Worksheet 10.5

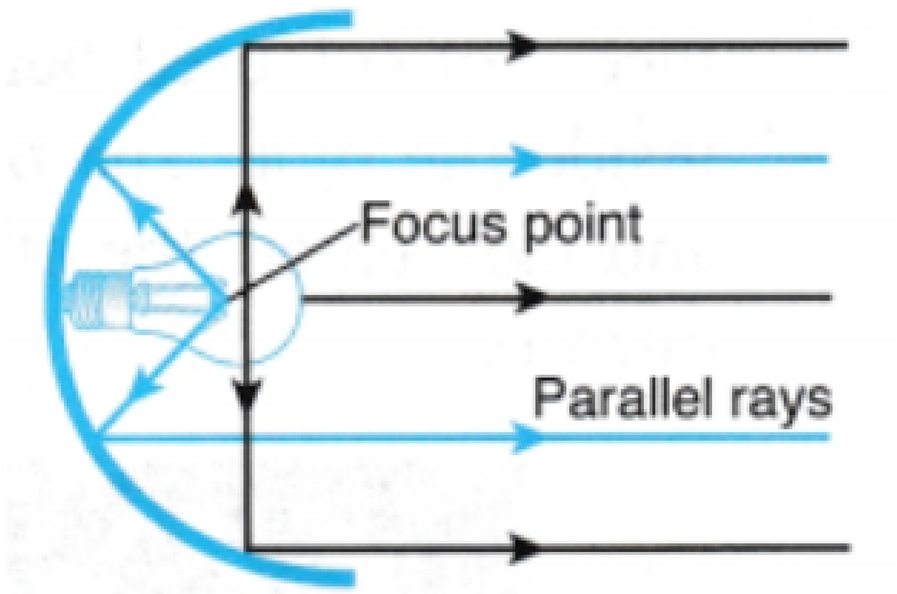
Marks - 25

Case study based questions

10th Science

Light - Reflection and Refraction

Passage - 1 **5 Marks**



A car headlamp

Parabolic mirrors are used in torches and car headlamps as reflectors. A small lamp is placed at the focus point of the mirror to produce parallel rays.

Q 1. In torches, searchlights and headlights of vehicles the bulb is placed

(1) Between the pole and the focus of the reflector.
(2) Very near to the focus of the reflector.
(3) Between the focus and centre of curvature of the reflector.
(4) At the centre of curvature of the reflector.

Q 2. The mirror having reflecting surface curved inwards is

(1) Plane mirror
(2) Convex mirror
(3) Cylindrical mirror
(4) Concave mirror

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Q 3. Which of the following can make a parallel beam of light when light from a point source is incident on it?

(1) Concave mirror as well as convex lens.
(2) Convex mirror as well as concave lens.
(3) Two plane mirrors placed at  to each other.
(4) Concave mirror as well as concave lens.

Q 4. State where an object must be placed so that the image formed by a concave mirror is at infinity.

(1) Between pole and focus of the mirror.
(2) At focus of the mirror.
(3) At the centre of curvature.
(4) NONE OF THESE

Q 5. State where an object must be placed so that the image formed by a concave mirror is the same size as the object.

(1) Between pole and focus of the mirror.
(2) At focus of the mirror.
(3) At the centre of curvature.
(4) NONE OF THESE

Passage - 2 **5 Marks**

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A convex mirror has a wider view than a plane mirror. Convex mirrors are used as blind corner mirrors on the road to help drivers view traffic around sharp corners.

Q 1. State true or false: As the distance of the object from the mirror increases, the distance of the image also increases.

(1) TRUE
(2) FALSE

Q 2. State the principle used in creating a mirror image.

(1) Principle of reflection
(2) Principle of refraction

Q 3. A 2.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 10 cm. The distance of the object from the lens is 15 cm. Find its magnification.

(1) -1
(2) -2
(3) -3
(4) -4

Q 4. Where should an object be placed in front of a convex lens to get a real image of the size of the object?

(1) At the principal focus of the lens.
(2) At twice the focal length.
(3) At infinity
(4) Between the optical centre of the lens and its principal focus.

