FRST 318 **Problem Set #3**

Name: Student #:
Lab day: Due date: Friday Feb 13th

1. Assessing the Economic impact of utilization standards

Consider a single firm purchasing logs in a competitive log market the firm faces the following cost curve for an individual timber stand that it holds and the market price is $\$165/m^3$.

Marginal Cost Curve: $MC = 15 + 2Q$

A. How much should the firm harvest? How much economic rent do they gain?

B. The government now introduces a stumpage charge of $\$10/m^3$. How much should they harvest now?

C. How much does the government collect in terms of revenue?

D. How much economic rent does the firm retain?

E. Is there any deadweight loss in this case? Explain and calculate (if there is one).

F. If the government introduces lump sum bidding and imposes a utilization standard requiring the firm to take 80m3 of the wood and an increased stumpage charge. What stumpage charge would eliminate all economic rent from the firm?

For answering these questions, please refer to Chapter 6 and the formulas given in the lecture.

2. Calculating Present Value
A**.** If you expect a timber harvest to yield a profit of $100,000 in 50 years, and you require at least a 6% return (your discount rate), what is that harvest opportunity worth to you today?

B**.** What is it worth if you harvest in 45 years? (You now expect a profit of $95,000)

C**.** What is the opportunity cost of harvesting at 50 years versus 45 years (at 6%)?

D**.** What if you harvest in 45 years, but decide that you require an 8% return?

3. Calculating Net Present Value.
Someone has offered you the opportunity to buy a 10-hectare Christmas Tree Farm that will yield Xmas Trees every 10 years, starting in 10 years, in perpetuity. You expect to grow 200 trees per hectare. The Christmas tree farm costs $1000 per year for the Tree Farm. You will borrow money from the bank at 6% to buy the farm.

A. Is this a worthwhile investment if you expect to net $6 per tree (after paying all your other costs, excluding the annual charges) how much would you be willing to pay?

B. How much would you be willing to pay if you expect to net $8 per tree?

C. How much profit would you make if you paid the amount you calculated in (3B) but the trees now net $10?

4. Operating Rates
Using the information below, develop a spreadsheet to help you calculate whether the mill is making money, losing money and should shut down or stay in operation for the following price points:

1) CAN$860; CAN$840; and CAN$820 / tonne of production.
2) US$800/ tonne of production at current exchange rates (please identify the exchange rate you are using).

Mill Capacity = 300,000 / tonne

Mill Costs:

Fibre = $560 / tonne
Energy = $75 / tonne
Chemicals = $65 / tonne
Labour = $80 / tonne
Overhead = $12 / tonne
Maintenance = $15 / tonne

Property Tax = $2,000,000 / year
Insurance = $200,000 / year
Corporate = $4,000,000 / year
Debt Interest = $4,000,000 / year
Capital Investment = $1,000,000 / year

Operating Rate	M Premium
1	21
0.99	16
0.98	11
0.97	7
0.96	4
0.95	2.4
0.94	1.6
0.93	1
0.92	0.6
0.91	0.4
0.9	0.2
0.89	0.04
0.88	0.01

Please indicate your final answer here, print the excel sheet and attach it to your problem set.