

## **ENSC 201 Assignment 3, Due on Monday September 30, 2013**

### **3.1**

You have a small company that has grown by 15% every year for the last three years. You sell that company for \$500 000 in order to start a new company. You borrow \$500 000 at 10% interest, and sell \$500 000 worth of stock in the new company, to members of the public who were impressed by the performance of your last company. What is the weighted cost of capital to the new company, and what should the pre-tax MARR be?

### **3.2**

You own a small company, developing and marketing a unique technology. Over the past few years it has grown in value to \$100 000. You need a large influx of capital, \$900 000, to take the company to the next stage. If you can get this capital, then over the next year, you expect the company to increase in value to \$2 000 000. You consider two alternative methods: you can sell \$400 000 worth of non-voting stock in the company, retaining control and owning \$100 000 of stock yourself. Then you can borrow the remaining \$400 000 from the bank at 12% interest. If you follow this plan and the company performs as you expect, how much will you have at the end of the year after paying off the debt?

You decide this is not enough reward for your work, and decide to increase your leverage: you will only sell \$100 000 of stock, award yourself \$100 000 of stock corresponding to the current assets of the company, and raise the remaining \$800 000 from the bank, again at 12% interest. How much more money can you expect to make this way?

Unexpectedly, another company goes into business during the year, selling the same technology. By the end of the year, your company is worth only \$900 000. After paying off the debt, how much money would you have under each of the two financial strategies you considered?

### **3.3**

A company expects a new machine to save \$15 000 per year for eight years, after which it will have a salvage value of \$2 000. 80% of the firm's capital is represented by common stock which sells for \$30/share, pays annual dividends of \$2.70, but has not increased in selling price over the last four years. The other 20% of its capital comes from long-term debt on which the annual interest rate averages 12%. How much can the company pay for the new machine if the investment is to earn twice the cost of capital?

### **3.4**

A newspaper company in Pretoria, South Africa, has annual labour costs of R 12 000 000. The proprietor, John Dube, is considering replacing the company's old equipment with an advanced computer-based system. He can get R 900 000 in scrap metal costs for the old equipment, and it will cost R 6 600 000 to purchase the new system. Both these cash flows would occur in the present moment. Once the new system is in place, he can reduce his labour costs to R 10 000 000 every year. However, he expects it to take a year before the new system is working smoothly, and during that year

he will have to go on paying his current labour costs and also pay R 2 000 000 for skilled engineers to manage the transition. Once the system is set up, he will have to pay an additional R 2 000 000 every five years to upgrade it, but as long as he keeps upgrading, the system should last indefinitely. Dube's MARR is 10%.

On the basis of a calculation of equivalent annual cost, decide whether it is worth replacing the system.

### 3.5

The Board of Governors at the University of Gollawaloo in Northern Australia is considering several possible projects for the coming year. In increasing order of first cost, these are:

1. Hire a former Olympic swim coach for the University swim team. This will cost \$120 000 a year, but is expected to increase enrolments by 100 students per year for the next 10 years – that is, the University expects total enrolment to go up by 100 students in the first year, 200 in the second year, and so on. Each additional student increases the University's profits by \$500.
2. Convert the University's Philosophy Department to sheep pens. This requires an initial investment of \$400 000, but will save \$100 000 a year on salaries. This saving will start to be realised after the first year, since the incumbent Philosophy professors must be given a year's notice. The sheep-breeding business is expected to bring in \$50 000 in profit every year. Enrolment will not be significantly affected.
3. Convert the University's Olympic-size swimming pool to a sheep dip. This has an initial cost of \$450 000, but use of the sheep-dip can be offered to local farmers, bringing in a net profit of \$60 000 per year. If the University is also running a sheep-breeding business, having a sheep dip on campus will increase the profitability of this business to \$90 000 per year, in addition to the income from the local farmers.
4. Lease the University football fields to the Flinders Mining Company, which will mine them for uranium. Flinders will make an immediate payment of \$350 000 for this, but the University will have to agree to restore the fields to their original condition after ten years, at a cost of \$200 000. If the football fields are converted to uranium mines, enrolment will drop by 10%, which will lose the University \$50 000 a year for the next ten years. This drop is expected to occur even if the former Olympic swim coach is hired for the swim team.

Organize the possible projects into independent projects and a number of mutually exclusive sets. If the University's MARR is 10%, evaluate each of these in terms of their present worth and recommend which, if any, should be carried out.