

# Homework Set No. 7, Physics 835

## Deadline – Monday, March 13, 2006

1. (10 pts) Jackson Problem 10.1 (a,b)
2. (10 pts) Jackson Problem 10.4 (Hint: use dielectric function

$$\epsilon = \epsilon_r + \frac{i\sigma}{\omega\epsilon_0} \quad (1)$$

in previously derived cross section)

3. (10 pts) Jackson Problem 10.11 (a,b), where Fresnel integrals are defined by

$$C(\xi) = \sqrt{\frac{2}{\pi}} \int_0^\xi \cos \eta^2 d\eta \quad (2)$$

$$S(\xi) = \sqrt{\frac{2}{\pi}} \int_0^\xi \sin \eta^2 d\eta. \quad (3)$$

In part (b) a numerical plot of  $I(X)$  would suffice, though you may do what Jackson requires for a full credit as well. Finally, a hint:

$$\int_{-\infty}^{\infty} dy e^{iy^2} = \sqrt{\frac{\pi}{2}} (1 + i). \quad (4)$$

Can you prove this?