Physics 116C Homework 2 due 10/11/07

Boas Chapter 13: 2.3, 2.5, 2.6, 2.7, 2.10, 2.11, 2.16,

In addition, in problem 2.10 find the exact value for T(5,5) using symmetry, and ideas from problems 2.11 and 2.16. Your answer should not be an infinite series.

## Additional problem:

1. Consider the equation for a damped string

$$\frac{\partial^2 y}{\partial x^2} = \frac{1}{V^2} \frac{\partial^2 y}{\partial t^2} + \nu \frac{\partial y}{\partial t}$$

The string is initially held at rest with the shape  $y(x, t = 0) = \sin(\frac{\pi x}{l}) + \sin(\frac{100\pi x}{l})$ . Also the ends of the string are fastened at x = 0 and x = l, so that y(x = 0, t) = y(x = l, t) = 0. Calculate y(x, t). Don't worry too much about expressing your final answer in terms of real functions, as this will vary over the values of parameters V and  $\nu$  chosen. But please comment on the analogy of this problem to overdamped and underdamped motion, and the regimes where each kind of motion will occur. *Hint: Read Chapter 13 section 4*