Applied Physics

Lab Report#3

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EXP. 1

Color Addition

Objective

To understand and demonstrate the concept of additive color mixing using primary colors of light (Red, Green, and Blue).

Apparatus

- Three primary color LED light sources (Red, Green, Blue)
- Projection screen or white surface
- Power supply and controllers for LEDs
- Ruler or measuring scale

Procedure

1. Set up the three LED sources at equal angles directed towards a white screen.
2. Turn on one LED at a time to observe the individual color.
3. Switch on two LEDs at once to observe the resultant color due to mixing.
4. Finally, turn on all three LEDs simultaneously and observe the white light formed.

Observations and Calculations

LEDs On	Resultant Color
Red + Green	Yellow
Red + Blue	Magenta
Green + Blue	Cyan
Red + Green + Blue	White

Conclusion
The experiment verifies the principle of color addition. Mixing two primary colors gives a secondary color, and combining all three results in white light.

EXP. 2
Prism

Objective
To study the refraction and dispersion of light through a glass prism.

Apparatus

- Glass prism
- White light source
- Screen
- Protractor
- Ruler

Procedure

1. Place the prism on a flat surface and direct the white light towards one face.
2. Mark the incident and refracted rays.
3. Measure the angle of deviation.
4. Observe the dispersion spectrum on the screen.

Observations

- White light splits into a spectrum of seven colors.
- The angle of deviation increases with wavelength.

Conclusion

The experiment demonstrates that prisms disperse light due to different refractive indices for each wavelength, validating the phenomenon of dispersion.

EXP. 3
(Reflection)

Objective

To verify the laws of reflection.

Apparatus

- Plane mirror
- Ray box or laser pointer
- Protractor
- White paper
- Pencil

Procedure

1. Fix the mirror vertically on the paper.
2. Direct an incident ray at various angles.
3. Trace the incident and reflected rays.
4. Measure the angles using a protractor.

Observations

Angle of Incidence (θi)	Angle of Reflection (θr)
20°	20°

Angle of Incidence (θi)	Angle of Reflection (θr)
40°	40°
60°	60°

Conclusion
The angle of incidence is equal to the angle of reflection, validating the law of reflection.

EXP. 4
Snell's Law

Objective
To verify Snell's Law of Refraction.

Apparatus

- Glass slab or semicircular glass block
- Ray box
- Protractor
- White paper

Procedure

1. Shine a light beam at various angles into the glass.
2. Trace incident and refracted rays.
3. Measure the angles and compute sine values.
4. Plot sin(θi) vs sin(θr).

Observations and Calculations

θi	θr	sin(θi)	sin(θr)
20°	13°	0.342	0.225

θi	θr	sin(θi)	sin(θr)
40°	25°	0.643	0.423

Conclusion
The plot is linear, confirming Snell's Law: sin(θi)/sin(θr) = constant (refractive index).

EXP. 5
Total Internal Reflection

Objective
To observe the conditions for Total Internal Reflection (TIR).

Apparatus

- Semicircular glass block
- Ray box
- Protractor

Procedure

1. Direct a light ray from the flat face into the curved surface.
2. Increase the angle of incidence gradually.
3. Identify the critical angle where the refracted ray disappears.

Observations

- At low angles, refraction occurs.
- Beyond the critical angle, the light reflects entirely within the block.

Conclusion

Total internal reflection occurs when the angle of incidence exceeds the critical angle. This confirms the principle of TIR.

EXP.6
Convex and Concave Lenses

Objective

To study the behavior of light rays through convex and concave lenses.

Apparatus

- Convex and concave lenses
- Ray box
- Screen
- Meter scale

Procedure

1. Shine parallel rays onto each lens and observe their paths.
2. Note focal point in convex (converging) and apparent divergence in concave (diverging).
3. Measure focal length by adjusting the distance until a clear image forms.

Observations

- Convex lens focuses rays at focal point.

- Concave lens diverges rays as if from a virtual focal point.

Conclusion

The experiment validates the converging nature of convex lenses and diverging nature of concave lenses. Their focal lengths can be measured through image formation.