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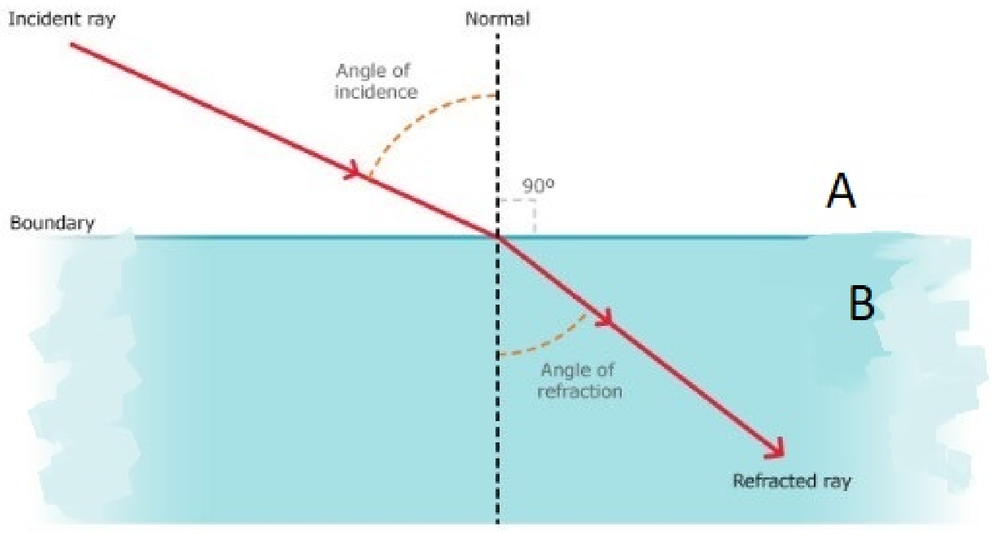
Q 5. If a virtual image is formed 10.0 cm along the principal axis from a convex mirror of focal length -15.0 cm, what is the object distance from the mirror?

(1) 30 cm
(2) 10 cm
(3) 6 cm
(4) 3 cm

Passage - 3

5 Marks



Manu observes that the absolute refractive indices of two media given as in figure are 2.0 and 1.5 respectively and the speed of light in medium 'B' is 2×10^8 m/s.

Q 1. Calculate the speed of light in vaccum?

(1) m/s
(2) m/s
(3) m/s
(4) NONE OF THESE

Q 2. Calculate the speed of light in medium 'A'?

(1) m/s
(2) m/s
(3) m/s

(4) NONE OF THESE

Q 3. The value of refractive index of a medium with respect to the vacuum is known as?

(1) Absolute refractive index
(2) Snell's Law

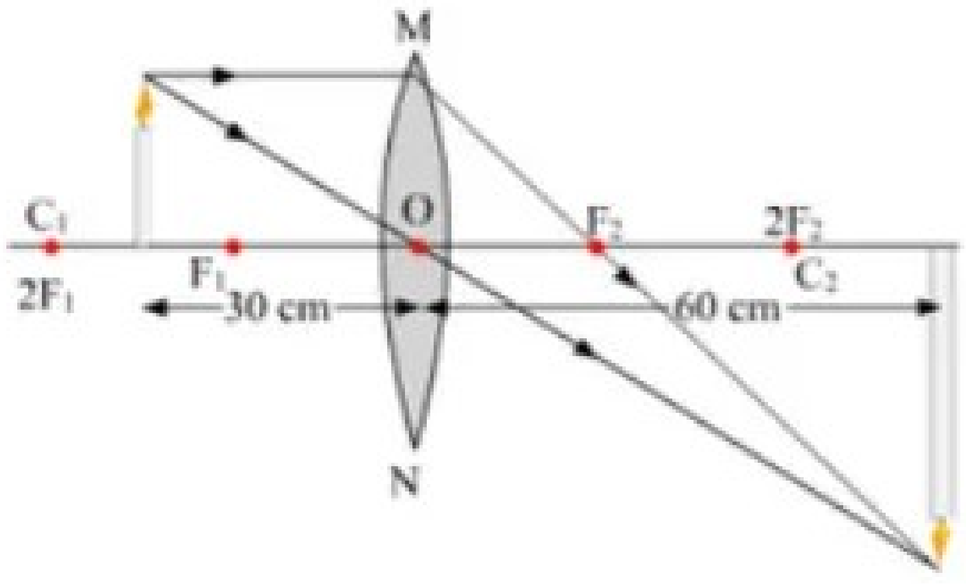
Q 4. The light travel fastest in

(1) Water
(2) Air
(3) Glass
(4) Diamond

Q 5. The formula to calculate the refractive index is

(1) n = cv
(2) n =
(3) n =
(4) v = nc

Passage - 4 **5 Marks**



Worksheet 10.5

Marks - 25

Manu observes that the image of a candle flame placed at a distance of 30 cm from a spherical lens is formed on a screen placed on the other side of the lens at a distance of 60 cm from the optical centre of the lens. Few questions came to her mind.

