

Physics 187
 Homework #2
 Due Monday 16, 2012

Jackson Chapter Two:

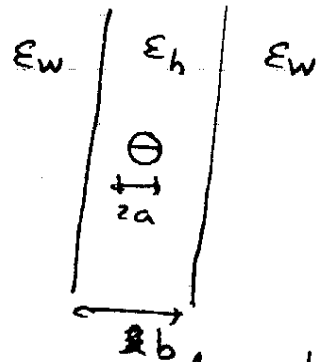
7, 11

Jackson Chapter Three:

1, 3

5. In chapter two we read that A. Parsegian computed the Born energy of a charge of radius a in a membrane of thickness b . It is

$$G = \frac{q^2}{2\epsilon_h a} - \frac{q^2}{\epsilon_h b} \log\left(\frac{2\epsilon_w}{\epsilon_w + \epsilon_h}\right)$$



Hint: You will need an infinite series of image charges and then sum the series of contributions to the electrostatic energy coming from each charge. You may be able to get the sum by thinking about the Taylor series for $\log x$ about $x=1$.