SRI RAM DAYAL KHEMKA VIVEKANANDA VIDYALAYA SENIOR SECONDARY SCHOOL

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PHYSICS PROJECT

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CLASS: XII – B

TOPIC: Refractive Index Of A Liquid

INDEX

REFRACTIVE INDEX

(WATER)

AIM

To find the refractive index of a liquid using a convex lens and plane mirror.
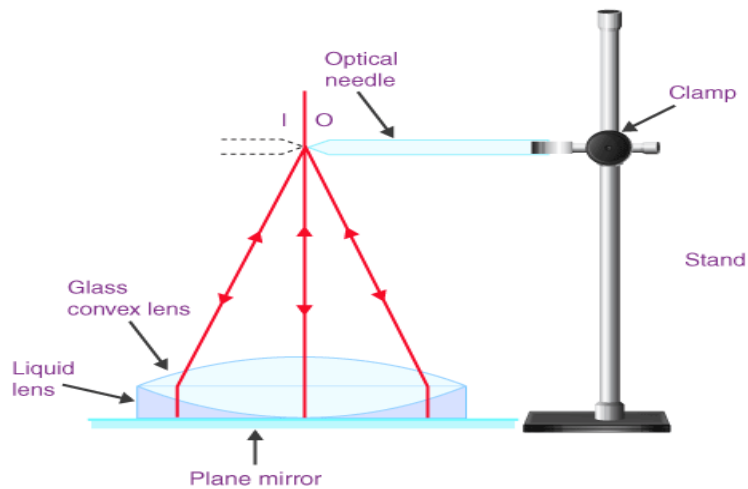
APPARATUS

- Convex Lens
- Plane Mirror
- Optical Needle
- The clean transparent liquid in a clean beaker
- An iron stand with base and clamp arrangement
- Plane glass slab
- Plumb Line
- Spherometer
- Half metre scale

FORMULA

Let us consider f_1 and f_2 to be the focal length of the glass convex lens and liquid lens respectively and let F be the focal length of their combination, then

$$n = 2 - \frac{f_1}{f_2}$$

DIAGRAM

PROCEDURE

For the focal length of the convex lens,

- Choose a convex lens and find its rough focal length.
- Place the plane mirror on the horizontal base of the iron stand
- Place the convex lens on the plane mirror
- Screw tight the optical needle in the clamp of the stand and hold it horizontally above the lens at a distance equal to its rough focal length.
- Bring the tip of the needle to the principal vertical axis of the lens so the tip of the needle appears to be touching the tip of its image.
- Move the needle up and down and remove the parallax between the tips of the needle and its image.
- Measure the distance between the tip and upper surface of the lens using a plumb line and half metre scale.
- Also, measure the distance between the tip and the surface of its plane mirror

For the Focal Length of the Combination

- Take a few drops of transparent liquid on the plane mirror and put a convex mirror over it.
- Move the needle up and down and remove the parallax between the tips of the needle and its image.
- Measure the distance between the tip and upper surface of the lens using a plumb line and half metre scale.
- Also, measure the distance between the tip and the surface of its plane mirror.
- Record your observations.

OBSERVATION

S.NO	Convex lens place on Plane mirror		Focal length	Convex lens place on Plane mirror with water		Focal length
	From lens surface (cm)	From mirror surface(cm)	$f_1=(a+b)/2$	From lens surface (cm)	From mirror surface(cm)	$f_2=(a+b)/2$
1						
2						

Mean value of $f_1=$

Mean value of $f_2=$

Calculations

RESULT

The Refractive index of water is

PRECAUTIONS

1. Only a few drops of liquid should be taken so as not to thicken the layer.
2. The parallax should be removed tip to tip.
3. The liquid taken should be transparent.

SOURCES OF ERROR

1. The liquid may not be quite transparent.
2. The parallax may not be fully remove