Q 1. What is the type of the lens?

(1) Convex lens
(2) Concave lens
(3) Bifocal lens
(4) Plane lens

Q 2. What is the focal length of the lens?

(1) 10 cm
(2) 15 cm
(3) 20 cm
(4) 25 cm

Q 3. If the height of the flame is 3 cm, find the height of its image.

(1) -1 cm
(2) -2 cm
(3) -6 cm
(4) NONE OF THESE

Q 4. What is the magnification of convex lens?

(1) -1
(2) -2
(3) -3
(4) -4

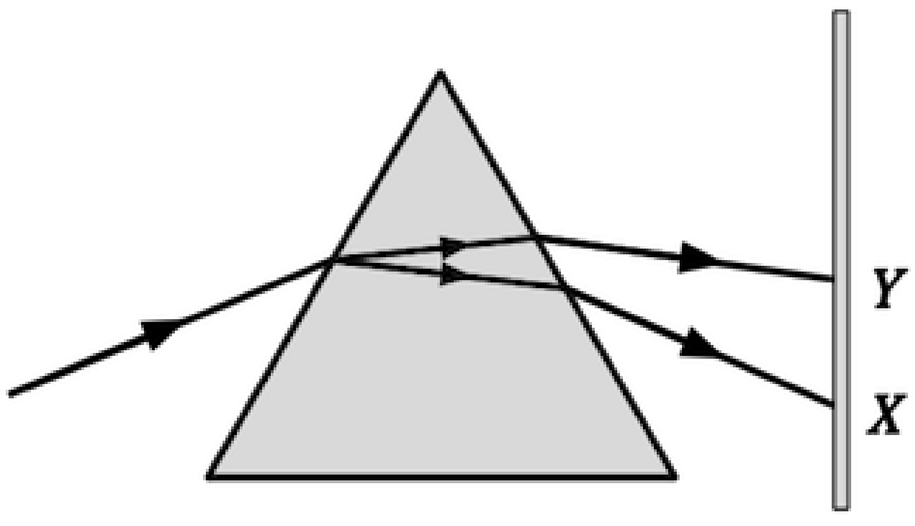
Worksheet 10.5

Marks - 25

Q 5. Focal length of convex lens is

(1) Negative
(2) Positive

Passage - 5 **5 Marks**



A teacher is teaching their students certain concepts related to the refraction of light. In the above figure, a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism it produces a rays XY on a screen.

Q 1. Is the angle of refraction greater or lower than the angle of incidence when it goes from air to glass?

(1) Greater
(2) Lower

Q 2. When light rays falls on one side of prism, it gets bent _____ .

(1) Towards the normal
(2) Away from normal

Q 3. In refraction of light through a prism, the light ray:

(1) Suffers refraction only at one face of the prism.
(2) Emerges out from the prism in a direction parallel to the incident ray.
(3) Bends at both the surfaces of prism towards its base.
(4) Bends at both the surfaces of prism opposite to its base.

Q 4. Which is the denser medium?

(1) Prism
(2) Air

Q 5. Glass has a _____ index of refraction than air.

