Engineering Economics and Problem Solving, 4N4, 2013

Tutorial/Assignment 2

Kevin Dunn, kevin.dunn@mcmaster.ca **Tutorial date: 16 September 2013; due date: 20 September 2013**

This tutorial (your second assignment) has one main goal: to get even more comfortable with the time value of many.

Question 1 [5]

Discount a cash payment of $71,244 dollars received in September 2017 into todays dollars, at the prevailing rate of inflation in Canada.

Question 2 [10]

Your company has excess steam available (400 metric tonnes per day) from your on-site generation plant and is considering selling it to a neighbouring site. Your generation system operates for 8000 hours a year and you are proposing selling at $2/klb.

What is the present value (at time zero) of all revenues for the next 5 year time frame? Assume a time value of money of 10%.

Explain whether or not it is fair to consider the net cash flow to occur at the end of the period. How will you alter your analysis?

Question 3 [10]

1. A manufacturer is considering two options: System A with cost of $600,000, a service life of 7 years and savings of $100,000 per year starting immediately at the time of installation. Or system B with cost of $115,000, a service life of 15 years and savings of $15,000 per year, also starting immediately. Which system has the fastest payback?
2. Calculate the present value of all cash flows, using a TVM of 5%. Add up the present values to calculate the net present value (NPV). Make a judgement based on this value on purchasing system A or B. Explain why the decision is different, and why this highlights the problem with payback period as a profitability measure.

Question 4 [10]

Company B owns a patent with 9 full years of remaining life. Company X pays royalties to company B to license the patent, in proportion to production levels at company X. Based on X's forecasts, they expect to make payments of $6,000 per year for the next 4 years, then payments of $9,000 for 4 years after that, followed by $13,000 for the last year of that patent license.

Company X is offering to prepay a license of $60,000 to company B, since they have money available right now. If you were the finance director of company X, what is your advice to the CEO? Consider an investing environment where rate of return are 10%.

Question 5 [3]

Describe whether investing in a project with a zero dollar NPV is acceptable.

Question 6 [10]

The following 3 unequal-life capital projects exist. The alternatives are not dependent on each other; cash flows are in the thousands of dollars.

- A: Revenues of \$150 each year for 5 years, and a salvage value of \$50. Upfront capital expenditure at $n = 0$ is \$180.
- B: Revenues of \$300 each year for 4 years, and a salvage value of \$60. Upfront capital expenditure at $n = 0$ is \$200.
- C: Revenues of \$300 each year for 3 years, and a salvage value of \$80. Upfront capital expenditure at $n = 0$ is \$200.

Your company has \$700 to spend on capital projects this year. Use an NPV analysis to decide how to proceed; your internal discount rate for time value of money is 20%. Assume revenues only start the year after capital expenditure (i.e. one year to purchase and install the capital items).

Question 7 [15]

Please make reasonable assumptions, and avoid trying to bias the outcome of this question. You can assume 4 or 5 years of study, depending on your group's preference.

1. Prepare the cash flow values and a cash flow diagram for your income and expenses for four/five years of university. You can pick one of your group members to answer this part of the question.

   Now continue your cash flow diagram for an additional 10 years or income and expenses, based on your group's expectations for the future, after graduation.

2. Prepare the cash flow values and a cash flow diagram for your income and expenses for four/five years after high school, as if you did not attend university, and also your income and expenses for 10 further years.
3. Calculate the present values for all cash flows from both situations. Calculate the net present value in both cases.
4. What is your conclusion so far in this study? You do not need to answer this question in these 4 sub-parts, however you should be present a logical and clear discussion on this topic.

END