical mirror?
- Q 19. How do we classify a material as an optically denser or rare medium?
- Q 20. A ray of light travelling in air enters obliquely into water. Does the light ray bend towards normal or away from the normal? Explain why?

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- Q 21. Using a ray diagram, describe the characteristic properties of an image formed by a convex mirror.
- Q 22. An object is placed between points $2F_1$ & F_1 in front of a convex lens. Using a ray diagram, explain the image formation. What are the properties of the image?
- Q 23. A concave lens of a focal length 15cm. forms an image at 10cm. from the lens. How far is the object placed from the lens? Draw the ray diagram.
- Q 24. A lens has a power -2D. Identify the type of lens. What will be the focal length of the lens?
- Q 25. Light enters from air into water which has refractive index 1.33. Calculate the speed of light in water. The speed of light in air is 3.0×10^8 m/s.
- Q 26. For a spherical mirror $m < 1$, will the image size be smaller or larger than the object size.
- Q 27. The magnification produced by a plane mirror is +1. What does this mean?
- Q 28. What is the unit of refractive index?
- Q 29. You are given kerosene, turpentine & water. In which of these the light travels faster.
- Q 30. If the angle between plane mirror & incident ray is 30° . What will be the angle of reflection?
- Q 31. The radius of curvature of a concave is 3cm. Find its focal length?
- Q 32. If the incident ray passing through the centre of the curvature of concave mirror, from where it pass after reflection?
- Q 33. If the size of image obtained by spherical mirror is twice the size of an object, identify the kind of mirror.
- Q 34. Define refractive index of medium.
- Q 35. What is the power of lens having focal length 2m?
- Q 36. How does the speed of light change when it travels from optically rarer to denser medium?
- Q 37. In which case the speed of light is more, when refractive index is 1.5 or 2.4?
- Q 38. Define magnification.
- Q 39. Define diopetre?
- Q 40. Name the type of spherical lens where image formed is always small & erect?
- Q 41. What kind of mirror is used for headlights of cars?
- Q 42. Name a mirror having focal length -15cm.
- Q 43. Why does a ray change its path when it passes from one medium to another medium?
- Q 44. One to which property of light, sharp shadows of opaque objects are obtained?
- Q 45. Draw a path of light as it enters from:
- (1) Air to glass.
 - (2) Glass to air.

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- Q 46. The paper is burnt when a concave mirror was kept 15.3cm away from it; find the focal length & radius of curvature of mirror?
- Q 47. The lens has power of +2.5D. Find the focal length & nature of lens?
- Q 48. A concave mirror produces 4 times magnified real image of an object placed at 10cm in front of it. Find the position of the image.
- Q 49. In case of glass slab, emergent ray is parallel to incident ray, Explain.
- Q 50. A concave has a focal length of 15cm. At what distance should be the object from the lens be placed, so that it forms an image at 10cm from the lens. Also find the magnification?
- Q 51. A concave mirror of focal length 15cm is used to obtain an enlarged image of 6cm height. The screen is placed at a distance of 37.5cm from the mirror. Find the position of the object from the mirror, height of an object & nature of the image formed.
- Q 52. An object is placed 12cm, away from the optical centre of a lens. Its image is formed exactly mid-way between the optical centre & the object:
- (1) What is the nature of the lens?
 - (2) Is the image formed erect or virtual?
 - (3) Draw a ray diagram to show the image formation.

Q1: An object is placed at a distance of 10cm from a convex mirror of focal length 15cm; find the position and nature of the image.

Q2: An object size 7cm in front of a concave mirror of focal length 18 cm. At what distance from the mirror should a screen be placed so that a sharp focused image can be obtained? Find the size & nature of the image.

Q3: A convex mirror used on an automobile has a focal length of 3m .If a vehicle behind is at a distance of 5m,find the location of the image?

Q4: An object of 4cm in size, is placed 25cm in front of a concave mirror of focal length 15cm. Find the position & nature of image and the size of the image.

Q5: A concave mirror of focal length 1.5m; forms a real image of an object at a distance of 40cm. Find the position of the image.

Q6: A concave mirror forms an image three times the size of the object. If the object distance is 10cm, find the image distance.

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Q7: A concave lens of focal length 15cm forms an image at 10cm from the lens. How far is the object placed from the lens? Draw the ray diagram.

Q8: An object is placed at a distance of 10cm from a convex mirror of focal length 15cm. Find the position & nature of the image.

Q9: A concave mirror is crafted from a hollow glass sphere of distance 2m. Calculate its focal length.

Q10: A man stands 2m away from a concave mirror of focal length of 1m. Calculate the distance of the image of the man from the mirror's pole. Will the image formed be real or virtual? Also calculate the image magnification & find the image size & its nature.

Q11: A car driver uses a rear-view convex mirror of 2.5m focal length to see the traffic behind him. If another is 10m away from the mirror, find its image position, nature & size.

Q12: An object of height 5.0cm is placed at a distance of 20cm in front of a convex mirror of radius of curvature 30cm. Find the position of the image, its nature & size.

Q13: What is the position of the image when an object is placed at a distance of 30cm from a concave mirror of focal length 30cm?

Q14: An object is placed at a distance of 10cm from a concave mirror of focal length 12cm. Find the position & nature of the image formed.