(1) Equal
(2) Greater
(3) Less
(4) NONE OF THESE

Worksheet 10.6

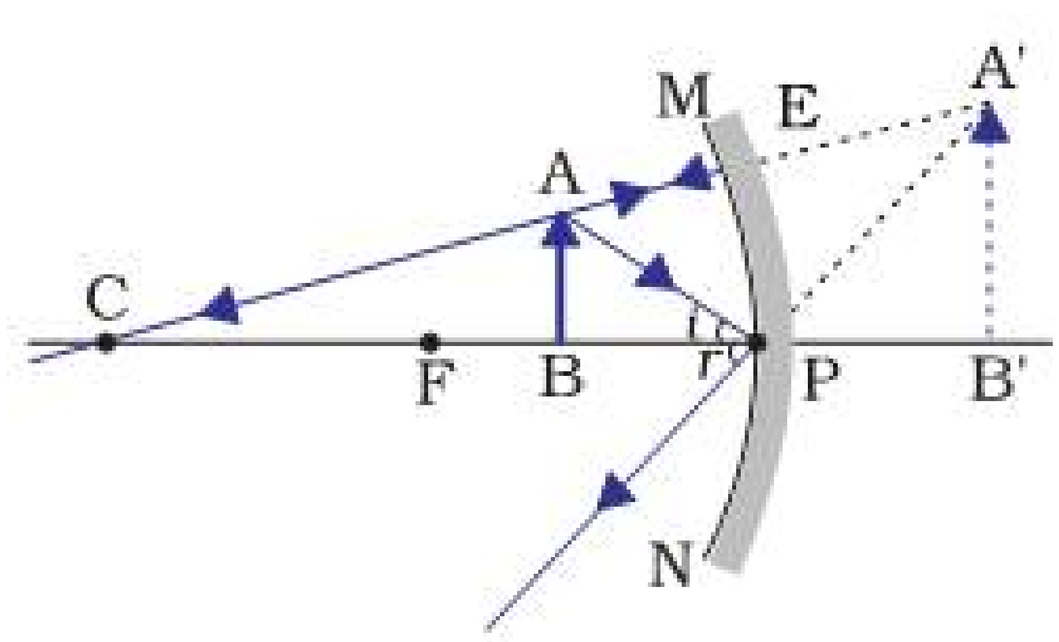
Marks - 25

Case study based questions

10th Science

Light - Reflection and Refraction

Passage - 1 **5 Marks**



Concave mirrors are used by dentists to examine the teeth of a patient. The concave mirror forms a magnified image of the teeth.

Q 1. What type of image is formed?

(1) Real
(2) Virtual

Q 2. An object, 4.0 cm in size, is placed at 25.0 cm in front of a concave mirror of focal length 15.0 cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image?

(1) 37 cm
(2) 37.5 cm
(3) 38 cm
(4) 38.5 cm

Worksheet 10.6

Marks - 25

Q 3. The object is placed between C and F. Then what will be the position of the image formed by a concave mirror?

(1) Beyond C
(2) At infinity
(3) Behind the mirror
(4) At C

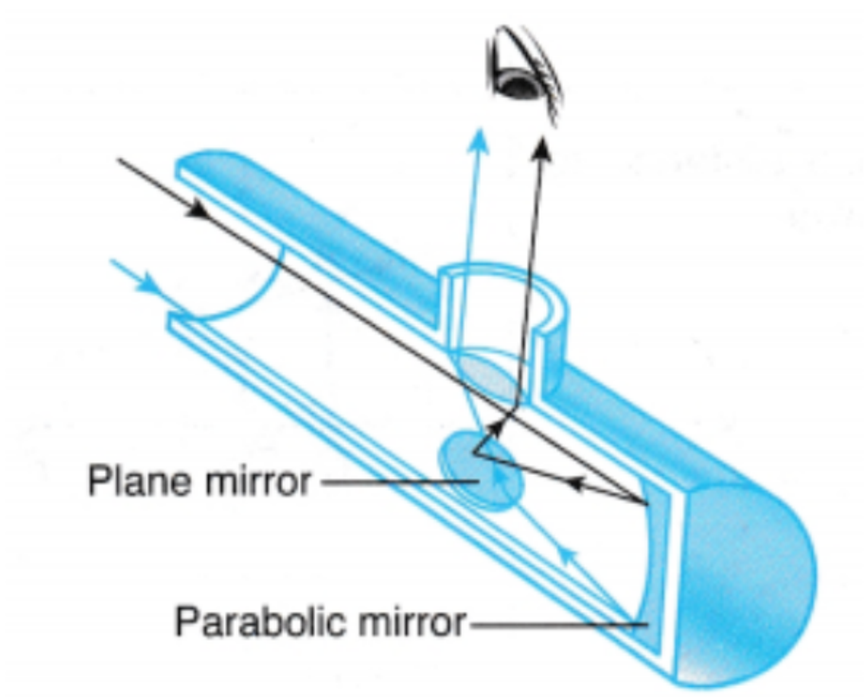
Q 4. If the object is placed between P and F, then what will be the nature of image formed by concave mirror?

(1) Real and inverted
(2) Virtual and erect

Q 5. If the object is placed at infinity, then what will be the size of image formed by the concave mirror?

(1) Same size
(2) Enlarged
(3) Highly diminished
(4) NONE OF THESE

Passage - 2 **5 Marks**



Worksheet 10.6

Marks - 25

An astronomical reflecting telescope uses a large parabolic mirror to gather dim light from distant stars. A plane mirror is used to reflect the image to the eyepiece.

