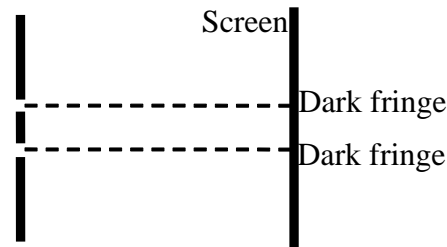


Physics 2135 Final Exam Preparation Homework Spring 2017

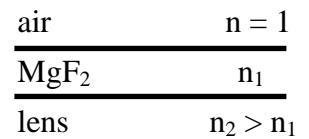
These problems are intended to help you check your level of preparation for the final exam (primarily the End Material Test). **They are not intended to cover every topic you could be tested on**, nor are they a guarantee of exam content.

1. Light moves from air into glass. Which of the following is true?
 [A] The frequency increases and the wavelength is constant.
 [B] The frequency decreases and the wavelength is constant.
 [C] The frequency is constant and the wavelength decreases.
 [D] The frequency is constant and the wavelength increases.

2. Light with wavelength 600 nm is incident on a double-slit system with slit separation of 0.40 mm. How far away from the slits should a screen be placed in order for the first dark fringe on either side of the central interference maximum to appear on the screen directly opposite the two slits?

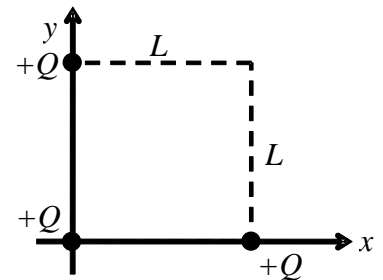


3. A lens is coated with a thin film of MgF_2 to reduce reflection. The index of refraction of MgF_2 is n_1 and the index of refraction of the lens is n_2 (where $n_2 > n_1$). What is the minimum thickness of MgF_2 that **eliminates** reflection of light of wavelength λ ? Assume normal incidence.

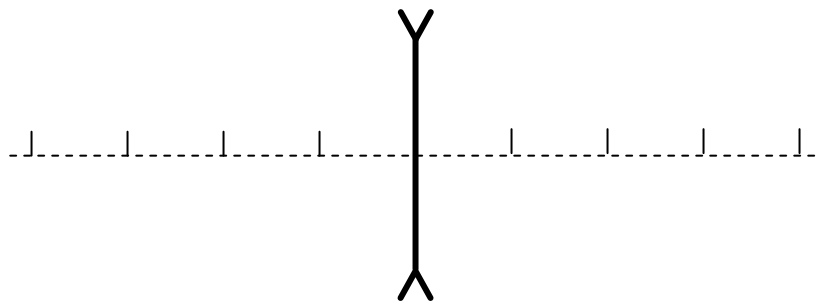


- [A] $\lambda / (4n_1)$ [B] $\lambda / (4n_2)$ [C] $\lambda / (2n_1)$ [D] $\lambda / (2n_2)$

4. Three identical point charges $+Q$ are placed on three corners of a square of side L . Find the Coulomb force on the point charge at the origin. Express your answer in **unit vector notation**.

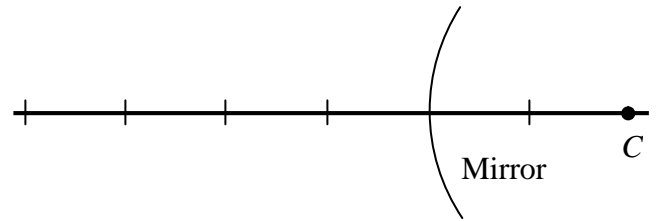


5. An object is 40 cm from a lens having an index of refraction $n=1.5$ and radii of curvature $R_1=-15$ cm and $R_2=+30$ cm. Find the location of the image. Verify your calculations with a ray diagram. Is the lens converging or diverging?

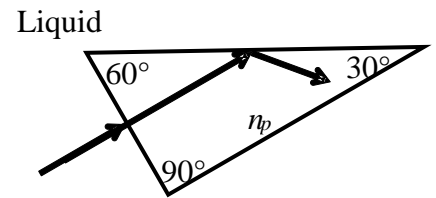


6. The side mirror of a car is a spherical convex mirror with a radius of curvature with a *magnitude* of 1.0 m. The upright image of a person is seen. The image 0.3 m tall and the actual person is 1.5 m tall.

- How far is the person from the mirror?
- Where is the image of the person located?
- Complete a ray diagram showing the formation of the image using the figure provided.



7. Light is incident perpendicular to the short face of the 30° - 60° - 90° prism as shown. The index of refraction of the prism is $n_p = 1.62$, and the prism is immersed in an unknown liquid. What is the maximum index of refraction of the liquid if the light is totally reflected from the long side of the prism?



Physics 2135 Spring 2017 Final Exam Rooms

May 12, 10:00 – 12:00

Instructor	Sections	Room
Dr. Hale	F, H	104 Physics
Dr. Kurter	B, N	125 BCH
Dr. Madison	K, M	B-10 Bertelsmeyer
Dr. Parris	J	St Pat's Ballroom
Dr. Parris	L	112 Bertelsmeyer
Mr. Upshaw	A, C, E, G	St Pat's Ballroom
Dr. Waddill	D	120 BCH

Special Accommodations Testing Center

These room assignments will be posted on the doors to
104 Physics.

BCH = Butler-Carlton Hall (Civil Engineering)
St. Pats Ballroom is in the Havener Center

All of these rooms (except 104 Physics and 112
Bertelsmeyer) are shared with Physics 1135.