



INDIAN SCHOOL AL WADI AL KABIR



Class: VIII	Department: SCIENCE-2022-2023	Date of completion: 13-11-2022
Worksheet No:11 with answers	Topic: LIGHT	Note: A4 FILE FORMAT
NAME OF THE STUDENT	CLASS / SEC	ROLL NO.

**I.VERY SHORT ANSWER (1M):**

1. What is meant by lateral inversion? [Hint- The phenomenon of the left side appearing right side and the right side appearing left side on reflection in a plane mirror is called lateral inversion.]
2. If an object is placed at a distance of 9.5 cm from a plane mirror, how far would it be from its image? [Hint-The object would be 19 cm far away from its image. The object is 9.5cm from the mirror, then the image of the object is 9.5cm on the other side of the mirror. Hence, the image is a total of 19cm from the object (9.5cm to the mirror + 9.5cm to the image).]
3. What would you do to see if the barber has cut your hair properly at the back? [Hint- I would keep another mirror at a certain angle to the main mirror in a vertical position.]
4. What happens to light when it gets dispersed? Give an example. [Hint- Light splits into its constituent colours, when it gets dispersed, e.g. Rainbow formation is due to the dispersion of white light after passing through water droplets which act as a prism.]
5. How many images of a candle will be formed if it is placed between two plane mirrors separated by an angle of 60°? [Hint- Number of images =  $(360/60) - 1 = 6-1 = 5$  images.]
6. How do eyelids protect our eyes? [Hint- Eyelids prevent objects from entering the eye. They also shut out the light when not required.]
7. Name the part of the eye which gives colour to the eyes. [Hint- Iris]
8. What kind of lens is there in our eyes? Where does it form the image of an object? [Hint- Convex lens. It forms the image of an object on the retina.]
9. What is a blind spot? [Hint- Blindspot is an area on the retina where the nerve endings enter the optic nerves. Since this area has no visual receptors such as rods and cones, the images falling on this area cannot be detected.]
10. Name the two kinds of cells in the human eye and state their functions. [Hint- Rods- sensitive to dim light, and Cones- sensitive to bright light.]

*For the question numbers 11,12 and 13, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below*  
*i)Both A and R are true and R is the correct explanation of the assertion.*

ii) Both A and R are true but R is not the correct explanation of the assertion.

iii) A is true but R is false.

iv) A is false but R is true

11. Assertion (A): Multiple images are formed when two plane mirrors are placed at an angle to each other.

Reason (R): The image formed by one mirror acts as the object for the second mirror.

i) Both A and R are true and R is the correct explanation of the assertion.

12. Assertion (A): We can see non-luminous objects around us.

Reason (R): Light emitted by the non-luminous object falls on the eye.

iii) A is true but R is false.

13. Assertion (A): Lack of vitamin A in foodstuffs is responsible for many eye troubles.

Reason (R): Raw carrots, broccoli, and green vegetables are rich in vitamin A.

ii) Both A and R are true but R is not the correct explanation of the assertion.

## II. PASSAGE-BASED QUESTIONS:

The light ray that falls on a mirror is called the incident light ray. The ray that comes back from the surface after reflection is called the reflected light ray. The point where the incident ray strikes the reflecting surface is called the point of incidence. A line drawn perpendicular to the mirror at the point of incidence is normal. If the rays, after reflection from a surface, are parallel, then the reflection is termed regular reflection. The reflection from a plane mirror is an example of regular reflection. When parallel rays, after reflection from a surface, are not parallel, then it is called diffused reflection or irregular reflection. The reflection from an uneven surface is diffused reflection.

### Laws of Reflection

Law 1: The angle of incidence is always equal to the angle of reflection. i.e.  $\angle i = \angle r$ .

Law 2: The incident ray, the normal at the point of incidence, and the reflected ray all lie in the same plane.

Note: Rules are applicable for plane surfaces as well as curved surfaces.

(i) Rakhi switched on a torch light and pointed it towards a mirror. She calculated the angle of the incident and found it to be  $50^\circ$ . What is the angle of reflection?

(a)  $40^\circ$

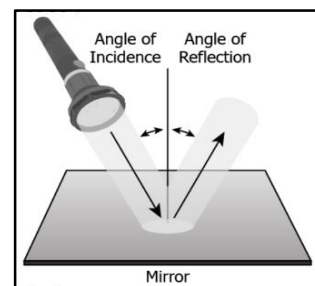
(b)  $45^\circ$

(c)  $50^\circ$

(d)  $100^\circ$

(ii) A student switched on a torchlight and points it towards a rough reflecting surface. What is likely to happen to the rays of light emitted from the torch?

