



## INDIAN SCHOOL AL WADI AL KABIR



<b>CLASS: VII</b>	<b>DEPARTMENT: SCIENCE</b> <b>2021-2022</b>	<b>DATE: 13.02.2022</b>
<b>WORKSHEET NO.: 14</b> <b>WITH ANSWERS</b>	<b>TOPIC: LIGHT</b>	<b>NOTE: A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT:</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

### I. VERY SHORT ANSWER TYPE QUESTIONS (1M):

1. Name any four different sources of light. [Hint: sun, stars, an electric bulb and a candle]
2. What is a mirror? [HINT: Any polished or smooth surface which can reflect light.]
3. Name the device which is used to split white light into seven colours. [Hint: A prism]
4. What do you mean by rectilinear propagation of light?  
[Hint: The property of light travelling in a straight line.]
5. Name the phenomenon responsible for-
  - a) The formation of rainbow. [HINT: Dispersion of light]
  - b) The formation of image of an object by a plane mirror. [HINT: Reflection of light]
6. What do you mean by reflection of light? [Hint- The bouncing back of light with the change in direction.]
7. What do you understand by dispersion of light? [HINT: The splitting of white light into seven different colours.]
8. What are spherical mirrors? [Hint: Mirrors having curved surfaces are known as spherical mirrors.]
9. Name any two letters of English alphabet in which the image formed in a plane mirror appears exactly like the letters. [Hint: A, H, I, M, O, T, U, V, W, X, Y]
10. What type of image is formed – (real or virtual)
  - a) In a plane mirror [Hint: Virtual]
  - b) on a cinema screen [Hint: Real]

For question numbers 11 to 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):** The inner surface of spoon acts like a concave mirror.

**Reason (R):** A concave mirror has reflecting surface curved inwards.

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

12. **Assertion (A):** The white light of sun is composed of seven colours.

**Reason (R):** When white light passes through a glass prism it splits the white light into seven colours.

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

13. **Assertion (A):** In the side mirror of a car, the images of all objects appear smaller than the objects.

**Reason (R):** Side mirrors are concave mirrors.

**iii) A is true but R is false.**

## **II. PASSAGE BASED QUESTIONS:**

We can see an image not only on plane surfaces but also on a curved surface. Take an example of a shining steel spoon. When we see our face on the outer surface of the steel spoon, the image formed is diminished and upright, whereas if we see our face on the inner side of the spoon, image is erect and larger in size. If you increase the distance of the spoon from your face, you may see your image inverted (upside down). The outer surface of the spoon that is bulging out is known as the convex surface and the inner curved surface is known as the concave surface. In a similar manner, spherical or curved mirrors are of two types - **concave mirrors** and **convex mirrors**.

1. A spherical mirror whose reflecting surface bulges out towards the light source –
  - a) plane mirror

- b) concave mirror
  - c) convex mirror
  - d) either concave or convex depending on which way you look at it.
2. An erect and enlarged image can be formed by –
- a) only a convex mirror
  - b) only a concave mirror
  - c) only a plane mirror
  - d) both convex and concave mirrors
3. The image formed in a convex mirror is always –
- a) smaller
  - b) larger
  - c) of same length
  - d) depends on distance of object
4. Which of the following is used as a rear-view mirror in cars and scooters?
- a) Plane mirror
  - b) Convex mirror
  - c) Concave mirror
  - d) None of these

### **III. CASE STUDY BASED QUESTIONS:**

1. Rahul and Nilam were given one mirror each by their teacher. Rahul found his image to be erect and of the same size whereas Nilam found her image erect and smaller in size. This means that the mirrors of Rahul and Nilam are respectively -
- a] plane mirror and concave mirror
  - b] concave mirror and convex mirror
  - c] plane mirror and convex mirror
  - d] convex mirror and plane mirror
2. Farzin is observing her image in a plane mirror. The distance between the mirror and her image 4 m. If she moves 1 m towards the mirror, then the distance between Farzin and her image will be –
- a] 6 m
  - b] 5 m
  - c] 8 m
  - d] 3 m
3. Rahul told his friend that ‘X’ can form a virtual image larger than the object by reflection. What is ‘X’?
- a] Plane mirror
  - b] Convex mirror
  - c] Concave mirror
  - d] Concave lens