Q 1. The length of a telescope is 2 m and the focal length of the objective is 2.0 cm. What is the focal length of the eyepiece?

(1) 194 cm
(2) 196 cm
(3) 198 cm
(4) 200 cm

Q 2. A telescope has an objective lens of focal length 200 cm and an eye piece with focal.length 2 cm. If this telescope is used to see a 50 metre tall building at a distance of 2 km, what is the height of the image of the building formed by the objective lens?

(1) 5 cm
(2) 10 cm
(3) 1 cm
(4) 2 cm

Q 3. Image formed by plane mirror is

(1) Real and erect
(2) Real and inverted
(3) Virtual and erect
(4) Virtual and inverted

Q 4. What is the focal length of plane mirror?

(1) Positive

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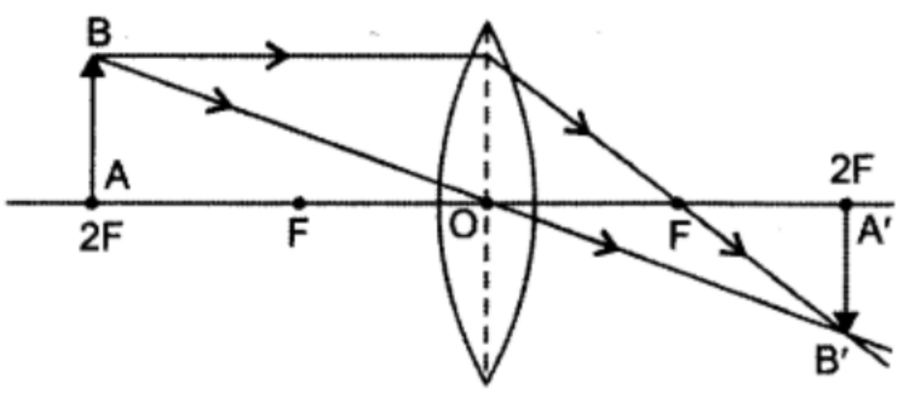
(2) Negative
(3) Zero
(4) Infinity

Q 5. What is the size of the image formed by plane mirror?

(1) Less than the size of object
(2) Greater than size of object
(3) Same size as object
(4) NONE OF THESE

Passage - 3

5 Marks



An object 2 cm high is placed at a distance of 64 cm from a white screen. On placing a convex lens at a distance of 32 cm from the object it is found that a distinct image of the object is formed on the screen.

Q 1. What is the focal length of the convex lens?

(1) 14 cm
(2) 15 cm
(3) 16 cm
(4) 17 cm

Q 2. What is the size of the image formed on the screen?

(1) Less than the size of object

(2) Greater than size of object
(3) Same size as object
(4) NONE OF THESE

Q 3. What is the height of the image?

(1) 1 cm
(2) 2 cm
(3) 3 cm
(4) 4 cm

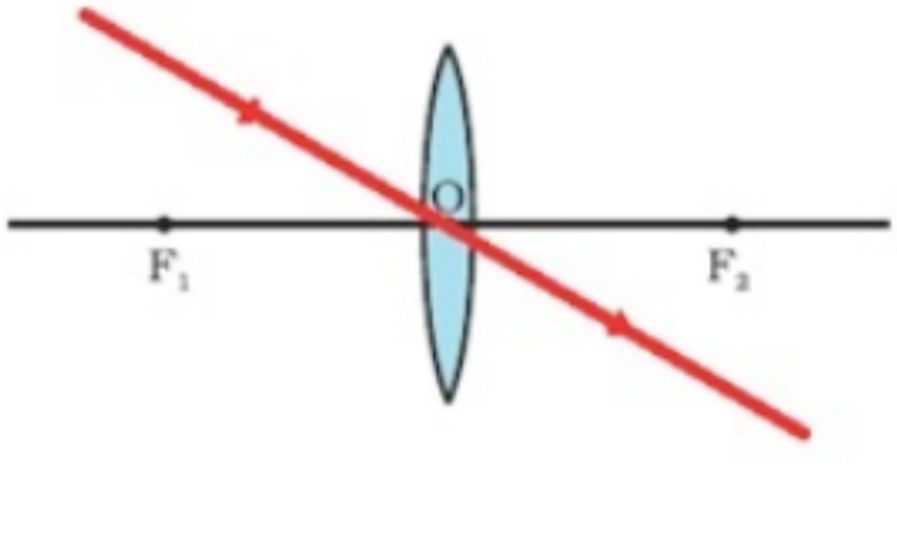
Q 4. Power of convex lens is

(1) Positive
(2) Negative

Q 5. A full length image of a distant tall building can definitely be seen by using

(1) A concave lens
(2) A convex lens
(3) A plane lens
(4) Both concave as well as plane lens

Passage - 4 **5 Marks**



Worksheet 10.6

Marks - 25

A girl was playing with a thin beam of light from her laser torch by directing it from different directions on a convex lens held vertically. She was surprised to see that in a particular direction the beam of light continues to move along the same direction after passing through the lens.

