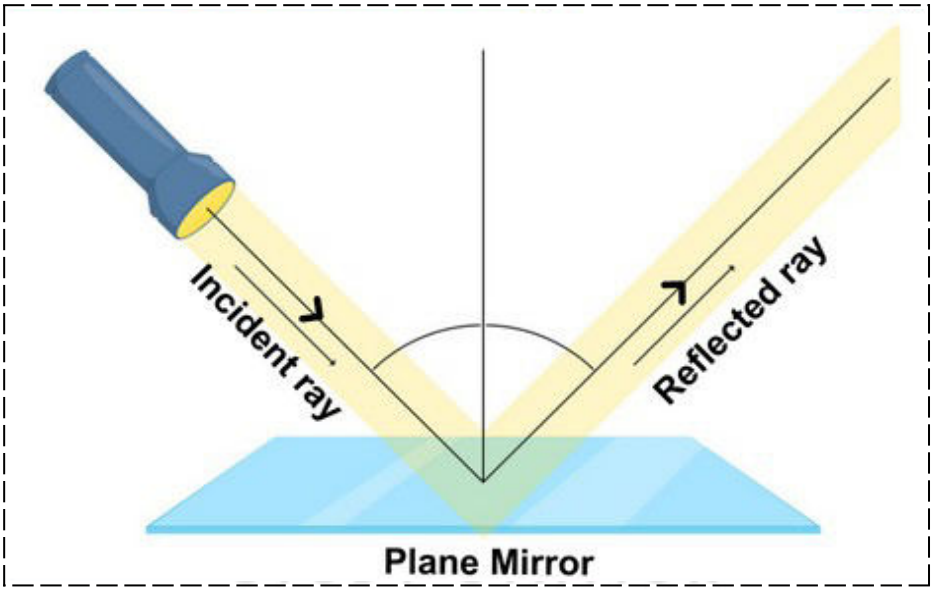
LIGHT

REFLECTION OF LIGHT

- The phenomenon of change in the direction of light or bounce back of light when it falls on a shiny, polished surface is called **reflection of light**.
- If it is a shiny surface the image of an object is formed.



- Similarly, the surface of water can also act like a mirror and change the path of light and that is why we see the reflection of tree or building in water.

TYPES OF IMAGES

a) **Real images** – It is an image which **can be obtained on a screen**.
Example – image formed on a cinema screen.
b) **Virtual screen** – It is an image which **cannot be obtained on a screen**.
Example – Image formed on a plane mirror.

PLANE MIRROR

A **mirror with a flat reflective surface** is called a plane mirror. Reflection of an object in a plane mirror is known as the image of the object.

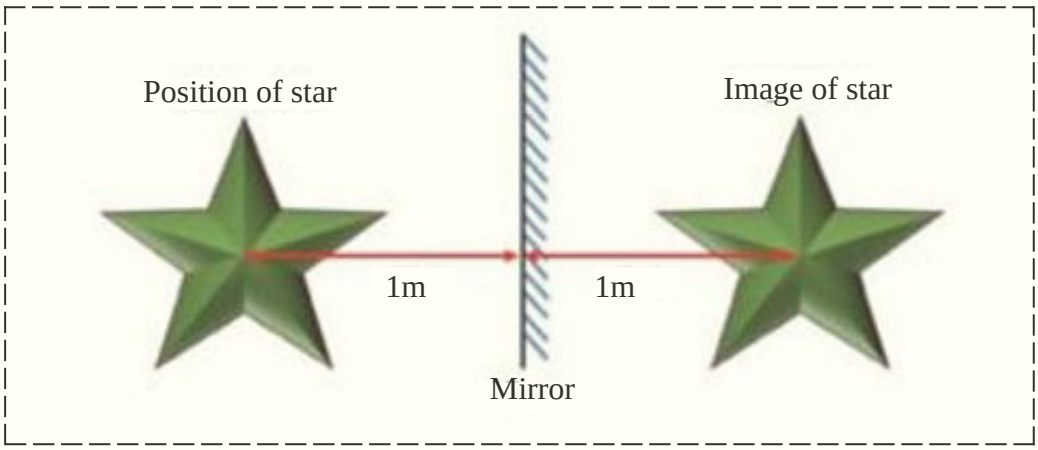
PROPERTIES OF A PLANE MIRROR -

1. The distance of the image formed by a plane mirror behind the mirror is equal to the distance of the object from the mirror.
2. The height of the image in a plane mirror is equal to the height of object.
3. The image formed by a plane mirror is virtual and erect (standing straight up) in nature.
4. Image formed by a plane mirror is laterally inverted, i.e. left appear to be on the right and vice-versa.

