

**Selina Solutions For Class 9 Physics**  
**Chapter 7 – Reflection Of Light**

Exercise-7(B)

1. Two plane mirrors are placed making an angle  $\Theta$  in between them. Write an expression for the number of images formed if an object is placed in between the mirrors. State the condition, if any.

**Solution:**

The expression is as follows:

$(n-1)$  if 'n' is even or odd, the object placed is symmetrically  
If  $n=360^\circ / \Theta^\circ$ , n is odd and the object is placed asymmetrically

2. Two plane mirrors are placed making an angle  $\Theta^\circ$  in between them. For an object placed in between the mirrors, if angle is gradually increased from  $0^\circ$  to  $180^\circ$ , how will the number of images change: increase, decrease or remain unchanged?

**Solution:**

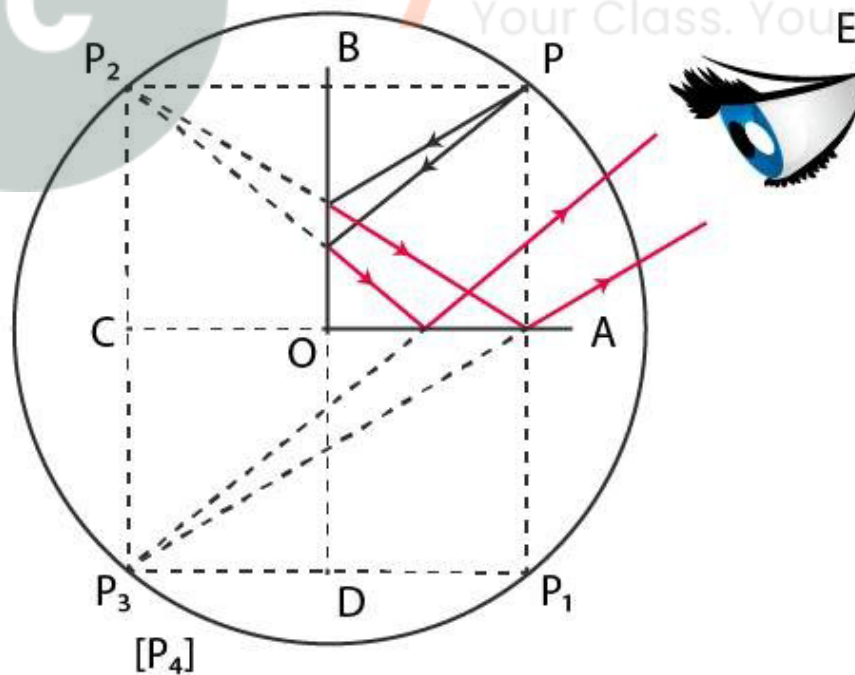
The number of images decreases.

3. How many images are formed for a point object kept in between the two plane mirrors at right angles to each other? Show them by drawing a ray diagram.

**Solution:**

If a point object is placed between two plane mirrors that are at right angles to each other, then 3 images are formed for it.

The ray diagram is as follows:



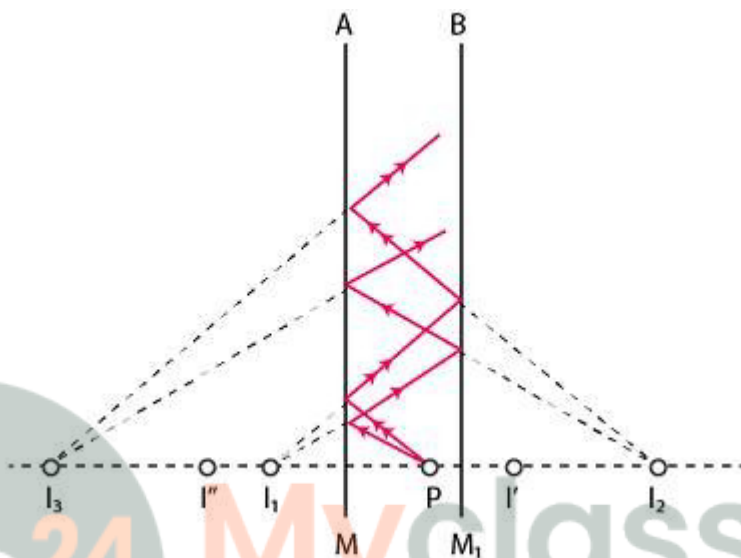
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4. Two plane mirrors are arranged parallel and facing each other at some separation. How many images are formed for a point object kept in between them? Show the formation of images with the help of a ray diagram.

**Solution:**

The number of images formed for a point object placed between two plane mirrors that are arranged parallelly, facing each other at some distance is infinite.

The ray diagram is as follows:



5. State two uses of a plane mirror.

**Solution:**

The two uses of a plane mirror are:

- In the optician's room to increase the effective length of the room, achieved by placing a plane mirror on the front wall and the sign board on the opposite wall, just behind the patient. For the patient, the sign board is at nearly double the length of the room
- The two parallel plane mirrors each inclined  $45^\circ$  in a periscope with vertical walls are placed facing each other.

**Multiple Choice type:**

1. Two plane mirrors are placed making an angle of  $60^\circ$  in between them. For an object placed in between the mirrors, the number of images formed will be :

- (a) 3
- (b) 6
- (c) 5
- (d) Infinite

**Solution:**

- (c) 5

If the angle between two mirrors is  $60^\circ$ ,  $n = 360^\circ / 60^\circ = 6$ , number of images =  $n - 1 = 6 - 1 = 5$

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**2. In a barber's shop, two plane mirrors are placed:**

- (a) Perpendicular to each other**
- (b) Parallel to each other**
- (c) At an angle of  $60^\circ$  between them**
- (d) At an angle of  $45^\circ$  between them**

**Solution:**

- (b) Parallel to each other**

In order to see the hair at the back of the head, the two plane mirrors are placed parallel at the front and at the back of the viewer.

**Numericals:**

**1. State the number of images of an object placed between the two plane mirrors, formed in each case when the mirrors are inclined to each other at**

- (a)  $90^\circ$  and**
- (b)  $60^\circ$**

**Solution:**

- (a)** The number of images formed when an object is placed between the two plane mirrors at an angle of  $90^\circ$ , is 3. Three images are formed.

We know that, two mirrors kept perpendicular to each other, produces three images for an object that is placed in between them.

i.e, the angle between two mirrors is  $90^\circ$ ,  $n=360^\circ/90^\circ = 4$ , number of images =  $n-1 = 4-1 = 3$ .

- (b)** The number of images formed if an object is placed between two plane mirrors with an angle of  $60^\circ$ , is five. Five images are formed:

i.e, the angle between two mirrors is  $60^\circ$ ,  $n=360^\circ/60^\circ = 6$ , number of images =  $n-1 = 6-1 = 5$ .

**2. An object is placed**

**(i) asymmetrically**

**(ii) symmetrically, between two plane mirrors inclined at an angle of  $50^\circ$ . Find the number of images formed.**

**Solution:**

Given:

Angle between the two mirrors =  $50^\circ$

$n=360^\circ/50^\circ \Rightarrow 7.2$ , can be rounded off to 7, which is an odd number.

- (i)** The number of images that will be formed when the image is placed asymmetrically is n, which is 7.
- (ii)** The number of images that will be formed when the images is placed symmetrically is  $n-1$ , i.e.,  $7-1=6$ . 6 images are formed.