MEASURING REFRACTIVE INDEX OF GLASS

1 Below write the method you used to determine the refractive of glass using monochromatic light.

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_____

Which is always greater? The angle in air or in the medium?

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_____

2 Why is it important to use monochromatic light to do this experiment accurately?

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3 (i) How many times did the ray change direction? _____

(ii) Where did this occur? _____

(iii) Does this change if the incident ray is NOT directed at the centre of the straight side?

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(iv) If the refracted ray travels along a radius and then it meets the curved surface of the block at 90^{o} and this means it (will / will not) change direction.

4 (i) Think about the prism. What happened to white light shone through a prism?

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(ii) Is this statement true or false?

Light of different frequencies/wavelengths is refracted by different amounts. Red light is refracted less than violet light and has a greater wavelength.

(iii) What can you conclude about frequency and refractive index?

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(iv) Is refractive index dependent only on the medium (material) the light passes through?

_____.

If no, what else does it depend on? _____

4 (v) Use this information to explain why white light is split into a spectrum when passing through a prism.

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5 (i) Refraction occurs because a wave travels at different speeds in different media.

So, $n = \frac{\sin \theta_1}{\sin \theta_2} = \frac{v_1}{v_2}$

Use $v = f\lambda$ to add the rest of the above equation.

(ii) **However**, frequency is UNAFFECTED by a change in medium. ie. the frequency of red light is the **SAME** in water, air, glycerol, etc.

Now simplify the above equation to give:

SNELLS' LAW

$$n = \frac{\sin \theta_1}{\sin \theta_2} = \frac{v_1}{v_2} =$$

EXAMPLE: A wave of frequency 6×10^{14} HZ, enters a block at an angle of 50^o, and the angle in the block is 36^o. Find the speed and wavelength of the light in the block.

WORKING: HINT: What is the speed of light in air?