

St John Baptist De La Salle Catholic School, Addis Ababa

Homework 2

4th Quarter

Aaron GK

May 19, 2023

Notes, and use of other aids is allowed. Read all directions carefully and write your answers in the space provided. To receive full credit, you must show all of your work.

Cheating or indications of cheating and similar answers will be punished accordingly.

Information

- The homework is due primarily on **Friday, May 19th**. You can submit it on **Monday, May 22nd**, but the Advanced Problems won't count.
- You should Work on it **in groups** and consult me if you have any questions. As I have reiterated multiple times, cheating between groups will have a serious consequence.
- For purposes of neatness and simplicity of grading, you should do the homework on an **A-4 paper**.

Questions

1. The refractive index of visible light from a material to air is 4.8. What is the speed of light through the material? What is the critical angle for this material?
2. Light is traveling from water to air.
 - (a) What happens if the angle of incidence is 50° ?
 - (b) If light is incident at an angle of 30° , what is the angle of refraction?
3. When an object is submerged in a medium, it looks as though its nearer to the surface than it actually is when viewed from a outside. Show that, when viewed from almost vertically above, the refractive index of the medium can be given as a ratio of its real depth to the apparent depth.
4. A ray of 700 nm light goes from air into medium($n = 1.8$) at an incident angle of 45° . At what incident angle must 500 nm light enter flint glass to have the same angle of refraction?

Advanced Problems

5. Prove the law of reflection using Huygens' principle.