Part I

TEST QUESTIONS (FOR FINAL)

Note: The REVIEW FOR THE FINALS

[MWF FINAL 12/15 1:30 p.m.
TuTh FINAL 12/19 1.30 P.M.]

is Scheduled for

Wednesday, Dec 13

2 P.M.

a. I plan to discuss the following Test Questions. If you want any T.Q's from previous listings to be discussed let me know by Tuesday, Dec 12.

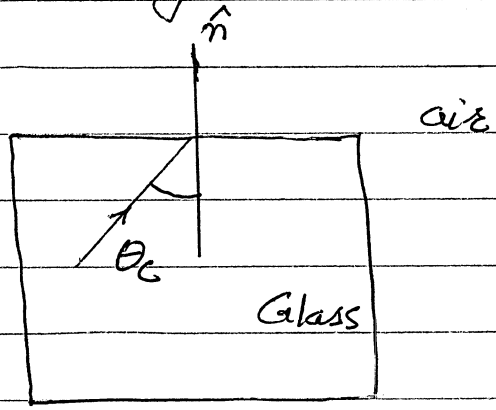
b. The final has 25 (twenty five) problems, each worth 8 pts.

c. Maxwell's EQNS. ARE ALWAYS ON THE FINAL TEST

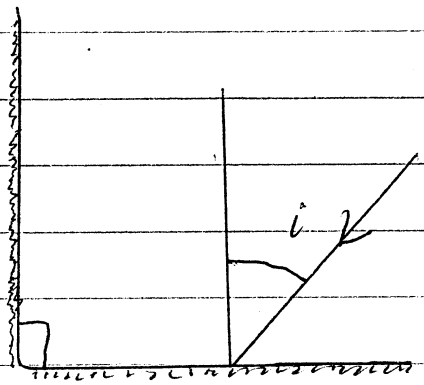
d. If you want BONUS on FINAL You NEED VISITS NOW.

e. If you are missing your "Contract" grade by 1 or 2 pts. please come and talk to me a.s.a.p.

1. As shown a ray of light is incident at the glass – air interface ($n_{glass} = 1.5$). If the angle of incidence is the critical angle, where do you draw the refracted ray



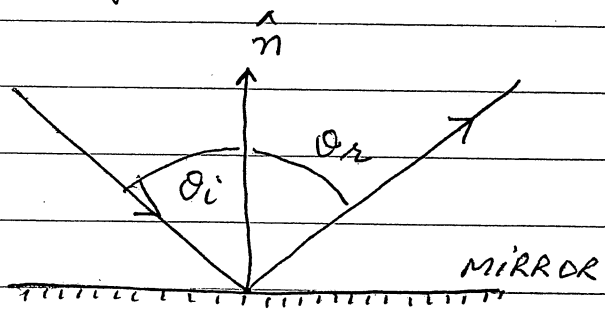
2. The picture shows a corner reflector: Two plane mirrors at right angles to one another. Locate the path of light as it leaves the system:



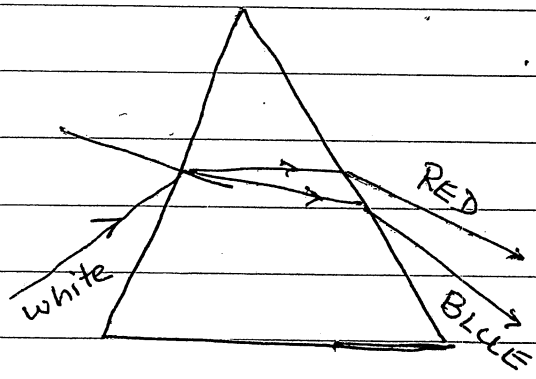
3. Show that the law of Reflection is a direct consequence of Fermat's principle of least time.

3. If in Prob, $\theta_{inc} > \theta_c$ what happens to the light after it hits the surface? Why?
Write down Maxwell's Equations and explain their Significance.

4 In the picture shown if you rotate the mirror by an angle θ by what angle will the reflected ray be rotated? Why?



5 Newton's Expts showed that when white light goes through a prism the emerging beam is split into several colors. If he observed what is shown in the picture what did he learn about the properties of light? Why?



6. All mirrors form images given by the Equations

$$\frac{1}{p} + \frac{1}{q} = \frac{2}{r}, \quad m = -\frac{q}{p}$$

where p = object-mirror distance, q = image-mirror dist. r = Radius of mirror. How do you distinguish among a plane, a concave and a convex mirror?

7. Use the Equations of prob 6 to locate images for $p \to \infty$, $p > f$, $p = f$, $p < f$, $p < \frac{f}{2}$. In each case, calculate magnification and specify if image is real or virtual. Draw ray Diagrams to support your answers.

Why is there a "minus" sign on the right of the Equation

$$m = \frac{-q}{p}.$$

8. Describe the method used to locate the image of a point object produced by any optical system.

9. How would you experimentally distinguish between a real image and a virtual image.

10. The right rear view mirror of your car has a warning "objects are nearer than they appear." What kind of mirror is this? Draw a ray diagram to support your answer.

11. Show that with a Convergent mirror or lens a real image can never come closer than the focal point.