Question:
The image formed by a plane mirror is at 1m behind the mirror. What will be the distance (in meters) of the object from the mirror?

Answer:
The distance of the image formed by a plane mirror behind the mirror is equal to the distance of the object from the mirror.

Therefore, distance of star from the mirror is 1m.



LATERAL INVERSION

The phenomenon due to which the left side of the object is seen on the right side in the image and the right side of the object appears to be on the left side of the image.

Example -

Question:
The word 'AMBULANCE' is written in the form of a mirror image on the vehicle. Why?

Answer:
The word 'AMBULANCE' is written in a mirror image so that, the driver in the vehicle going ahead of the ambulance could read it correctly in his rear-view mirror and he would give way to the ambulance so as to allow the ambulance to reach the hospital as soon as possible. This happens because of the lateral inversion we observe in a mirror.

SPHERICAL MIRRORS

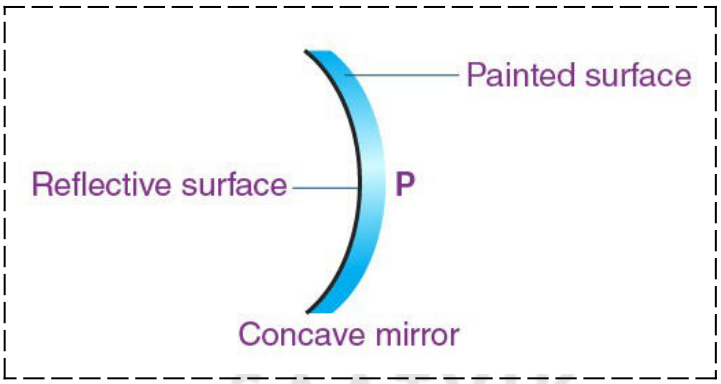
The mirrors which **have a curved reflecting surface** are known as spherical mirrors.
Example – A shining surface of spoon, cosmetic mirror, shaving mirror, side-view mirror in a car etc.

Spherical mirrors are of two types -

1. Concave mirror -

A spherical mirror where the reflecting surface is on the inner side of the curved shape is called concave mirror. Concave mirror are converging in nature.

Example – Shaving mirror



PROPERTIES OF CONCAVE MIRROR

- ✗ **If the object is far away from the mirror** – The image formed is real, inverted (opposite side up as the object) and diminished (smaller in size).

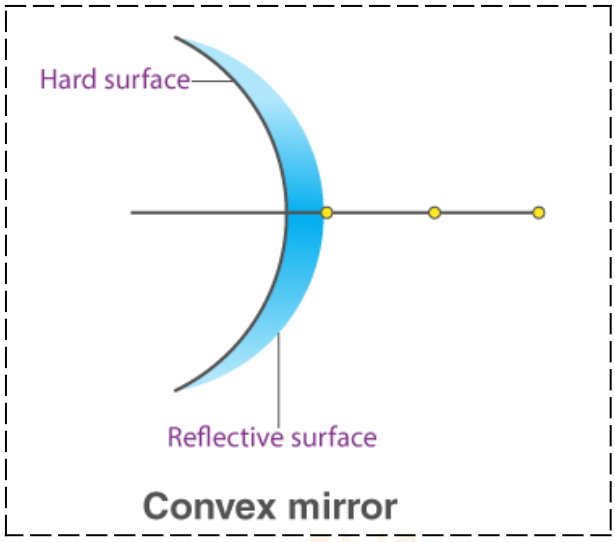
- ✗ **If the object is very close from the mirror** – The image formed is virtual, erect (same side up as the object) and enlarged (larger than the object).