Q15: An object is placed 20cm in front of a concave mirror of focal length 12cm. Find the position, & nature of the image.

Q16: A concave mirror of focal length 30cm is placed at a distance of 90cm from the wall. How far from the wall should an object be placed so as to get its real image on the wall?

Q17: Find the size, nature & position of the image formed when an object of size 1cm is placed at a distance of 15cm from a concave mirror of focal length 10cm.

Q18: A concave mirror has a focal length of 40cm. Determine the position of the object for which the resulting image will be erect & four times the size of the object.

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Q19: If an object is placed at a distance of 8cm from a concave mirror of focal length 10cm, discuss the nature of the image formed by drawing a ray diagram.

Q20: An object is placed 20cm in front of a convex mirror of focal length 10cm. Find the position, & nature of the image.

Q21: A convex has a focal length of 20cm. Determine the position of the object for which the image is one-half the size of the object.

Q22: A candle is placed at a distance of 49cm from a convex mirror having radius of curvature of 70cm. Determine the position of the image & its magnification.

Q 24. A concave lens has focal length of 20cm. At what distance from the lens a 5cm tall object is placed so that it forms an image at 15cm from the lens? Also calculate the size of image formed.

Q 25. An object located 32cm in front of a lens forms an image on a screen 8cm behind the lens:

(a) Find the focal length of the lens.

(b) Determine the magnification,

(c) Is the lens converging or diverging?

Q 26. An object 50cm tall is placed on the principle axis of a convex lens. Its 20cm tall image is formed on the screen placed at a distance of 10cm from the lens. Calculate the focal length of the lens.

Q 27. What is the power of a lens having a focal length of (a) 50cm, (b) -50cm?

Q 28. An object 20cm tall is placed on the principle axis of a convex lens. Its 30cm tall image is formed on the screen placed at a distance of 10cm from the lens. Calculate the focal length of the lens.

Q 29. Find the power of a concave lens of focal length 2m.

Q 30. An object 30cm tall is placed on the principle axis of a convex lens. Its 10cm tall image is formed on the screen placed at a distance of 15cm from the lens. Calculate the focal length of the lens.

Q 31. Find the position, size & nature of the image of an object 5cm high which is placed 10cm in front of a convex lens of focal length 6cm.

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- Q 32. An object 5.0cm tall object is placed perpendicular to the principle axis of a convex lens of focal length 20cm. The distance of the object from the lens is 30cm. By calculation determine:
- The position
 - The size of the image formed.
- Q 33. An object is placed 100cm in front of a thin converging lens of focal length 50cm. Find the position of the image. What is the nature of the image formed?
- Q 34. An object 3.0cm high is placed perpendicular to the principle axis of a concave lens of focal 15.0cm. The image is formed at a distance of 10.0cm from the lens. Calculate
- Distance at which the object is placed
 - Size & nature of the image formed.
- Q 35. Find the position & nature of an image formed by a convex lens of focal length 15cm when an object 6cm high is placed 30cm in front of the lens.
- Q 36. A convex lens has a focal length of 25cm. Calculate the distance of the object from the lens if the image is to be formed on the opposite side of the lens at a distance of 75cm from the lens. What will be the nature of the image?
- Q 37. An object of height 4cm is placed 15cm from a convex lens of focal length 5cm. Find the position, size & nature of the image.
- Q 38. An object is placed 8cm from a concave lens of focal length 24cm. Where the image formed & what is the magnification?
- Q 39. A convex lens has focal length of 30cm. Calculate at what distance should the object be placed from the lens so that it forms an image at 60cm on the other side of the lens. Find the magnification produced by the lens in this case.
- Q 40. An object 3cm high is placed at a distance of 20cm in front of the convex lens of focal length 12cm. Find the position, nature & size of the image formed.

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- Q 41. A concave lens of focal length 15cm forms an image 10cm from the lens. Find the distance of the object from the lens.
- Q 42. An object is placed 45cm from a lens forms an image on a screen placed 90cm on the other side of the lens. Identify the type of the lens & find its focal length.
- Q 43. Where an object should be placed from a converging lens of focal length 20cm, so as to obtain a real image of magnification 2?
- Q 44. A convex lens has a focal length of 10cm. What is its power?
- Q 45. A convex lens forms a real & inverted image of a needle at a distance of 50cm from it. Where is the needle in front of the convex lens, if the image is equal to the size of the object? Also, find the power of the lens.
- Q 46. An object 5cm high is held 25cm away from a converging lens of focal length 10cm. Draw the ray diagram & find the position, size & the nature of the image formed.
- Q 47. The power of the lens is dioptre. What is the focal length & type of lens?
- Q 48. A concave lens of focal length 15cm forms an image 10cm from the lens. How far is the object placed from the lens? Draw a ray diagram.
- Q 49. A doctor has prescribed corrective lens of power +1.5D. Find the focal length of the lens. Is the prescribed lens diverging or converging?
- Q 50. A concave lens has focal length of 15cm. At what distance should the object from the lens be placed so that it forms an image at 10cm from the lens? Also, find the magnification produced by the lens.
- Q 51. The lens has power of +2.5D. Find the focal length & nature of lens?

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