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

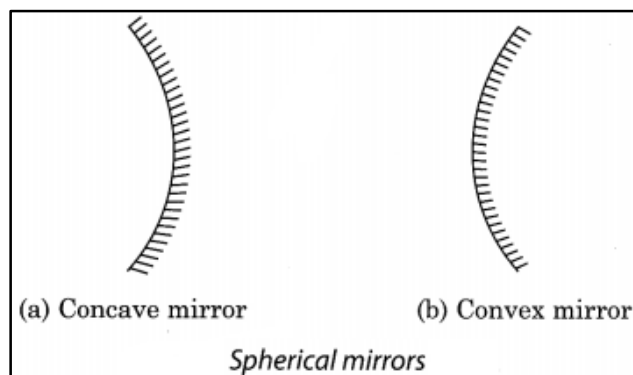
1. What is lateral inversion? [Hint: A mirror forms an image such that its left side is object’s right side and its right side is object’s left side]

2. Give two uses each of a concave and convex mirror.  
[Hint: Concave mirror – shaving mirror, dentist, telescopes;  
Convex mirror – rear view mirror, shopping security mirror]
3. What kind of image is formed by concave lens?  
[Hint: Upright, virtual and smaller than the object.]
4. What kind of image is formed by convex lens? [Hint: A convex lens can form a real or virtual image ,also the image can be smaller or larger in size than the object . When the object is placed very close to the lens, the image formed is virtual, erect and magnified.]
5. Why does a Newton’s disc appear white when rotated?  
[HINT: All the seven colours combine to make white.]
6. Write the difference between concave and convex mirror.  
[Hint: Concave - **A spherical mirror**, whose reflecting surface is curved inwards.  
Convex - **A spherical mirror**, whose reflecting surface is curved outwards]
7. Mention the two laws of reflection of light.  
[Hint: i] The incident ray, the reflected ray and the normal at the point of incidence all lie in the same plane.  
ii] The angle of incidence is always equal to the angle of reflection.]
8. Explain why concave mirrors are used as shaving mirrors. [Hint: When the face is held close to a concave mirror, then an enlarged image of the face is seen in the concave mirror, this helps a man in making a smooth shave.]
9. State one way in which the image formed in a convex mirror is similar to that in a plane mirror and one way in which it is different.  
[Hint: similarity - virtual and erect, difference – smaller than the object]
10. The side mirror of a scooter got broken. The mechanic replaced it with a plane mirror.  
Mention any inconvenience that the driver of the scooter will face while using it?  
[Hint: Driver cannot see the traffic spread over large area behind him.]
11. What happens when a beam of sunlight is passed through a glass prism?  
[Hint: When a beam of light is passed through a prism it splits into seven different colours (VIBGYOR). The band of seven colours is called spectrum.]

12. How are rainbows formed? [Hint: Rainbows are formed by the splitting of white light of the sun through transparent water droplets present in the air. The sunlight splits into seven colours of the rainbow.]

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

1. State four characteristics of the image formed by a plane mirror.  
[Hint: Image is upright, virtual, same size as size of the object, image formed is at same distance behind the mirror as the object is in front of it]
2. Two different types of lenses are placed on a sheet of newspaper. How will you identify them without touching? [Hint: On observing the letters of newspaper, we can differentiate the two types of lenses. If the image is larger or magnified then the lens is a convex lens and if the image is smaller or diminished in size for all positions of the object, then the lens is concave.]
3. What type of mirror is used:
  - a) In a searchlight [HINT: concave]
  - b) As a side-view mirror in a car [HINT: convex]
  - c) As a shaving mirror [HINT: concave]
  - d) Vigilance-mirror in a big shop [HINT: convex]
4. In what way is the word “AMBULANCE” painted in front of the hospital vans? Why is it painted in this way? [The word AMBULANCE on the hospital vans is written in the form of its mirror image, because any vehicle which is ahead of ambulance van can see the laterally inverted alphabets correctly from his rear-view mirror and make way for it to pass through and enable it to reach the hospital quickly.]
5. Draw diagrams to differentiate between Concave and convex mirror



