Experiment No. (1)
Refractive index of glass

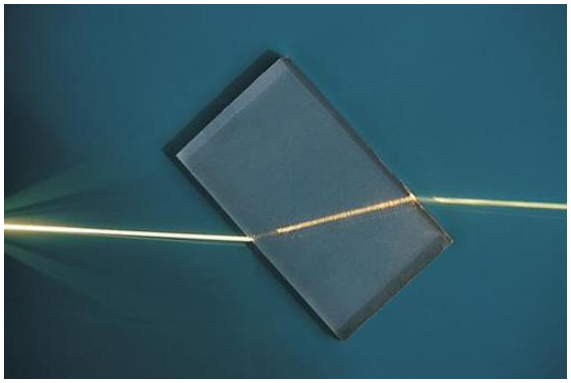


Fig. (1): Experimental setup

Object:

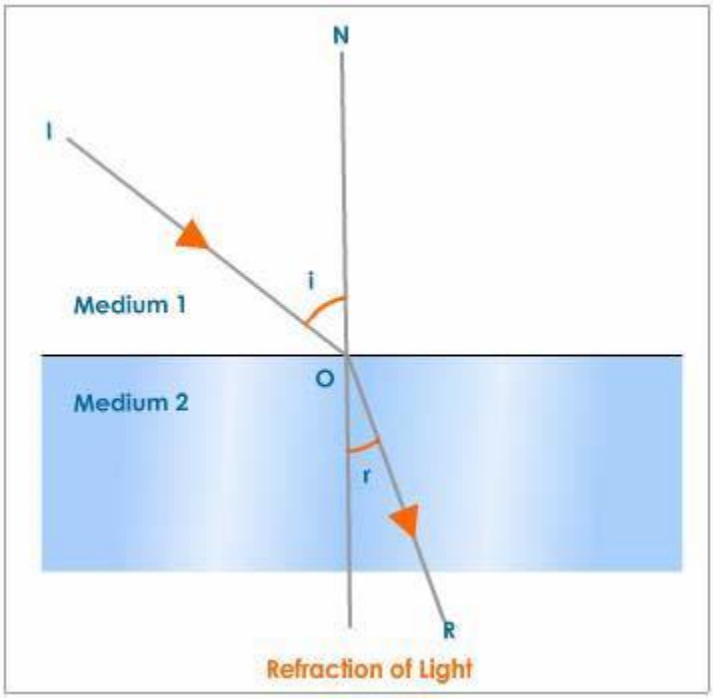
The aim of the experiment is to study the refraction index of a glass

Equipment:

- Circular disk
- Trapezoidal prism
- He-Ne laser

Theory:

refractive index, also called index of refraction, measure of the bending of a ray of light when passing from one medium into another. If i is the angle of incidence of a ray in vacuum (angle between the incoming ray and the perpendicular to the surface of a medium, called the normal), and r is the angle of refraction (angle between the ray in the medium and the normal), the refractive index *n* is defined as the ratio of the sine of the angle of incidence to the sine of the angle of refraction; *i.e.*, $n = \sin i / \sin r$. Refractive index is also equal to the velocity *c* of light of a given wavelength in empty space divided by its velocity *v* in a substance, or $n = c/v$.



Procedure:

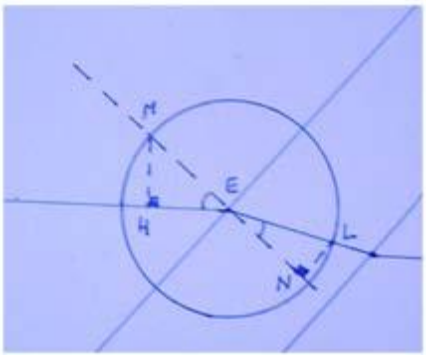
1- Align the setup as shown in fig.(1).

2- Using the thumbtacks, fix a sheet of paper on the wooden plane and lay the glass block, resting on the wider faces, at the centre.

3- Draw the outline of the glass block on a piece of paper. Two pins A and B determine the direction of an incident ray on a face of the glass block. The two pins are fixed on the working plane so that the straight line passing through them forms with the edge of the block a determined angle.

4- Looking beyond the glass block, find the position for which the two pins, seen through the glass block, are aligned, then fix two

other pins O and P to determine this new straight line. Verify that the two pins are aligned on the straight line determined by the other two.
5- Take away the glass and draw the lines as shown in the figure and a circumference of any radius centred in E.



6- From Snell`s law we have that:

$$n_2 = \frac{\sin\theta 1}{\sin\theta 2}$$

Discussion:

1- Define refractive index.

2- Discuss your result.

3- Did you think that the density of glass effect the refractive index of it? Explain.