Q 1. What is the reason?

(1) The girl must have directed the ray of light along the direction of the optical centre of the lens.
(2) The girl must have directed the ray of light along the direction of the focus of the lens.

Q 2. A convex lens of focal length 10 cm 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?

(1) 40 cm
(2) 50 cm
(3) 60 cm
(4) 70 cm

Q 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. What is the nature of the image?

(1) Real and erect
(2) Real and inverted
(3) Virtual and erect
(4) Virtual and inverted

Q 4. Where should an object be placed in front of a convex lens to get a real image of the size of the object?

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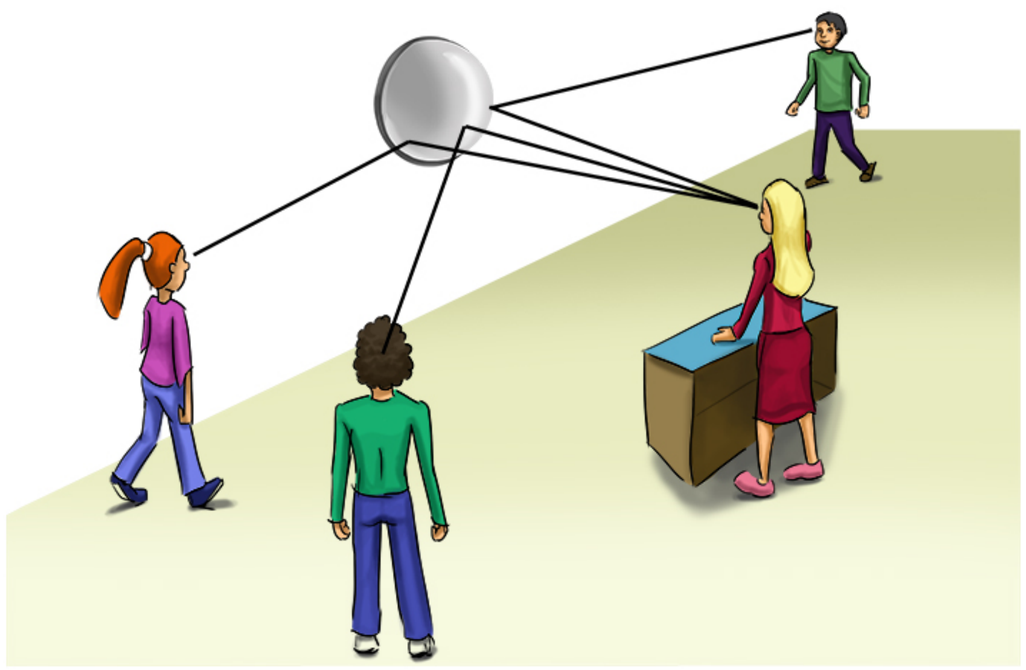
(1) At the principal focus of the lens.
(2) At twice the focal length.
(3) At infinity
(4) Between the optical centre of the lens and its principal focus.

Q 5. Focal length of convex lens is

(1) Negative
(2) Positive

Passage - 5

5 Marks



Convex mirrors are also used for security purposes in various places. They are places near ATM's so that bank customers can check if someone is behind them.

Q 1. What type of image will be formed using convex mirrors?

(1) Real
(2) Virtual

Q 2. What is the size of the image formed using convex mirrors?

(1) Less than the size of object
(2) Greater than size of object
(3) Same size as object
(4) NONE OF THESE

Q 3. Focal length of convex mirror is

(1) Negative
(2) Positive

Q 4. An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the nature of the image.

(1) Real and erect
(2) Real and inverted
(3) Virtual and erect
(4) Virtual and inverted

Q 5. State true or false: As the distance of the object from the mirror increases, the distance of the image also increases.

(1) TRUE
(2) FALSE