UNIQUE STUDY POINT
Chapter 15 Light NCERT Solutions

Question 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.

Answer: (a) virtual image (b) mirror (c) plane (d) real (e) lens

Question 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)

Answer. (a) False (b) True (c) True (d) False (e) False

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

Column I	**Column II**
(a) A plane mirror	(i) Used as a magnifying glass.
(b) A convex mirror	(ii) Can form image of objects spread over a large area.
(c) A convex lens	(iii) Used by dentists to see enlarged image of teeth.
(d) A concave mirror	(iv) The image is always inverted and magnified.

(e) A concave lens	(v) The image is erect and of the same size as the object.
	(vi) The image is erect and smaller in size than the object.

Answer:

Column I	**Column II**
(a) A plane mirror	(v) The image is erect and of the same size as the object.
(b) A convex mirror	(ii) Can form image of objects spread over a large area.
(c) A convex lens	(i) Used as a magnifying glass.
(d) A concave mirror	(iii) Used by dentists to see enlarged image of teeth. The image is always inverted and magnified.
(e) A concave lens	(vi) The image is erect and smaller in size than the object.

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

Answer: Characteristics of the image formed by a plane mirror:
(i) The image formed is virtual
(ii) The image is laterally inverted.
(iii) It is of the same size as the object.
(iv) The image is situated at the same distance from the mirror as the object.
(v) The image is erected.

Question 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.

Answer: If the letters of English alphabet A, H, I, M, O, T, U, V, W, X, Y are kept in front of a plane mirror, then they would form images which exactly look like the original letters of the alphabet. These letters are vertically symmetric. For example, if we divide letters A and U in the middle, then we would find that the right halves are equivalent to the left halves of the letters. Hence, even if the image interchanges sidewise, it will appear same as the letter

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

Answer: The image which cannot be taken on a screen is called virtual image. When some object is placed very close to the concave mirror we don't get any image on the white screen placed behind the mirror. Such image is called virtual image.

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

Answer:

Convex lens	**Concave lens**
(i) Convex lens converges the light falling on it.	(i) Concave lens diverges the light falling on it.
(ii) Convex lens is thicker in the middle.	(ii) Concave lens is thinner in the middle.

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

Answer: Concave mirrors can form enlarged image of the object. Therefore, they are used by the dentist to see the enlarged image of the patient's teeth.

Convex mirror forms diminished and upright image of the object. It is used as a side view mirror of the car because it enables the driver to view objects spread over a large area behind him/her.

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

Answer: Concave mirror can form a real image.

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

Answer: Concave lens always forms a virtual image.

Choose the correct option in Questions 11-13:

Question 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

Answer: (ii) concave mirror

Question 12. David is observing his image in a plane mirror. Die 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

Answer: (iii) 6 m

In the case of a plane mirror, the distance between the object and the mirror (d_1) is same as the distance between the image and the mirror (d_2).

Given,
Distance between the mirror and David's image, $d_2 = 4$ m
Therefore, $d_1 = d_2 = 4$ m

If David moves 1 m towards the mirror, then $d_1 = 4 - 1 = 3$ m
Again, $d_1 = d_2 = 3$ m
Therefore, the distance between David and his image is $d_1 + d_2 = 3 + 3 = 6$ m.

Question 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 mew 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

Answer: (ii) 4 m/s

The speed of the car is 2 m/s which means the car is approaching the truck with a speed of 2 m per second. The distance between the car and truck will decrease at a double rate. This is because the image of the truck will travel a distance twice the distance travelled by the car in equal time. Hence, the image of the truck will appear to approach the driver with the speed of 2 ×2 = 4 m/s.