NEATH PORT TALBOT COLLEGE
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School of Maths & Science
Science Practical

Refractive index of a glass block

◆ Aim

To verify the formula linking angle of incidence, angle of refraction and relative refractive index.

◆ Introduction

You will pass a light beam through a glass or Perspex block. By carefully recording the position of the incident and emerging beam from the block you can measure angles if incidence and refraction. This will allow you to find the refractive index of you block.

◆ Safety

Control Measures

- You are reminded of the need for good laboratory practice in order to maintain a safe working environment.

Hazards

Electrical hazard

Ensure that the power supply is switched off when connecting the ray box

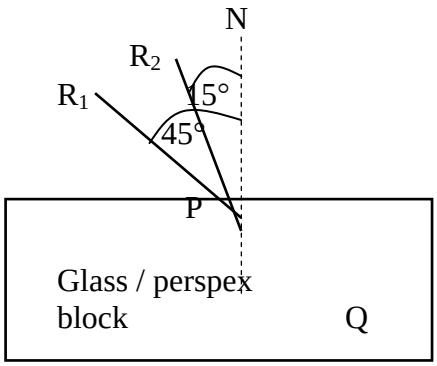
Apparatus Required

Power supply, ray box with single slit, rectangular glass or perspex block, large sheet of white paper, ruler and protractor

◆ **Procedure**

1. Place the block on the paper and draw an outline so that you have a clear indication of its position. Construct the following arrangement on your sheet of white paper.

2. Draw a normal N, a ray R_1 with angle of incidence 45°, a ray R_2 with angle of incidence 15°, all at point P.



3. Shine the ray of light along the 45^o line. Now mark on the paper the path of light as it emerges from the block at Q.

4. Remove the block from the paper and join points P and Q, which will indicate the path of light as it passes through the block.

5. Measure the angle of refraction with a protractor and record in the table below.

6. Calculate the refractive index of the block you have been given and record the value in the table.

7. Repeat your measurements for line R_2, to allow you to double check your result.

	Angle of incidence (i)	**Angle of refraction (r)**	**Sin (i)**	**Sin (r)**	**Refractive index (n)**
R_1	**45^0**				
R_2	**15^0**				

8. Consider the main sources of error involved in the experiment. List them below.

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9. Estimate the errors incorporated into your experiment; then add the maximum error in your angle to the value of the angle of refraction (r). Using the new angle of refraction, recalculate the refractive index of the block. Comment on how the refractive index has changed.

   Maximum estimated error in angle _____

	Angle of incidence (i)	**Angle of refraction (r)**	**Sin (i)**	**Sin (r)**	**Refractive index (n)**
R_1	**45^0**				
R_2	**15^0**				

10. Comment on the change in refractive index of the block

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