

## Assignment 08

### 1. Problem 1

A firm exists that makes only one product, using one kind of machine. Categorize each of the following costs as direct or indirect. Assume that a traditional costing system is in effect. Justify your selection, if the categorization you assign it to would depend on the assumptions made.

Cost of materials (inputs to production)	Cost of marketing the product
Interest payments	Cost of storing the product before sale
Machine depreciation	Insurance costs
Product handling and shipping costs	Engineering drawings
Machine operator wages	Machine operator overtime expenses
Utility costs	Cost of tooling and fixtures
Support (administrative) staff salaries	

#### Direct:

- Cost of materials (inputs to production)
- Product handling and shipping costs
- Utility costs (if the costs relate to running the machine for longer hours for production)
- Machine operator overtime expenses (workers working overtime depending on production needed)

#### Indirect:

- Interest payments
- Machine depreciation
- Machine operator wages (For permanent workers)
- Support (administrative) staff salaries
- Cost of marketing the product
- Cost of storing the product before sale (For companies having their own warehouses)
- Insurance costs
- Engineering drawings
- Cost of tooling and fixtures

## 2. Problem 2

Assume you have \$2,000 available for investment for a five-year period. You wish to invest the money. There are obviously many alternatives available. You should be willing to assume a modest amount of risk of loss of some or all of the money if necessary, but not a great amount of risk (so, no investments in poker games or at horse races). Describe three ways you might consider investing the money, and what rate you think you might be able to earn. What is your minimum attractive rate of return? Explain why.

One way is to buy government bonds. Depending on the country, they are very low-risk. Although the rate of return for a bond is low (for a Canadian government bond, about 3.75% for a five-year bond), the low-risk setting is attractive for investment, although it runs a risk of devaluation.

Another way to invest money is to put the money into a savings account. In Canada, some accounts can earn up to 4.50% per annum. Putting this into a five-year investment, this allows for a higher rate of return than buying government bonds, although a risk comes with the stability of the bank where you would choose to open the account in and inflation, among others.

The third way of investing this money is on the stock market. In Canada, the historic annual average rate of return is about 8%, which could possibly be the rate of return I could earn. Although this carries risks, they can be minimized by proper, thorough research on the company, knowledge of economic conditions and the industry the company is in, and luck.

My minimum attractive rate of return would be 30% after five years. This will ensure that my return will surpass the rate of inflation across the five years, and that this is a good percentage for compensating the risks I take to invest.

## 3. Problem 3

An asset costs \$200,000 and has a salvage value of \$20,000 after 10 years. What is the depreciation charge for the fourth year, and what is the book value at the end of the eighth year, assuming each of the following:

- (a) CCA Class 8?
- (b) Straight-line depreciation?
- (c) Sum-of-the-years'—digits depreciation?
- (d) Double-declining-balance depreciation?

Round your answers to the nearest dollar.

$d_{tn}$  = Depreciation charge for year  $n$

- (a) Using corrected equation:

$$CCA_n = P(1 - \frac{d}{2})(1 - d)^{n-2}(d)$$

Year 4 Depreciation Charge: \$23,040

Year 8 Book Value: \$37,749

*See attached Excel sheet for full solution*

- (b) Depreciation Charge =  $\frac{\$200,000 - \$20,000}{10} = \$18,000/\text{year}$   
 Book Value:  $\$200,000 - 8 \times (\$18,000/\text{year}) = \$56,000$

- (c)  $B = \$200,000$ ;  $S = \$20,000$ ;  $N = 10$

$$SOYD = \frac{10(10 + 1)}{2} = 55$$

$$d_{t1} = (\frac{10}{55})(\$200,000 - \$20,000) = \$32,727$$

$$d_{t2} = (\frac{9}{55})(\$200,000 - \$20,000) = \$29,455$$

$$d_{t3} = (\frac{8}{55})(\$200,000 - \$20,000) = \$26,182$$

$$d_{t4} = (\frac{7}{55})(\$200,000 - \$20,000) = \underline{\underline{\$22,909}}$$

*Year 8 book value on the next page*

$$d_{t5} = \left(\frac{6}{55}\right)(\$200,000 - \$20,000) = \$19,636$$

$$d_{t6} = \left(\frac{5}{55}\right)(\$200,000 - \$20,000) = \$16,364$$

$$d_{t7} = \left(\frac{4}{55}\right)(\$200,000 - \$20,000) = \$13,091$$

$$d_{t8} = \left(\frac{3}{55}\right)(\$200,000 - \$20,000) = \$9,818$$

$$\text{Book Value: } \$200,000 - \$32,727 - \$29,455 - \$26,182 - \$22,909 - \$19,636 - \$16,364 - \$13,091 - \$9,818 = \underline{\$29,818}$$

(d) Depreciation rate:  $\frac{2}{10} = 20\%$

$$d_{t1} = 20\% \times \$200,000 = \$40,000 \rightarrow \text{Book Value 1} = \$160,000$$

$$d_{t2} = 20\% \times \$160,000 = \$32,000 \rightarrow \text{Book Value 2} = \$128,000$$

$$d_{t3} = 20\% \times \$128,000 = \$25,600 \rightarrow \text{Book Value 3} = \$102,400$$

$$d_{t4} = 20\% \times \$102,400 = \underline{\$20,480} \rightarrow \text{Book Value 4} = \$81,920$$

$$d_{t5} = 20\% \times \$81,920 = \$16,384 \rightarrow \text{Book Value 5} = \$65,536$$

$$d_{t6} = 20\% \times \$65,536 = \$13,107 \rightarrow \text{Book Value 6} = \$52,429$$

$$d_{t7} = 20\% \times \$52,429 = \$10,486 \rightarrow \text{Book Value 7} = \$41,943$$

$$d_{t8} = 20\% \times \$81,920 = \$16,384 \rightarrow \text{Book Value 8} = \underline{\$33,554}$$

## 4. Problem 4

A \$700,000 asset has been depreciated with the straight-line method over an eight-year life. The estimated salvage value was \$80,000. At the end of the sixth year, the asset was sold for \$210,000.

- (a) What is the estimated book value after 6 years, based on depreciation? What is the calculated difference between book value and sold market value for the asset? (Round both answers to the nearest dollar.)
- (b) Which of the following occurred: Recaptured Depreciation, Loss on Disposal, or Capital Gain?
- (c) If this method of depreciation were allowed under tax law, and a tax rate of 33% applied, how much tax would be owed or credited to the firm due to the sale of the asset?

$$\begin{aligned} \text{(a) Depreciation Charge: } & \frac{\$700,000 - \$80,000}{8} = \$77,500/\text{year} \\ \text{Book value at 6 years: } & \$700,000 - 6(\$77,500) = \$235,000 \\ \$210,000 - \$235,000 & = -\$25,000 \end{aligned}$$

(b) Loss on Disposal

$$\begin{aligned} \text{(c) } \text{tax} &= t \times (B_d - S) \\ \text{tax} &= 33\% \times (\$235,000 - \$210,000) \\ \text{tax} &= \$8,250 \end{aligned}$$