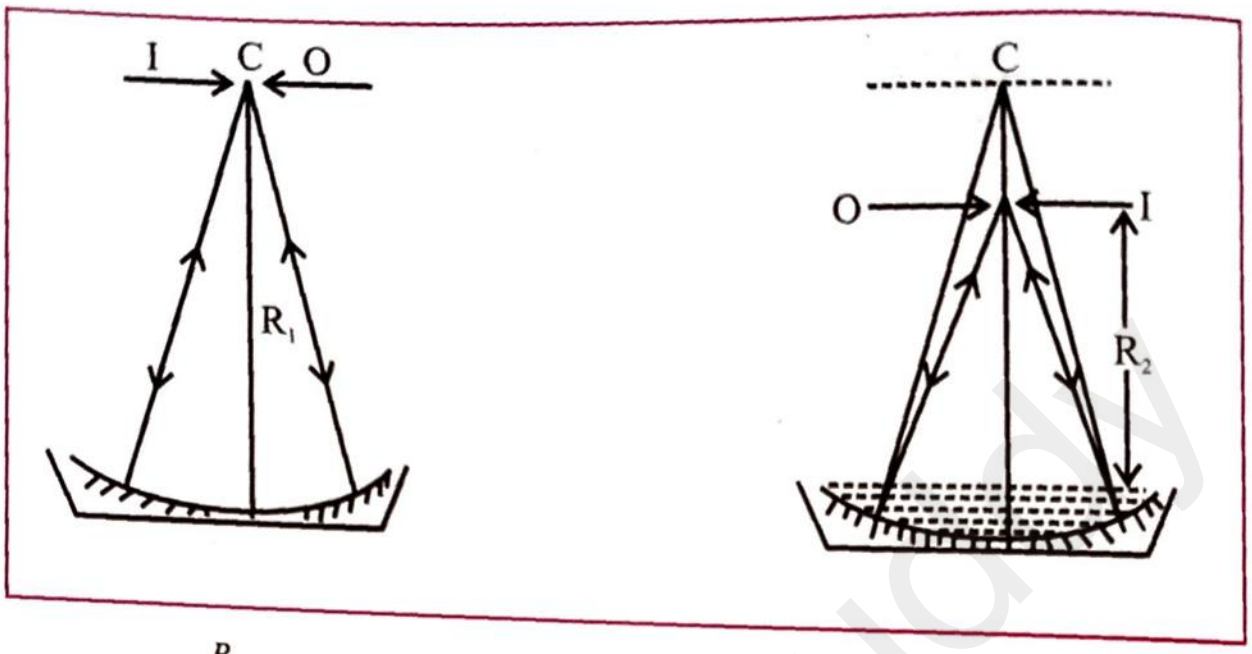
EXPERIMENT NO. 8
R.I. OF A LIQUID BY CONCAVE MIRROR

Aim: To determine the refractive index of a liquid by using a concave mirror.

Apparatus: A concave mirror, index pin, Retort stand, liquid, meter scale.

Diagram:



Formula: $\mu = \frac{R_1}{R_2}$

Where, μ= R. I. of the liquid
R_1 = Distance between the mirror and the pin
R_2 = Distance between the pin and surface of liquid

Procedure:

1. Keep the concave mirror on a horizontal surface.
2. Clamp the index pin horizontally in the retort stand in such a way that the tip of the pin is on the principal axis of the mirror.
3. Look from above the pin and adjust the position of the pin either by raising or by lowering it so that it coincides with its own inverted image formed by reflection in the mirror, without parallax. (You will have to lower down the object pin if image appears thinner than the object pin and raise the object pin if the image appears thicker than the object pin).
4. Measure the distance (R_1) of the pin from the pole of the mirror with a scale. This distance is equal to the radius of curvature of the mirror. Repeat these two more times and take the mean value of R_1 (as shown in fig. 1)
5. Pour a quantity of the given liquid on the concave mirror such that it covers more than half the surface.
6. Lower the pin and adjust its position again so that it coincides with its own image without parallax. (Use the same judgement).
7. Measure the distance R_2 of the pin from the surface of liquid (as shown in fig. 2)
8. Repeat these two more times.

Observations:

Sr. No.	Distance between pin and the surface of the mirror: R_1 cm	Mean R_1 cm	Distance between pin and the surface of the liquid: R_2 cm	Mean R_2 cm
1	18	26.66 cm	22	24
2	30		24	
3	32		26	

Formula: $\mu = \dfrac{R_1\ (mean)}{R_2\ (mean)}$

Calculations:

$$\mu = \frac{R_1(mean)}{R_2(mean)}$$

$$= \frac{26.66}{24} = 1.11$$

$$\mu = 1.11 \text{ cm}$$

Result: Refractive index of given liquid = μ = 1.11cm

Precautions :

1. There should be no parallax between the pin and its image.
2. The pin should be horizontal.
3. The quantity of the liquid added to the mirror should not be very small.
4. The part of the upper surface of the liquid in contact with the mirror is slightly curved. Hence, consider the central part of the liquid while determining "R"

Additional Experiment you can do :

Repeat the above experiment by using kerosene and sop water instead of water.

Multiple-choice Questions

1. Which one of the following is the refractive index of water:
   a) 1.333 b)1.545 c) 1.723 d) 2.891

2. The bending of a ray of light as it travels from one medium to another is called.....
   a) Deflection b) total internal reflection c) refraction d) reflection

Questions

1. State Snell's law of refraction.

The ratio of the sine of the angle of incidence to the ratio of sin of angle of refraction is a constant for a light of a specified concave and for the specified pair of medium.
t snell [redacted]'s law status that the ratio of sin i is a constant refractive index on second medium respective the first.

2. What is the merit of the method described in this experiment?

Measuring the refractive index of a substance of medium is part of various apparatus that are used to determine thus index. These apparatus have denoted the yeous based on the different ways light reflects and transmits in the medium.
t one of those methods in valuse a spherals called with a liquid, which itself are excellent affernativ

3. Is the any other method to determine the refractive index of a liquid?

Refractive index index of refractive is a that defines the law the light pass medium. Here, the angle of incidence and r is the angle of refraction. Refractive index is also defined as the ratic at the speed of light in vacuum the speed of light its medium.
A simple method is introduce to measure the refractive index as a liquid with an experiment. device compressed of a graduated adjacent and a which are coaxial.

Remark and sign of teacher: .....