(a) Rays of light will get absorbed



(b) Scattering of the rays of light

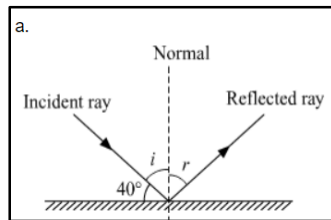
(c) Reflect back along the path of incidence

(d) Reflect in one particular direction depending on the angle of incidence

(iii) What is reflection? [Hint-Bouncing back of light rays after hitting any surface is called reflection of light.]

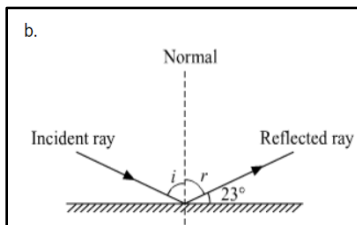
(iv) Solve the following examples.

a) If the angle between the plane mirror and the incident ray is  $40^\circ$ , what are the angles of incidence and reflection?



$$\begin{aligned}\angle i + 40^\circ &= 90^\circ \\ \Rightarrow \angle i &= 50^\circ \\ \text{Using law of reflection, we have} \\ \angle i &= \angle r = 50^\circ\end{aligned}$$

b) If the angle between the mirror and the reflected ray is  $23^\circ$ , what is the angle of incidence of the incidence ray?



$$\begin{aligned}\angle r + 23^\circ &= 90^\circ \\ \Rightarrow \angle r &= 67^\circ \\ \text{Using law of reflection, we have} \\ \angle i &= \angle r = 67^\circ\end{aligned}$$

### III. CASE STUDY-BASED QUESTIONS:

Ajith and Dipu had come to visit an ophthalmologist. On enquiring, it was found that Ajith can read his book when he places it very near to his eyes, but his friend Dipu can only see objects which are placed at a distance, but not the ones placed nearby.

When observed by a doctor it was found that Ajith was suffering from short-sightedness which is a defect of vision wherein far-off objects appear blurred and objects near are seen clearly and Dipu was suffering from long-sightedness which is a defect of vision wherein there is difficulty in viewing objects that are near but one can view far objects easily.

Some old people suffer from cataract which is the clouding of the lens that prevents the formation of a clear, sharp image. Because of this clouding blurred images are formed. Correction of cataract can happen through surgery by placing an artificial lens in place of the opaque lens. They have very limited vision to see things. It is necessary that you take proper care of your eyes. If there is any problem you should go to an eye specialist.

i) Identify the defect Ajith is suffering from.

(a) [Short sightedness](#)

(b) Cataract

(c) Conjunctivitis

(d) Long-sightedness

ii) Identify the defect Dipu is suffering from.

- (a) Cataract
- (b) Short sightedness
- (c) Conjunctivitis
- (d) Long-sightedness

iii) Why one should include vitamin A-rich eatables in their diet? [Hint-Eating foods rich in vitamin A has been shown to be important for maintaining our eyesight and our immune system.]

iv) What are the main sources of vitamin A? [Hint- Raw carrots, broccoli, and green vegetables (such as spinach) and cod liver oil are rich in vitamin A.]

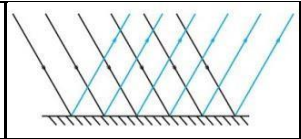
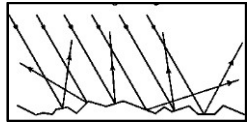
**IV. a) SHORT ANSWER TYPE QUESTIONS (2 M):**

1. Give four characteristics of an image formed by a plane mirror.  
[Hint- It is virtual, erect and of the same size as the object, the distance of the object from the plane mirror is the same as the distance of the image from the plane mirror and it is laterally inverted.]
2. Distinguish between real and virtual images. [Hint-Real image can be obtained on a screen and is inverted. A virtual image cannot be obtained on a screen and is always erect.]
3. What is a cataract? How is it treated medically? [Hint- In old age, eyesight becomes foggy because the eye lens becomes cloudy. When it happens, people are said to have cataract. In extreme cases, it leads to loss of vision. It is treated surgically by removing the opaque lens and replacing it with a new artificial lens.]
4. Eyes of the nocturnal birds have a large cornea and a large pupil. How does this structure help them? [Hint- Eyes of the nocturnal birds having large corneas with a wider pupils, can collect more ambient light which helps them to see objects even at night. Also it has on its retina a large number of rods and only few cones]
5. How do visually impaired people read? [Hint- Braille is one of the several aids that has been created for visually impaired people. It makes use of raised dots that are placed in various regular patterns and they enable people to read and write using their hands.]
6. A Periscope is a device made by using two plane mirrors placed at particular angles.
  - a) On which principle does it work? [Multiple reflections of light.]
  - b) What is it used for? [Hint-In submarines to see things above the surface of the water.]

