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SCHOOL:STA

SUBJECT :PHYSICS.

CLASS: SS2.

TOPIC: REFLECTION OF LIGHT FROM A PLANE SURFACE.

SUB TOPICS: IMAGES FORMED BY A PLANE SURFACE.

CONTENTS.

When two plane mirrors are inclined to each other at an angle. Several images are formed. If the angle between the mirrors is  $\theta$ . The number (n) of images formed is given by

$$n = 360/\theta - 1.$$

However, when the two mirrors are parallel to each other, the number of images will be infinite.

Example 1: An object is placed between two mirrors inclined at  $90^\circ$  to each other. What is the number of images observed ?

SOLUTION.

$$n = 360/\theta - 1.$$

$$n = 360/90 - 1$$

$$n = 4 - 1$$

$$n = 3.$$

Example 2: What will be the angle between two inclined mirrors when the number of images is eight?

SOLUTION.

$$n = 360/\theta - 1.$$

$$8 = 360/\theta - 1$$

$$8 + 1 = 360/\theta .$$

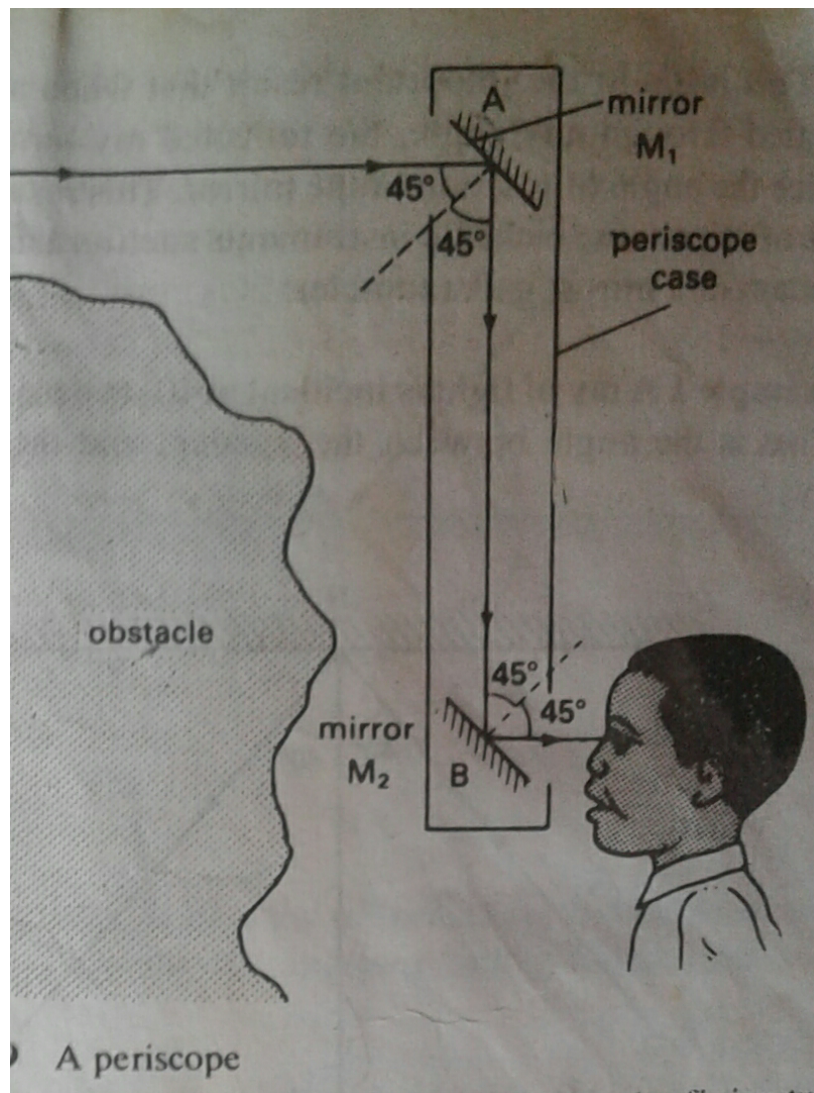
$$9\theta = 360.$$

$$\theta = 360/9.$$

$$\theta = 40^\circ.$$

#### APPLICATIONS OF PLANE MIRRORS.

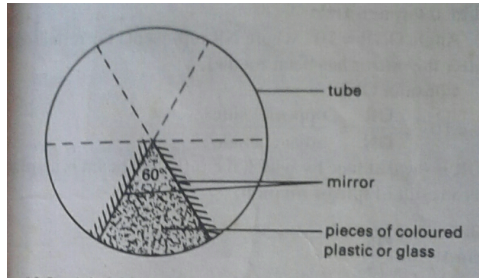
1. It is used in simple periscope; this is made of two plane mirrors facing each other and inclined at  $45^\circ$  to the line joining the two as shown in the diagram below.



2. It is used as a looking glass.

3. It is used in sextant.

4. It is used in kaleidoscope; this is made when two plane mirrors are inclined at  $60^\circ$  as shown in the diagram below.



#### EFFECTS OF MIRROR ROTATION ON A REFLECTED RAY.

When a mirror is rotated or turned through  $\theta$ , the angle of rotation of the reflected ray is  $2\theta$ .

Example 3: The angle between a fixed ray of light and a plane mirror is  $20^\circ$ . If the mirror rotates through  $30^\circ$ , by how many degrees does the reflected ray rotate?

SOLUTION.

The mirror rotates through  $30^\circ$ .

Therefore, the reflected ray rotates through  $2 \times 30^\circ = 60^\circ$ .