6. Differentiate between real image and virtual image -

REAL IMAGE	VIRTUAL IMAGE
i) Image that can be obtained on a screen is called real image	i) Image that cannot be obtained on a screen is called virtual image
ii) Image is always inverted	ii) Image is always erect
iii) e.g. Image formed on the retina of the eye	iii) e.g. Image formed by a plane mirror.

7. Mandar suffers from toothache and goes to the dentist. He becomes afraid when he sees different instruments in doctor's hand. But he becomes surprised when he observes some reflecting shiny surface fitted on the doctor's forehead -

a) What is the shiny surface and what is its function?

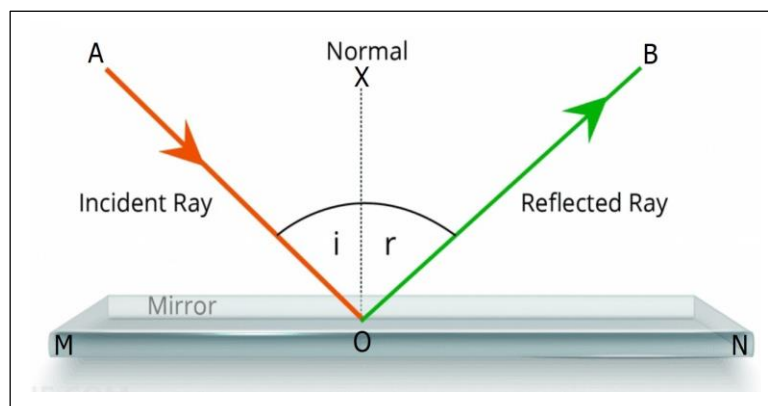
[Hint: Concave mirror. To see an enlarged image of the teeth.]

b) Mention some other devices where such kind of mirror can be used?

[Hint: Reflectors of torch, headlights of car.]

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

1. What do you mean by 'angle of incidence' of a ray of light on a plane mirror?



[Hint: Angle of incidence is the angle between the incident ray and the normal to the plane mirror at the point of incidence.]

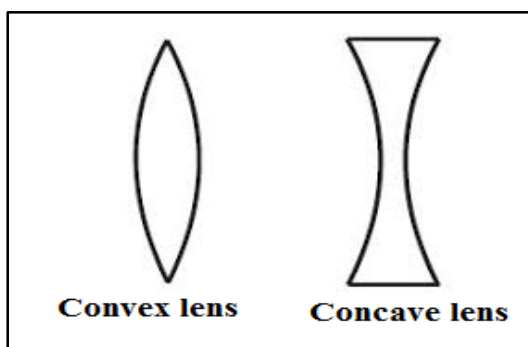
In the figure, MN is the plane mirror, AO is the incident ray, O is the point of incidence, OX is the normal and  $\angle AOX$  is the angle of incidence.]

2. Write an experiment to show that the sunlight consists of seven colours.

[Hint: Take a glass prism. Allow a narrow beam of sunlight through a small hole in the window of a dark room to fall on one face of the prism. Let the light coming out of the other face of the prism fall on a white sheet of paper or on a white wall. We see colours similar to those in a rainbow. This shows that the sunlight consists of seven colours.]

3. With the help of diagrams, define and differentiate between concave and convex lenses.

[Hint:



CONVEX LENS	CONCAVE LENS
1. A convex lens is thicker in the middle and thin at the edges	1. A concave lens is thin in the middle and thicker at the edges
2. It is also known as convergent lens	2. It is also known as divergent lens
3. A convex lens usually magnifies images	3. Objects look smaller through concave lens

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