Assignment 9

EECE/CPEN 481

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Selected problems from the textbook (Engineering Economic Analysis: Fourth Canadian Edition). Some have been revised significantly from the original textbook question, to clarify or simplify the problem: answer the question as listed here.

Problems are drawn mainly from material in Chapters 9, 12, and 13.

1. Problem 1 (1 pt)
2. Problem 2 (1 pt)
3. Problem 3 (2 pts)
4. Problem 4 (2 pts)

1. Problem 1

A firm has issued 35,000 shares of stock whose current price is $110 per share. Shareholders expect an annual return of 14%. The firm also has taken a two-year loan of $4,100,000 for which they pay 8.2% annual interest. It has also issued 4,500 bonds with a face value of $960 each, with 15 years left to maturity, quarterly compounding, and a coupon interest rate of 6.1%. Each bond is currently worth (has a current market price of) $1,120.

(a) Using market values for its debt and equity, calculate the firm's weighted-average cost of capital (WACC) before taxes. Round to one decimal place (x.x%).
(b) Assume a tax rate of 25% applies. Calculated the WACC after accounting for the impact taxes have. Apply the same rounding.

2. Problem 2

Chun operates a consulting business that produces a taxable income of $220,000 per year. The business is set up as a proprietorship, so the taxable income is treated like salary income for her, from a tax perspective. (It's the same as if she had a job that paid that amount of salary.) Chun can claim $11,474 as a federal personal exemption against her personal income. (from Table 12-2). The applicable individual federal income tax table is in Table 12-1.

Chun is considering incorporating her business. If she does, she will pay herself a salary of $130,000 a year from the corporation, upon which federal income tax must be paid. The corporation will then pay taxes on the remaining income. A federal corporate tax rate of 15% will apply (from Table 12-3). (Assume that no small business deductions apply.) The corporation will retain the balance (as retained earnings).

Although normally provincial income and corporate taxes would also apply, you can ignore these in this case.

a. How much tax will she pay if she continues to operate the business as a proprietorship?
b. How much tax would she pay if she incorporated her business, both personally and through her corporation?
c. Should she incorporate (will her taxes go down)? How much will her taxes change by?

3. Problem 3

Carolyn owns a data processing company. She plans to buy additional equipment for $60,000, use it for four years, and sell it for $8,000. She expects that the use of the equipment will produce a net income of $36,000 per year. The combined federal and provincial incremental tax rate is 40%. Using a CCA rate of 55% and a borrowing interest rate of 10%, answer the following questions. Completing the table below the questions may help do so. Round answers to the nearest dollar.

a) What is the book value when the equipment is sold?
b) Does a gain ("Recaptured Depreciation") or a loss ("Loss on Disposal") occur when the equipment is sold? What is the amount of gain or loss?
c) What is the net present worth of the after-tax cash flow? Was it a good decision to purchase the equipment?

Year	Before-Tax Cash Flow	CCA	Taxable Income	Income Taxes	After-Tax Cash Flow	PW
0	–$60,000	n/a	n/a	n/a	-$60,000	-$60,000
1	+$36,000					
2	+$36,000					
3	+$36,000					
4	+$36,000					
4	+$8,000					
					NPW	

4. Problem 4

A machine has a first (capital) cost of $14,000. The repair costs are covered by the warranty in year 1, then they increase by $550 per year. Assume an interest rate of 10%.

(a) Calculate the EUAC for the first 10 years of the machine's use, rounding to the nearest dollar.
(b) Identify the minimum EUAC for this machine, and the year it occurs.
(c) Based on this value, what how many years should the machine be used before it is sold?