**IV. b) SHORT ANSWER TYPE QUESTIONS (3 M):**

1. Draw and also state two points of difference between regular and diffused reflection.

<b>REGULAR REFLECTION</b>	<b>DIFFUSED REFLECTION</b>
Regular reflection takes place when the surface is smooth and highly polished.	Irregular reflection takes place when the surface is rough or uneven.

Image is formed due to this type of reflection.	Image is not formed due to this type of reflection. We can see things around us due to diffused or irregular reflection.
	

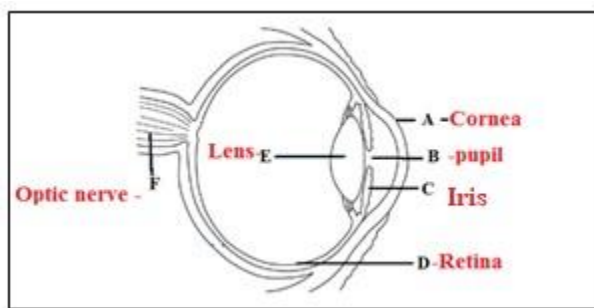
2. What is a Kaleidoscope? On what principle does it work and also state its applications. [Hint- Kaleidoscope is an instrument containing mirrors and pieces of coloured glass whose reflection produces changing patterns when it is rotated. It is based on the principle of multiple reflections of light. Applications are given below:

- (i) It is used for decoration purposes, toys, etc. (ii) Kaleidoscope is also useful for designers and artists to get ideas for new patterns to design wallpapers, jewellery and fabrics.]

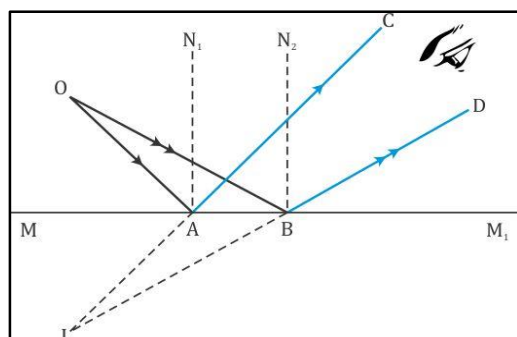
3. Explain the process which enables us to perceive motion in a cartoon film.

[Hint: We perceive motion in a film due to the persistence of vision. The impression of an image does not vanish immediately from the retina. It persists there for about 1/16th of a second. So, if still images of a moving object are flashed on the eye at a rate faster than 16 per second, then the eye perceives this object as moving. The movies that we see are actually a number of separate pictures in proper sequence. They are made to move across the eye usually at the rate of 24 pictures per second (faster than 16 per second). So, we see a moving picture.]

4. Label the parts in the given figure.



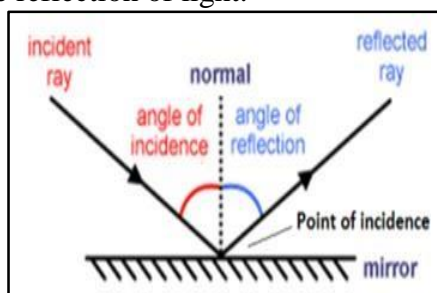
5. Draw a diagram to show the image formation in a plane mirror and answer the following questions



- (i) What is the size of the image of a 5 cm high object? (5 cm)  
(ii) What is the position of the image if the object is placed 10 cm far away from the mirror? (10 cm from the mirror]  
(iii) What is the nature of the image? [Virtual]

**V.LONG ANSWER TYPE QUESTIONS (5 M):**

1. Draw a neat labelled ray diagram to show the reflection of light from a plane mirror. Explain all the terms related to the reflection of light.



- A light ray travelling from the source towards the mirror is called an incident ray.
  - The light ray that bounces back from the mirror is called the reflected ray.
  - The point at which the incident ray meets the mirror is called the point of incidence.
  - The line drawn perpendicular to the surface of the mirror at the point of incidence is termed as normal.
  - The angle between the incident ray and the normal at the point of incidence forms the angle of incidence.
  - The angle between the reflected ray and the normal at the point of incidence is known as the angle of reflection.
2. State the functions of the following parts of the human eye.
- [a] Cornea- a transparent portion that protects the eyes and allows light to enter the eye.  
b) Iris- is coloured part of the eye behind the cornea. It regulates the amount of light entering the eye by adjusting the size of the pupil.  
c) Pupil- In dim light, the iris makes pupil enlarge to allow more light to enter the eye. In bright light, the iris makes the pupil contract, to reduce the amount of light entering the eye.  
d) Retina- a delicate membrane just behind the eyeball. It acts as a screen on which an image is formed. It has light-sensitive receptors called rods and cones.]

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