

NCERT Solutions for Class 7th Science

Chapter 15 – LIGHT

Q.1 Fill in the blanks:

- (a) An image that cannot be obtained on a screen is called _____.
- (b) Image formed by a convex _____ is always virtual and smaller in size.
- (c) An image formed by a _____ mirror is always of the same size as that of the object.
- (d) An image which can be obtained on a screen is called a _____ image.
- (e) An image formed by a concave _____ cannot be obtained on a screen.

- Ans**
- (a) An image that cannot be obtained on a screen is called **_virtual_**.
 - (b) Image formed by a convex **_mirror_** is always virtual and smaller in size.
 - (c) An image formed by a **_plane_** mirror is always of the same size as that of the object.
 - (d) An image which can be obtained on a screen is called a **_real_** image.
 - (e) An image formed by a concave **_lens_** cannot be obtained on a screen.

Q.2 Mark 'T' if the statement is true and 'F' if it is false:

- (a) We can obtain an enlarged and erect image by a convex mirror. (T/F)
- (b) A concave lens always form a virtual image. (T/F)
- (c) We can obtain a real, enlarged and inverted image by a concave mirror. (T/F)
- (d) A real image cannot be obtained on a screen. (T/F)
- (e) A concave mirror always form a real image. (T/F)

- Ans**
- (a) We can obtain an enlarged and erect image by a convex mirror. (**F**)
Correct: Image formed by a convex mirror is always virtual, erect and diminished.

- (b) A concave lens always form a virtual image. (**T**)
- (c) We can obtain a real, enlarged and inverted image by a concave mirror. (**T**)
- (d) A real image cannot be obtained on a screen. (**F**)

Correct: An image that can be obtained on a screen is called real image.

- (e) A concave mirror always form a real image. (**F**)

Correct: Image formed by a concave mirror can be real or virtual depending on the position of the object.

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Q.3 Match the items given in Column I with one or more items of Column II.

Column I

- (a) A plane mirror
- (b) A convex mirror
spread over a large area.
- (c) A convex lens
enlarged image of teeth.
- (d) A concave mirror
and magnified.
- (e) A concave lens
same size as the object.

Column II

- (i) Used as a magnifying glass.
- (ii) Can form image of objects
- (iii) Used by dentists to see
- (iv) The image is always inverted
- (v) The image is erect and of the
- (vi) The image is erect and smaller
in size than the object.

Ans

Column I

- (a) A plane mirror
- (b) A convex mirror
- (c) A convex lens
- (d) A concave mirror
- (e) A concave lens

Column II

- (v) The image is erect and of the
same size as the object.
- (ii) Can form image of objects
spread over a large area.
- (vi) The image is erect and smaller
in size than the object.
- (i) Used as a magnifying glass.
- (iii) Used by dentists to see
enlarged image of teeth.
- (vi) The image is erect and smaller
in size than the object.

Q.4 State the characteristics of the image formed by a plane mirror.

Ans Characteristics of the image formed by a plane mirror:

- 1) The image is virtual, erect and of the same size as the object.
- 2) Image is at the same distance behind the mirror as the object is in front of it.

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3) Image cannot be obtained on a screen.

4) In the mirror the right side of the object appears left side of the image and vice-versa.

Q.5 Find out the letters of English alphabet or any other language known to you in which the image formed in a plane mirror appears exactly like the letter itself. Discuss your findings.

Ans The alphabets A,H,I,M,O,T,U,V,W,X,Y will have the images exactly like themselves. This is because they are vertically symmetrical i.e. if a vertical line is drawn in middle of the alphabets, the two halves will be identical.

Q.6 What is a virtual image? Give one situation where a virtual image is formed.

Ans An image that cannot be obtained on a screen is called a virtual image. An object placed in front of a plane mirror will have a virtual image as it cannot be obtained on a screen.

Q.7 State two differences between a convex and a concave lens.

Ans

Concave Lens	Convex Lens
They are thinner in the middle than at the edges	They are thicker in the middle than at the edges
It converges (bends inward) the light generally falling on it. Therefore, it is called a converging lens.	It diverges (bends outward) the light generally falling on it. Therefore, it is called a diverging lens.

Q.8 Give one use each of a concave and a convex mirror.

Ans Concave mirrors can produce enlarged images and hence are used by dentists to see an enlarged image of the teeth.

Convex mirrors can form images of objects spread over a large area and hence are used as rear view mirrors of vehicles to help the drivers to see the traffic behind them.

Q.9 Which type of mirror can form a real image?

Ans Concave mirror

Q.10 Which type of lens forms always a virtual image?

Ans Concave lens

Choose the correct option in questions 11–13

Q.11 A virtual image larger than the object can be produced by a

- (i) concave lens (ii) concave mirror
(iii) convex mirror (iv) plane mirror

Ans (ii) concave mirror

Q.12 David is observing his image in a plane mirror. The distance between the mirror and his image is 4 m. If he moves 1 m towards the mirror, then the distance between David and his image will be

- (i) 3 m (ii) 5 m
(iii) 6 m (iv) 8 m

Ans (iii) 6 m

In case of a plane mirror, image is at the same distance behind the mirror as the object is in front of it. Distance of David from mirror is 3 m. So distance of David from his image is $3 \times 2 = 6 \text{ m}$.

Q.13 The rear view mirror of a car is a plane mirror. A driver is reversing his car at a speed of 2 m/s. The driver sees in his rear view mirror the image of a truck parked behind his car. The speed at which the image of the truck appears to approach the driver will be

- (i) 1 m/s (ii) 2 m/s
(iii) 4 m/s (iv) 8 m/s

Ans (iii) 4 m/s

The distance of the truck from the image is double the distance of it from the car. So the image of truck appears to move at double the speed of car i.e. **4 m/s**.