

10th Physics

Chapter 12 Geometrical Optics

Conceptual Questions

1. When you look at the front side of polished spoon, your image is inverted and from back of spoon, your image is erect. Explain why?

Because the front side of polished spoon behaves like a Concave mirror while the back side of spoon behaves like a Convex mirror.

Explanation:

→ The front (Concave) side of the spoon behaves as a Concave mirror and we know that Concave mirror forms inverted real image.

→ The back (Convex) side of the spoon behaves as a Convex mirror and we know that Convex mirror forms erect virtual image.

2. Which mirror is used by girls for make up and why?

Concave mirror is used by girls for make up because it forms magnified and upright image.

Explanation:

When the mirror is placed very near to face such that your face (object) lies inside its focal length then a erect and magnified image is formed which helps you to see the details of your face and apply a sharp make up on it.

3. Why are large Convex mirrors fixed at blind turns of mountains?

Large Convex mirrors are fixed at blind turns of mountains to help drivers to see vehicles coming from the other side.

Explanation:

An image formed in a Convex mirror is smaller. When image is smaller, more images can fit onto the mirror, so a Convex mirror provides a larger field of view and helps the driver to see a larger area of the opposite sides. So in this way chances of accident can be reduced.

4. Which mirrors are used for rear view of vehicles and why?

Convex mirrors are used for rear view of vehicles because they enable the driver to see a wide area of the road behind the car.

Explanation:

Convex mirrors form smaller image. When image is smaller, more images can fit onto the mirror, so a Convex mirror provides a larger field of view and helps the driver to see a larger area of the opposite side.

Uploaded by www.FazalAcademy.com

5. If a person is walking in pool, why do his legs appear shorter in water?

The legs appear shorter while standing in a pool, because of refraction of light.

Explanation:

When a ray of light enters from water to air, it is refracted away from the normal. The rays coming from the legs appear to be slightly above the actual position. Therefore, the legs of the person appear shorter in water.

Don't forget to Subscribe !!

6. Why do diamonds sparkle brightly?

Diamonds sparkle brightly because of three factors; reflection, total internal reflection and dispersion.

Explanation:

(i) Reflection: When light hits surface of diamond, it reflects and create the appearance of a sparkle.

(ii) Total internal reflection: When light enters the diamond it reflects multiple times in the diamond because of total internal reflection and diamonds sparkle brightly.

(iii) Dispersion: To some extent diamond behaves like a prism and disperse the light. So we can see seven colors and diamonds sparkle brightly.

7. When white light passes through a prism, it disperses into its seven colours. Why does dispersion take place in prism?

When white light passes through a prism, it disperses into its seven colours and it is called dispersion.

Explanation:

White light is made up of seven bands of colors each having different wavelengths. Upon passing through a prism, each of the colours travels at different speeds and hence has different angles of refraction leading to the splitting of the light i.e. dispersion.

Example: Red color deviates least and is formed at the upper part of the spectrum and violet color deviates more and is formed at the bottom of the spectrum.

Fazal Academy

8. Magnifying glass can burn the paper. How is it possible?

Magnifying glass is a Convex lens. As we know that Convex lens converges all the light rays falling on it to a single point i.e. its focus. So when light rays converge at a point, the intensity of light increases and the heat of all rays is concentrated on this point and it will start burning.

9. Your grandfather uses spectacles to read newspaper. You see through the spectacles and you observe that objects behind it were inverted. Why was it so observed?

A Convex lens is used in the spectacles to read newspaper. Therefore, the image formed by it is inverted.

Explanation:

When your grandfather reads the newspaper his eyes lie in the focal length of the lens, so the image of newspaper is erect and enlarged. But when you see from his glass standing behind him, you are out of the focal length of the Convex lens, so the image of newspaper is inverted. That is the reason when we see through the spectacles, you observe the objects behind the lens are inverted.

10. Under what condition, is a Convex lens nearly acts as diverging lens?

Condition:

(i) A Convex lens can behave as a diverging lens when it is placed in a medium whose refractive index is greater than the refractive

index of the material of the lens.

Example :

A Convex lens of glass ($n=1.5$) behaves as a diverging lens when immersed in Carbon disulphide of higher refractive index ($n=1.6$).

Condition 2 :

When an object is placed inside the focal length of a Convex lens, the rays do not converge to the opposite side of the lens, in this case Convex lens acts as diverging lens.

**Don't forget to Subscribe !!
Fazal Academy**