ECE 472F PROBLEM SET # 5 (suggested completion date: November 27th, 2015)

1. The Netronics Corporation is currently subcontracting, from an outside source, the circuit board assembly and testing of its very popular and profitable line of network switches. Its subcontracting agreement has just expired and the company is considering its renewal. The president of Netronics also wishes to consider whether it would be more economical to bring the assembly and testing process in-house given the substantial growth of their switch line. As well, considering the in-house option may give Netronics better negotiating leverage in the new subcontracting agreement.

   The assembly machine costs $500 000 and has an expected life of five years with an estimated salvage value of $100 000. It is a CCA Class 28 asset that has a depreciation rate of 40%. The testing machine costs $100 000 and has no residual value after five years and is also CCA Class 28. Netronics will always have assets in CCA Class 28.

   Extensive programming of the new testing machine to ensure proper verification of the completed circuit boards is required. The cost of this is estimated to be $100 000 and this cost can be <u>expensed</u> completely at the end of the first year.

   Operating and maintenance costs are largely fixed for the range of production volumes anticipated during the five-year planning horizon. These costs total $90 000 per year.

   Under the terms of the expired subcontract agreement, assembly and testing is done for an all-inclusive cost of $125.00 per circuit board. The expected volume of circuit boards is 2 000 for the first year of the planning horizon growing at a rate of 4% in each of the following four years.

   The company is profitable and pays tax at the rate of 40%. Its after-tax cost of capital is 10%.

   (a) What is the after-tax Net Present Value of the in-house circuit board assembly and testing option? Calculate the after-tax cash flows using the relevant provisions of the Canadian Income Tax Act.
   (b) Assuming that the terms of the subcontract agreement can be extended for the next five years, what is the after-tax Net Present Value of the subcontract option?
   (c) Which option would you recommend to the president of the Netronics? Fully explain your recommendation.
   (d) The president is concerned that manufacturing the circuit boards in-house might divert staff from more important development activities. The president is willing to pay a 10% premium to out-source the boards for this reason. If the subcontracting company were aware of this preference, how much could it charge for each circuit board and still get the contract?

   Prepare your analysis in full compliance with the Canadian Income Tax Act.

2. InterShare Inc., an Internet service provider, is planning to acquire a number of network routers and servers costing $4 000 000 at the beginning of the fiscal year. This equipment has an estimated life of 5 years and a forecasted salvage value of $100 000. The company has done a cost study and identified all of the costs of locating its facility in Canada and also in the United States. What remains to be done is an analysis of the tax effects of depreciation here in Canada versus the US. Identify the difference in Book Value arising from use of the different depreciation methods at the end of Year 5 by first calculating the annual depreciation for each of the 5 years of estimated useful life; the accumulated depreciation each year; and the book value of the equipment at the end of each year:

   (a) Using the Modified Accelerated Cost Recovery System assuming a 5-year Property Class (as allowed by the Internal Revenue Service in the United States); and
   (b) Using a CCA Class with a rate of 30% (as required by Canada Revenue Agency under the Income Tax Act in Canada).

   Show your results in an organized form. If all other costs were the same, where should InterShare Inc. locate its facility based on this depreciation analysis? What is the present value of the tax savings associated with your recommendation? The company's tax rate is 40% (in both countries) and the MARR is 12%. (For the purposes of this question consider the tax savings associated with the five annual depreciation charges; ignore any disposal effects at the end of Year 5.)

3. A Canadian startup venture, widget.com, has purchased a warehousing facility for $4 000 000. Currently widget.com is not profitable and furthermore it does not expect to make a profit for the next three years after which it predicts that it will be very profitable. What is the after-tax present value cost of this warehouse? The CCA rate for buildings is 5% and widget.com expects to pay tax at a rate of 40%. Its MARR is 15%. (Assume that widget.com will own the warehouse for a very long time.) Prepare your analysis in full compliance with the Canadian Income Tax Act.