USES OF CONCAVE MIRROR

- ✗ Concave mirror are used in headlights of vehicles and reflectors of torches.
- ✗ Dentists uses a concave mirror to see an enlarged image of the teeth.
- ✗ Concave mirror are used as shaving mirror as these magnify the image and the image is upright when the mirror is held close.

2. Convex mirror -

A spherical mirror where the reflecting surface is on the other side of the curved shape is called convex mirror. Convex mirror are diverging in nature. Example – Rear- mirror of a car.



PROPERTIES OF CONVEX MIRROR

A convex mirror forms an image which is always virtual, erect, diminished than object.

USES OF CONVEX MIRROR

- ✗ Convex mirror are used in vehicles as the rear-view mirror. Because the image is erect and small in size which increase the field of view.
- ✗ Convex mirror are used for security purposes.

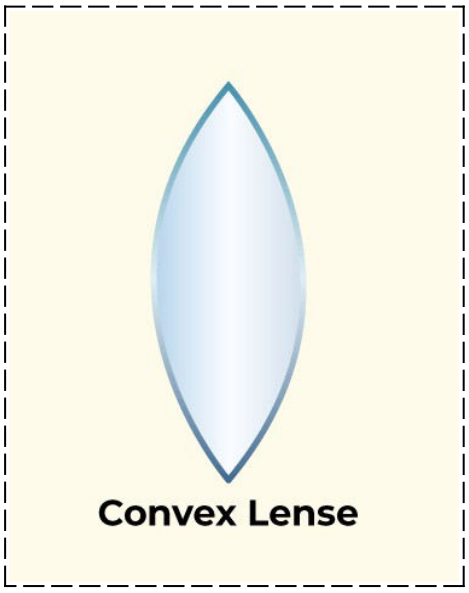
SPHERICAL LENS

A transparent glass, which has two curved surface is called a spherical lens.

There are two types of lens -

✗ Convex lens -

A spherical lens which is thicker at the centre and thinner at the edges is known as convex lens.
Example – Magnifying glass, microscope.

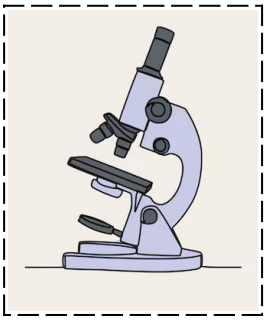


PROPERTIES OF CONVEX LENS

- ✗ **When an object is placed far away from the lens** – The image will be real, inverted and diminished than the object.
- ✗ **When the object is placed very close to the lens** – The image will be virtual, erect and enlarged than the object.

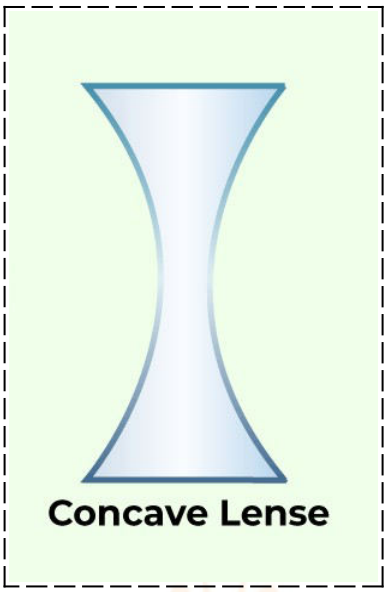
USES OF CONVEX LENS

It is used to make magnifying glass, spectacles, cameras, microscopes, telescopes and binoculars.



✗ Concave lens -

A spherical lens which is thinner at the centre than the edge is called the concave lens.
Example – Peep-hole in the door, spectacles etc.



