CHAPTER – 15

LIGHT

SOLUTIONS:

EXERCISES

Q1 Fill in the blank:

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. Virtual image.

b. Mirror

c. Plane

d. Real

e. Lens

Q2 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.

b. A concave lens always form a virtual image.

c. We can obtain a real, enlarged and inverted image by a concave mirror.

d. A real image cannot be obtained on a screen.

e. A concave mirror always form a real image.

Ans:-

a. False

b. True

c. True

d. False

e. False

Q3 Match the items given in Column I with one or more items of 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	vi) The image is erect and smaller in size than the object.

Ans:- a) ------- v)

b) ------- ii)

c) ------- i)

d) ------- iii)

e) ------- vi)

Q4 State the characteristics of the image formed by a plane mirror.

Ans:- Image formed by a plane mirror is erect, same size of the object, laterally inverted and at the same distance from the mirror as the object is in front of it.

Q5 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:- A, H, I, M, O, U, V, W, X, Y are the letters of English alphabet in which the image formed in a plane mirror appears exactly like the letters itself. Because these letter are laterally symmetrical. So, no change will be observed after these letters form their respective images in a plane.

Q6 What is virtual image? Give one situation where a virtual image is formed.

Ans:- An image which cannot be obtained on screen is called Virtual image.

We see our image when we stand in front of a dressing table. This image is virtual image. The images formed by plane mirror, convex mirror and concave lens are virtual image.

Q7 State two differences between a convex and concave lens.

Ans:-

Convex lens	Concave lens
1. Convex lens are thicker in the middle than at the edges.	1. Concave lens are thinner in the middle than at the edges.
2. A convex lens converges the light falling on it.	2. A concave lens diverges the light falling on it.
3. A convex lens can form both real and virtual image.	3. A concave lens always form virtual image.

Q8 Give one use each of the concave and a convex mirror.

Ans:- Concave mirror is used by the dentists for examining teeth.

Convex mirror is used as side mirrors in automobiles.

Q9 Which type of mirror can formed a real image?

Ans:- Concave mirror can form a real image.

Q10 Which type of lens forms always a virtual image?

Ans:- Concave lens always forms a virtual image.

Choose the correct option in question 11-13

Q11 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

Q12 David is observing his image in a plane mirror. The distance between the mirror and his image is 4m. if he moves 1m towards the mirror, than the distance between David and his image will be

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

Ans:- iii) 6m

[Initial distance between David and the mirror = 4m

Final distance between David and the mirror = 4 – 1 = 3m

In plane mirror, the image is formed at the same distance from the mirror as the object is in front of it.

Therefore distance between David and his image = 3 + 3 = 6m.

Q13 The rear view mirror of a car is a plane mirror. A driver is reversing his car at a speed of 2m/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) 1m/s ii) 2m/s iii) 4m/s iv) 8m/s

Ans:- iii) 4m/s

[Speed of object in mirror = 2u where u is the original speed i.e. 2 x 2 = 4 m/s]

EXTRA QUESTIONS AND ANSWERS

Q1 What is the property of light?

Ans:- The property of light is light travels along a straight line

Q2 What is reflection of light?

Ans:- The changes in the direction of light that falls on a smooth shiny surface like mirror is known as reflection of light.

Q3 What is concave mirror?

Ans:- If the reflecting surface is the inner side of the spherical mirror, it called concave mirror.

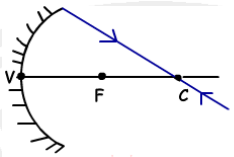


Fig. Concave mirror

Q4 What is convex mirror?

Ans:- If the reflecting surface is the outer side of the spherical mirror, it is called convex mirror.

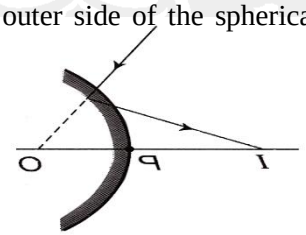


Fig. Convex mirror

Q5 What is real image?

Ans:- An image which can be obtained on screen is called real image. Example, image on a cinema screen.

Q6 What type of image is formed by a concave mirror?

Ans:- Concave mirror can form both virtual and real image, erect and inverted, smaller or larger or same size of the object.

Q7 What type of image is formed by a convex mirror?

Ans:- Convex mirror can always form a virtual and erect image, smaller in size.

Q8 State two difference between concave and convex mirror.

Ans:-

Concave mirror	Convex mirror
1. Concave mirror can form both virtual and real image.	1. Convex mirror always form virtual image.
2. Size of the image may smaller or enlarged.	2. Size of the image is smaller.

Q9 What are convex lenses?

Ans:- Those lenses which are thicker in the middle than at the edges are called convex lenses.

Q10 What are concave lenses?

Ans:- Those lenses which are thinner in the middle than at the edges are called concave lenses.

Q11 Why convex lens is called converging lens?

Ans:- Convex lens converges the light falling on it. That is why it is called converging lens.

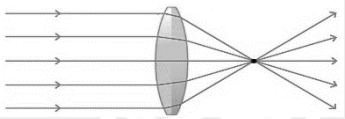


Fig. Converging lens

Q12 Why concave lens is called diverging lens?

Ans:- Concave lens are called diverging lens because it diverges the light falling on it.

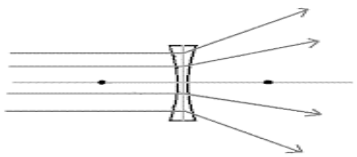


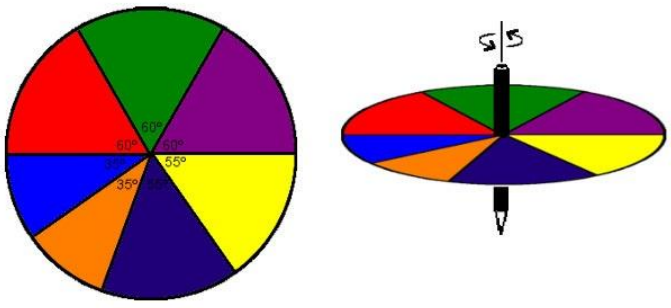
Fig. Diverging lens

Q13 What are the colours of rainbow?

Ans:- Rainbow consists of seven colours. They are red, orange, yellow, green, blue, indigo and violet.

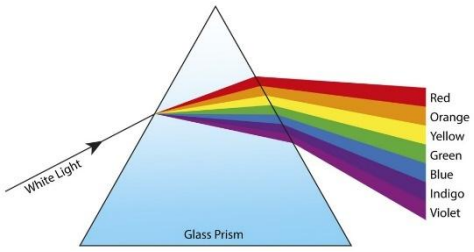
Q14. What is Newton's disc?

Ans:- Newton's disc is a disc containing seven segments of colours. When the disc is rotated fast, the colours are mixed together and appears as white.



Q15 How can you show that white light consist of seven colours using a prism?

Ans:-



Let us take a glass prism. A narrow beam of sunlight is allowed to fall on one face of the prism from the window in a dark room and let the light coming out of the other face of the prism fall on a white sheet of paper. We observed that the beam of light is splitted into seven colours. Thus, it shows that white light consist of seven colours.