You are allowed to have one study sheet while taking the exam. The sheet may have notes on both sides. In addition, you will need a calculator and a pen or pencil to complete the exam.

Answer each question as succinctly as possible. Where calculations are involved, show your work. Partial credit can only be assigned if you show your work. Answers should be neat. I may take off points for messy or illegible answers.

The exam is worth 150 points. Point values for individual questions are indicated to the left of the question. There is an extra credit problem, worth 8 points, at the end of the exam.

1. Explain why a dollar earned in the future does not have the same value as a dollar earned today.

2. Explain in words the difference between discounting and deflating.

3. Assume you are a forestry consultant. You have a client who owns 250 acres of timberland, and she has asked you to do some financial analyses of different management options. Her primary reasons for owning the land are for recreation and hunting, but she is also interested in making some income from timber production. What are some questions you might ask the client in order to determine an appropriate alternate rate of return to use in analyzing her forest management alternatives.
4. You wish to endow your alma matter with a fund that will generate a real value of $1,000 each year, forever, for scholarships. The fund is expected to earn a nominal rate of 7%, and inflation is expected to average 3%.

(8) a. What real rate of return is the fund expected to earn?

(8) b. How much money will you need to place in the fund to ensure that a real value of $1,000 can be withdrawn each year?

5. In southwestern PA, the average stumpage price for red oak sawtimber is now $448/mbf (as of the 4th quarter of 2002). In the 4th quarter of 1994 it was $454/mbf.

(8) a. What was the nominal annual rate of price change for red oak sawtimber in the region between the 4th quarters of 1994 and 2002?

(8) b. If the average rate of inflation for lumber and wood products was -0.968% between 1994 and 2002, what was the real rate of price change for red oak sawtimber in southwestern PA during this period?

(8) c. If this same real rate of price change continues for red oak in the region for the next 20 years, what will the real price of red oak be in southwestern PA in the year 2022?
6. The NPV and B/C ratios for two investments, Option A and Option B, are shown below in Figures 6.1 and 6.2, respectively.

(a) Estimate the internal rates of return (IRR) for the two options. Explain how you estimated these values.

(b) Under what conditions is Option A the best project? Under what conditions is Option B the best project? Under what conditions is neither project acceptable? Explain your answers.
7. Consider the following yield table for "gold pine" plantations:

<table>
<thead>
<tr>
<th>Age</th>
<th>Yield (mbf/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>60</td>
<td>21</td>
</tr>
<tr>
<td>70</td>
<td>26</td>
</tr>
</tbody>
</table>

(8) a. What is the periodic annual increment of gold pine between ages 50 and 60?

(8) b. What is the compound interest rate of growth of gold pine between ages 40 and 50?

(8) c. At which of the five ages (30, 40, 50, 60, or 70) is the mean annual increment of gold pine maximized? What is the mean annual increment at that age?

8. You have been hired to establish a "gold pine" plantation (yield data in problem 7). It costs you $210/acre to plant the stand, and a chemical release costing $60/acre will be required at age 5 (to kill the hardwood competition). Current stumpage prices are $310/mbf. You expect stumpage prices and planting and release costs to go up over time at about the same rate as the inflation rate, which you expect to be about 4%. The landowner wants to grow the trees to a rotation age of 60 years, and she has told you that her (nominal) alternative rate of return is 8%. She pays an annual tax of $3/acre on the land. What is the LEV of the land, given these assumptions and her preferred rotation?
9. Does it matter whether you use a real or nominal interest rate when calculating a LEV? Explain your answer.

10. How does an increase in the stand establishment cost affect the LEV and the optimal rotation for an even-aged stand? Explain your answer. In particular, explain any impact (or lack thereof) on the optimal rotation in terms of shifts in the marginal costs and/or marginal benefits of holding the stand for one more year.

Extra Credit. Pennsylvania’s state-owned liquor stores earn an annual net revenue for the state treasury of about $600 million. Many argue, for a variety of reasons, that the state should not be in this business. If the state decided to sell these stores to private companies, how much should the state be able earn from the sale? Give a specific dollar figure and explain your reasoning.