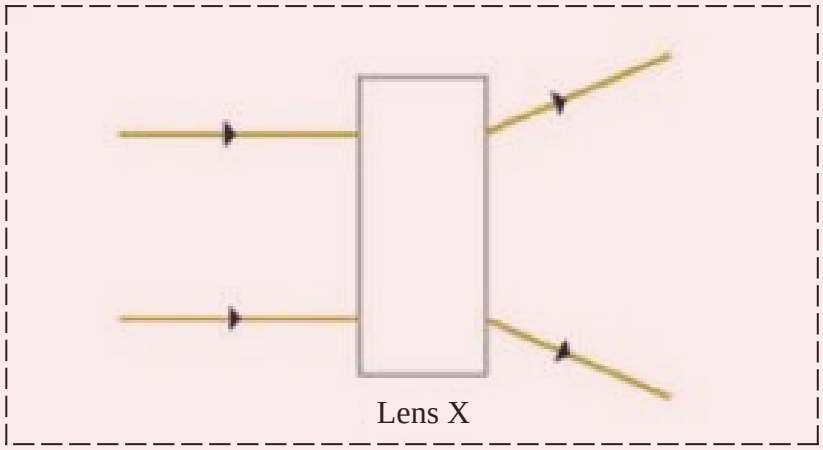
PROPERTIES OF CONCAVE LENS

A Concave lens always forms virtual, erect and diminished image of the object.

USES OF CONCAVE LENS

Concave lens is used to prepare certain kind of spectacles, eye hole in the door to see the person standing outside, flash light.

Question:
Given figure shows the path of light through a lens X (imagine there is a lens instead of the rectangular block as shown the figure below). Identify the lens X?

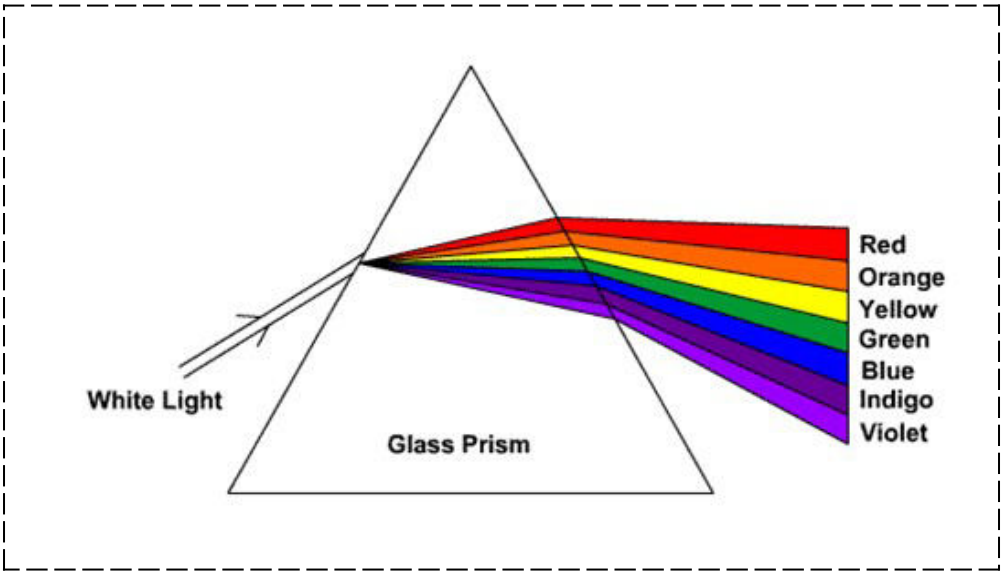


Answer:
The light rays are diverging in the diagram. Therefore, the lens is a **concave lens** as the concave lens is diverging in nature.

SUNLIGHT : WHITE OR COLOURED

Sunlight or white light is made up of seven colours called **VIBGYOR**.

These colours are violet, indigo, blue, green, yellow, orange and red.



Example – Rainbow

GLOSSARY

- **Reflection of light** – The phenomenon of change in the direction of light or the bouncing back of light when it falls on shiny polished surface or mirror is called reflection of light.
- **Convex mirror** – It is a spherical mirror where the reflecting surface bulges out towards the light source. e.g. Rear-mirror of car.
- **Concave mirror –** It is a spherical mirror where the reflecting surface is on the inner side of the curved shape. e.g. Shaving mirror.
- **Real image** – A real image is one that can be formed on a screen.
- **Virtual image** – A virtual image is one that cannot formed on screen.
- **Convex lens** – A spherical lens which is thicker at the centre and thinner at the edges is called convex lens.
- **Concave lens** – A spherical lens which is thinner at the centre and thicker at the edges is called concave lens.
- **Rainbow** – An arc of seven colours that sometimes appears in the sky when the sun shines through rain is called rainbow.