

Physics 262: Example Exam
100 points

1. (25 points) A plano-convex lens has a curved surface with radius of curvature R and index of refraction $n = 1.5$. An object is placed at a distance $s = R$.
 - (a) (15 pts) Draw two principle rays to show the image position.
 - (b) (10 pts) What are the image position and lateral magnification?
2. 2 (25 points)

The electric field of a plane wave is given by $\vec{E} = \hat{k}E_0 \cos(kx - \omega t)$

 - (a) (5 pts) What direction is the wave traveling?
 - (b) (5 pts) What is the polarization direction?
 - (c) (15 pts) How much force would be applied to a solar panel with area A ?
3. (10 points) To reduce glare from water, what direction should your sunglasses be polarized? Explain your answer.
4. (10 points) A half wave plate is designed to operate correctly for 550 nm light. If 600 nm light is used, what is the resulting polarization?
 - (a) elliptical, but closer to circular.
 - (b) elliptical, but closer to linear.
 - (c) linear.
 - (d) circular.
5. (10 points) Explain the difference between a ray and a wave front. Use a diagram.
6. (10 points) Which has a longer focal length: A spherical mirror with radius of curvature R or A plano-convex lens that has curved surface radius of curvature R and index of refraction $n = 2$. Explain your answer.
7. (10 points) A standing wave is generated between two reflectors separated by $L = 2\lambda$. At how many points between the mirror is the electric field intensity always zero? Explain using a diagram.