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SCHOOL:STA

SUBJ ECT :PHYSICS.

CLASS: SS2.

TOPIC: RECTILINEAR PROPAGATION OF LIGHT(NOTES)

SUB TOPICS: THE PIN - HOLE CAMERA.

The pin hole camera, invented as early as 1550, makes use of the fact that light travels in a straight line.

The pin hole camera consists of a light - tight box,one end of which has a small hole made with a pin or needle point.The opposite end has a screen made of tracing paper. In a dark room , a candle or a brightly lit object placed a short distance from the camera will form a bright inverted picture of the object on the screen. This is called an image. If the object is brought closer to the camera , the image will be larger . If the screen is replaced by a photographic plate, a picture can be taken with a pin- hole camera. A brighter image can be obtained by having a larger hole.More light then enters the box to form a bright image, but the image is blurred. The wider hole can be considered as a large number of pin holes,each forming its own image.The images they form overlap ,and they are seen as a single blurred image.

MAGNIFICATION

The magnification (m) of an image is defined as the ratio of the height of the image to the height of the object.

M= image height/ Object height

=image distance from camera/ Object distance from camera.

= Length of camera/ Object distance from camera.

EXAMPLE: The length of a pin hole camera is 10cm. It is used to photograph an object 80cm away from the pin hole , and 10cm high. Find the height of the image and magnification produced.

SOLUTION

M= Length of camera/Object distance from camera

=10/80

=0.25.

Also, magnification (M) = image height/ Object height.

0.25 = image height/ 10

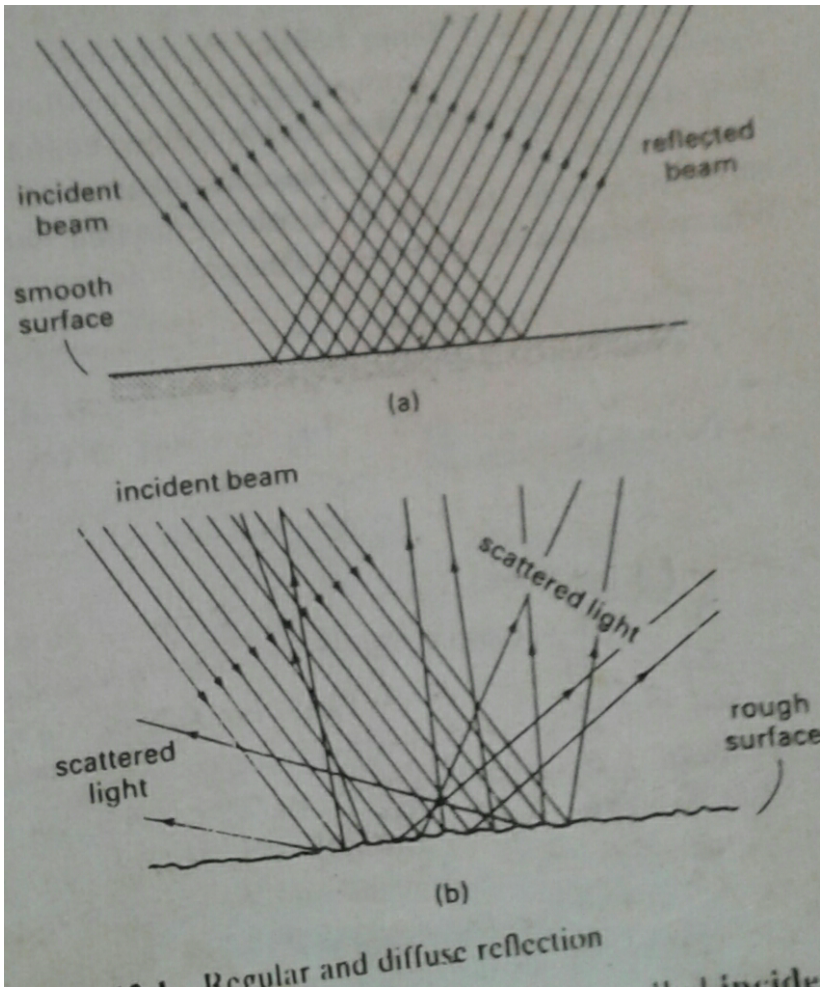
Image height = 10 ×0.25

=2.5cm.

TOPICS: REFLECTION OF LIGHT FROM PLANE SURFACES.

When light strikes a surface , it is absorbed, transmitted or reflected. There are two types of reflection namely; Regular and diffuse reflections.

In regular reflection, it takes place from a smooth , polished surface such as a plane or flat mirror. However, when the beam hits a rough surface, such as clothing material or paper surface, the rays are reflected in different directions. This is called scattered or diffuse reflection as shown in the diagram below.



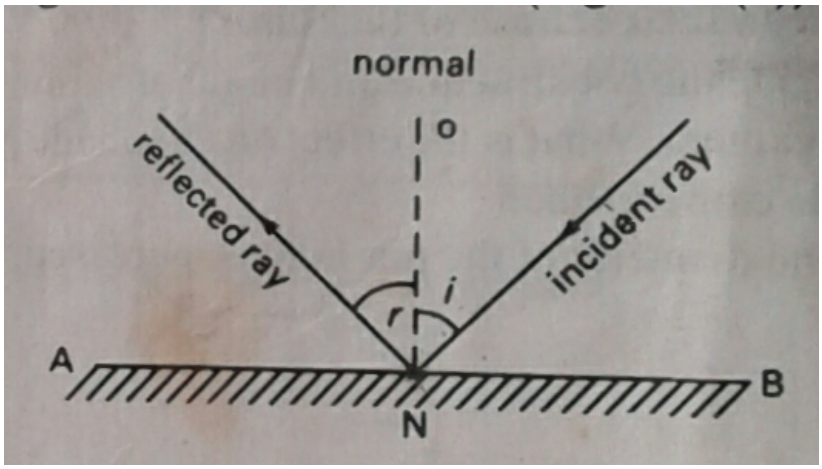
Regular and diffuse reflection

LAWS OF REFLECTION .

When a ray of light is incident on a smooth surface such as a mirror, part or all of the ray is reflected . The laws of reflection state that:

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

2.The angle of incidence (i) is equal to the angle of reflection (r) as shown in the diagram below.



Images formed can either be real (like the case of a pin - camera) or virtual (like the case of a plane mirror)

A real image is the one through which rays of light pass.If a screen is placed at the position of a real image, the image is seen on the screen.

A virtual image is one through which rays of light do not pass but which is nevertheless visible to the eye.

IMAGE FORMED BY A PLANE MIRROR.

The image formed by a plane mirror has the following characteristics :

I. It is the same size as the object.

II. It is as far behind the mirror as the object is in front.

III. It is laterally inverted.

Iv. It is virtual

V.It is upright.