

Quiz #2

1. (20 points) Suppose that you are evaluating various projects, each of which has an expected net cash flow of \$100,000 per year for 20 years. Circle the discount rate that you would recommend in each of the following situations and state why that is the best:
  - a. You work for International Paper Company, which owns vast forests in northern New England. The \$100,000 will come from sales of paper products from a new mill that you are planning to construct. IP has built several similar mills in throughout the region that have provided returns on investment of 10% to 20%. You are trying to decide whether to build another mill: 5 % 10% 15% 20% 25%
  - b. You are a banker, and a very large, financially stable company is willing to pay \$100,000 a year for 20 years toward principal and interest on a loan. The prime rate for corporate customers is currently 7%. What rate do you offer this very attractive customer?: 5.5% 6.5% 7.5% 8.5%
  - c. Your friend has a great scheme for a web site and wants you to cash in your trust fund in order to finance his new business. He promises to pay you \$100,000 per year for 20 years. What discount rate do you use in deciding the upper limit of what you might invest? 5% 10% 15% 20% 25%
  - d. A “Special Commission for Beaches” is formed to design, build and operate a series of beach resorts along the Charles River, which is expected to get cleaner year after year. The SCB is allowed to raise money by selling tax free bonds (currently selling at about 4% for similar agencies). Revenues will come from user fees and, if necessary, from Cambridge, Boston and other cities and towns along the river. What discount rate do you use in deciding how fancy to make the bath houses, the restaurants, and the boating facilities? 4% 7% 10% 13%

2. (20 points) You buy a factory for \$11 million and depreciate it over 20 years using straight line depreciation with a salvage value of \$1 million.
- What is the book value of the factory at the end of the 6<sup>th</sup> year?
  - Assume that state taxes are 6% and your federal tax rate is 34%. What is your effective tax rate?
  - Assuming that you make a profit, what are your tax savings related to depreciation in year 1?
  - What would your tax savings be in year 1 if you used the double declining balance method, assuming a 20 year life?
3. (20 points) You have 4 options for constructing an apartment building on a site. Your MARR is 10%. Which options are acceptable and which option is the best? (assume that net rents continue indefinitely, with no inflation).
- 5 story building, no frills: \$1 million investment, annual net income \$0.11 million
  - 5 story building, with pools and gardens: \$1.5 million investment, annual net income \$0.12 million
  - 10 story building, no frills: \$2 million investment, annual net income 0.21 million
  - 10 story building, upscale: \$2.5 million investment, annual net income 0.25 million
  - 15 story building, upscale: \$3.3 million investment, annual net income 0.35

4. (20 points)

You are a summer intern working for a hot shot project evaluation firm, and your supervisor admits to having a problem. He first thought that his project was really a terrible idea, because it had only a 2% IRR, but then he discovered that it also had an IRR of 18%, which is well above the firms hurdle rate of 10%. He checked his numbers, and the calculations (shown below) were in fact correct. He also did a few side calculations using the firms hurdle rate of 10% (also shown below). Explain the problem, complete the analysis, and tell your supervisor whether or not this is a good project.

Discount rate: 1.89%

Year	1	5	10	15	20	25	50 Total
Cash Flow	-100	180	-50	-200	75	2000	-3000 -1095
NPV	-98.1479	163.9376	-41.4746	-151.094	51.60429	1253.316	-1178.1 0.040106

Discount rate: 18.24%

Year	1	5	10	15	20	25	50 Total
Cash Flow	-100	180	-50	-200	75	2000	-3000 -1095
NPV	-84.5737	77.88439	-9.36108	-16.2018	2.628893	30.33329	-0.69008 0.019844

Present worth of construction (year 1) plus rehabilitation (years 10 and 15) is \$183.62 million assuming MARR of 10%.

Future worth of all revenues (years 5, 20, and 25) will be \$36.098 Billion at the end of year 50, assuming MARR of 10%..

5. Essay (20 points)

The project described in the previous question is a rather strange project, at least in terms of its cash flows. Let's assume that the numbers shown here are acknowledged to be rough estimates, although the general trends are likely to be similar to what is shown. Let's also assume that there are those who believe that it is worth doing, because of the great benefits over the first 25 years, while there are others who are concerned about the long term costs. What additional analyses would you suggest before reaching a final decision as to whether or not to recommend proceeding with this project?