Experiment to calculate the refractive index of glass

1.Objective: Find the refractive index of glass

2. Tools: Thick glass plate, white paper, ruler, protractor.

3.general theory: When a light ray moves from a low-density medium to a denser medium, it will be refracted approaching the normal Light is refracted at an angle less than the angle of incidence. *The angle of incidence is greater than the angle of refraction

Theory: When a light ray collides with a surface separating two transparent media in which the speed of light differs significantly, the incident ray is generally divided into a refracted and reflected ray, and there must be a perceptible angle between the ray and the perpendicular on the dividing line because refraction does not occur in the case of vertical incidence. When light travels from one medium to another, the light deviates from its path so that the ratio between the sine of the angle of incidence and refraction of the two media remains constant

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

Snell law

. It has been found that this ratio is specific to the material and is called the refractive index (refractive index), or it is known as the ratio between the speed of light in the air to its speed in a medium of a certain wavelength. The index of refraction depends on: the wavelength of light, which is inversely proportional to

the type of medium, which is directly proportional to density and temperature.

How to calculate the refractive index of a piece of glass in the shape of a cuboid:

1.Draw a straight, vertical line on a white sheet of paper that is slightly larger than the piece of glass whose refractive index is to be calculated. –

2- Place the paper on the circular protractor so that the column is aligned with the zero of the protractor, then place the rectangular piece of glass on it and determine the location of the ray's incidence so that it makes an angle of 30 with the column. Also determine the location of the ray's penetration with the pen, then lift the glass piece and connect the two points, the location of the ray's incidence and the penetration.

3.We measure The angle between the perpendicular and the line between the two points represents the angle of refraction.

 4- Repeat steps 1, 2, and 3, but change the angle of incidence by 5 degrees.

5.Repeat step 4 for the four appropriate angles of incidence and arrange the readings in a table.

6.Draw a graph between the sine of the angle of incidence and the sine of the angle of refraction and calculate the slope equal to n
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$N:$ is an index of refraction that has no unit of measurement.

$n_1:$ The refractive index of the first medium .

$n_2:$ Refractive index of the second medium .

$\theta_1:$ Angle of incidence .

$\theta_2:$ Angle of refraction.

N=1 Air constant

θ_1	θ_2	n_2