

## LIGHT

### I. OBJECTIVE TYPE QUESTIONS:

1. The path of the light is always

a. **straight line**

b. curved line

c. zig zag line

d. depends on the medium.

2. Which of the following mirrors shows lateral inversion?

a. concave mirror

b. plane mirror

b. convex mirror

**d. All of the above**

3. Which letter's image on a plane mirror will not be inverted sideways?

a. L

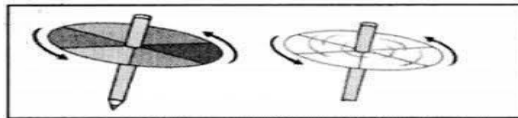
b. P

**c. W**

d. B

4. Shreya spins a multi-coloured wheel rapidly. What colour will the rapidly spinning

The wheel appears to be?



a. pink

b. blue

**c. white**

d. Green

5. Boohjo and Paheli were given one mirror each by their teacher. Boohjo found his image to be erect and of the same size whereas Paheli found her image erect and small in size. This means that the mirrors of Boohjo and Paheli are, respectively

- a. plane and concave mirror                      **b. plane and convex mirror**  
 c. concave and convex mirror                    d. convex and plane mirror
6. If an object is placed at a distance of 0.5m in front of the plane mirror, the distance between the object and the image formed by the mirror will be  
 a. 2m    b. 0.5m  
 c. 0.25m    **d. 1m**
7. You are provided with a concave mirror, convex mirror, concave lens and convex lens. To obtain the enlarged image of an object you can use either  
 a. concave mirror or convex mirror            b. concave lens or convex lens  
**c. concave mirror or convex lens**            d. concave mirror or concave lens

**For question numbers 8 to 11, two statements are given- one labelled Assertion(A) and the other labelled Reason (R) Select the correct answer to the questions from the codes (i), (ii), (iii) ad (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**
- 8. Assertion (A):** The white light of the sun is composed of seven colours.  
**Reason (R):** The prism adds colour to the white sunlight.  
**iii) A is true but R is false.**
- 9. Assertion (A):** The ray of light that falls on the surface of the reflecting material or mirror is the incident ray.  
**Reason (R):** The splitting up of white light into seven colours on passing through a glass prism is called dispersion of light.  
**ii) Both A and R are true but R is not the correct explanation of the assertion.**
- 10. Assertion (A):** The inner surface of the spoon acts like a concave mirror.  
**Reason (R):** A concave mirror has a reflecting surface curved inward.  
**i) Both A and R are true and R is the correct explanation of the assertion.**
- 11. Assertion(A):** When the object is placed very close to the convex lens, the image formed is virtual, erect and magnified.  
**Reason(R):** Concave mirrors can form real and inverted images when the object

is placed very close.

**i) A is true and R is false.**

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

1. What is a lateral inversion? **[Hint: A mirror forms an image such that its left side is the object's right side and its right side is the object's left side]**
2. Give two uses each of a concave and convex mirror.  
**[Hint: Concave mirror – shaving mirror, dentist, headlights in vehicles; Convex mirror – rear view mirror, shopping security mirror]**
3. Why are convex mirrors used as side view mirrors in cars? **[Hint: Convex mirror can be used to view a much larger area so it is used as the rearview or side view mirror in cars.]**
4. Name the phenomenon responsible for
  - a) The formation of a rainbow. **[Hint: Dispersion of light]**
  - b) The formation of the image of an object by a plane mirror. **[Hint: Reflection of light]**
5. What kind of image is formed by a concave lens? **[Hint: Upright, virtual and smaller than the object.]**
6. What kind of image is formed by a) convex lens if the object is placed close to the lens? **[Hint: Virtual, erect and magnified.]**
  - b) plane mirror **[Hint: Virtual]** c) on a cinema screen **[Hint: Real]**
7. What makes things visible to us? **[Hint: Objects are visible only when light reflected from them reaches our eyes.]**
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 make 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- image 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: The driver cannot see the traffic spread over a 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 a spectrum.]**

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

1. What type of image is formed by a concave mirror? **[Hint: The image formed by a concave mirror is real and inverted if the object is at a far distance. If the object is placed very near to the mirror, then the image formed is virtual and erect.]**

2. What is the nature of an image formed by a convex mirror? **[Hint: The nature of the image formed by a convex mirror is always virtual and erect.]**

3. Two different types of lenses are placed on a sheet of newspaper. How will you identify them without- touching them? **[Hint: On observing the letters of the 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.]**

4. What type of mirror is used:

- a) In a searchlight **[Hint: concave mirror]**
- 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]**

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

6. 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 the ambulance van can see the laterally inverted alphabets correctly from**

**its rear-view mirror and make way for it to pass through and enable it to reach the hospital quickly.]**

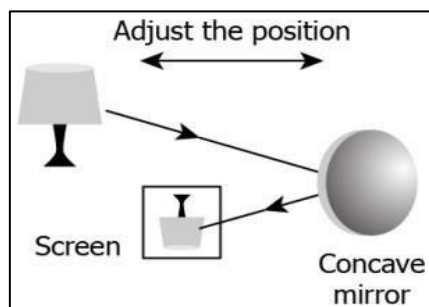
7. Amar suffers from toothache and goes to the dentist. He becomes afraid when he sees different instruments in the doctor's hand. But he becomes surprised when he observes that his Doctor examines his teeth with the help of a mirror.

a) Name the mirror used by the doctor and what is its function.

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

b) Mention some other devices or equipment where such a kind of mirror can be used. **[Hint: Reflectors of the torch, headlights of a car, shaving mirrors.]**

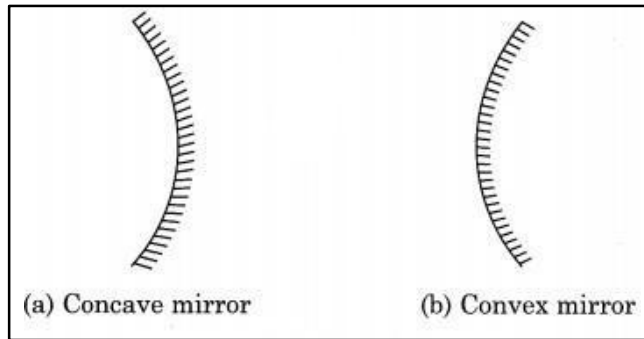
8. A student performs an activity where he uses a lamp and projects its image on a screen as shown in the image.



He kept on changing the distance between the lamp and the mirror for various positions. He notices that the image formed on the screen disappears when the lamp is held close to the mirror. What explains the disappearance of the image on the screen?

**[Hint-Objects held close to a concave mirror produce a virtual image which cannot be obtained on the screen.]**

9. Draw diagrams to differentiate between concave and convex mirrors.

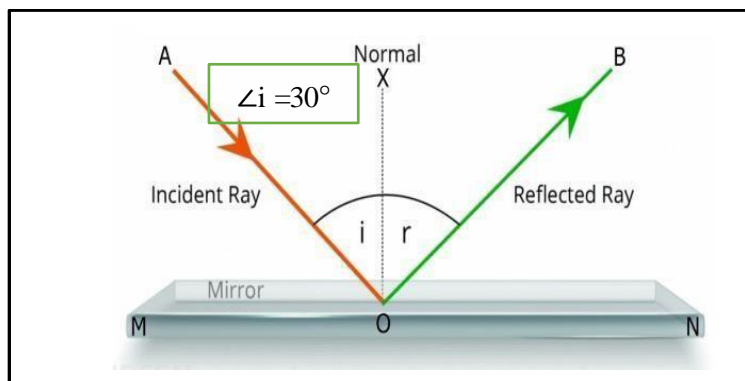


10. Differentiate between real image and virtual image.

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

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

1. a) What do you mean by 'angle of incidence' and 'angle of reflection' 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.

Therefore, the Angle of reflection is the angle between the reflected ray and the normal to the plane mirror at the point of reflection.

In the figure,  $\angle BOX$  is the angle of reflection.

b) Find the angle of reflection, if the angle of incidence is given as ( $\angle i=30^\circ$ ).

[Hint- According to the laws of reflection,

The angle of incidence is equal to the angle of reflection ( $\angle i=\angle r$ )

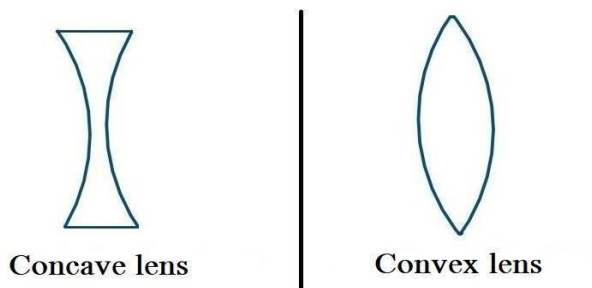
Therefore, if  $\angle i=30^\circ$ , then  $\angle r=30^\circ$ ]

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 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:



CONCAVE LENS	CONVEX LENS
1. A concave lens is thin in the middle and thicker at the edges	1. A convex lens is thicker in the middle and thin at the edges
2. It is also known as diverging lens	2. It is also known as converging lens
3. The image looks smaller through a concave lens	3. A convex lens usually magnifies images

## **V. CASE STUDY /PASSAGE BASED QUESTIONS:**

1. One day, Amar's friend was performing their respective experiments given by their teacher. While sitting in the practical lab instead of performing the experiment, Amar was playing with his meter scale. All of a sudden, he held the scale in his hand and started moving in front of the tube light, then he observed the seven colours of white light.

a. Name a coloured band of light obtained by the dispersion of light

[Hint- Spectrum is the band of colours formed by dispersion of light.]

b. Name the constituent colours of white light. [Hint: There are seven constituent colours of white light, they are Violet, Indigo, Blue, Green, Yellow, Orange, Red (i.e VIBGYOR)]

c. Name the device which is used to split white light into seven colours. [Hint: A prism]

d. Why does Newton's disc appear white when rotated? [HINT: All seven colours combine to make white.]

2. Anita is playing with a plane mirror and she observed the images formed in it. She observed that the mirror forms an image such that its left side is the object's right side and the right side is the object's left side. The distance between the mirror and her image is 4m. She also noticed that her image size is of the same size(object) as hers and it is erect. She tried to focus her image on a screen.

a. Explain the observation when Anita tried to focus her image on a screen.

[Hint- Plane mirror always forms a virtual image which cannot be focused on a screen.]

b. Name the phenomenon of 'right appearing left' and 'left appearing right'.

[Hint- Lateral inversion]

c. List any one characteristic formed by the plane mirror.

[Hint- Image is always erect, size of object and image is always the same, Object distance and the image distance is equal.]

d. The distance between the mirror and her image is 4m. If she moves 1 m towards the mirror, then the distance between Anita and her image will be?

[Hint- The distance between the mirror and her image is 4m

If she moves 1 m towards the mirror, then  $4 - 1 = 3\text{m}$

The final distance between Anita and her image will be  $3+3 = 6\text{ m}$ ]



