

Introduction to Finance

Problem Set 2

Question 1

Your company is preparing a new product line. The production process requires an immediate investment of \$75,000, and you plan to sell the entire inventory exactly one year from now. Given that your company's cost of capital is 5.8%, what's the minimum revenue you need to generate from these sales to ensure the project breaks even in terms of Net Present Value (NPV)?

Question 2

You are the CEO of a tech company specializing in high-performance processors for AI-driven devices. You are evaluating whether to launch a new product line. The development of the new processor will require an upfront investment of \$1.1 million (in year 0). You anticipate generating revenues of \$901,000 in the first year, which will increase to \$1.57 million in the second year. However, starting in the third year, revenues are expected to decline by 35% annually for the next 3 years until the product becomes fully obsolete. During years 1 through 5, you will face fixed costs of \$107,000 per year and variable costs amounting to 57% of revenues.

- a. What are the cash flows for the project in years 0 through 5?
- b. What is the project's NPV if the project's cost of capital is 8.4%?

Question 3

Innovatech, Inc. is funded by 35% debt, 11% preferred shares, and 54% common equity. The cost of its debt is 6.1%, and its preferred stock provides an annual dividend of \$2.01, with a current market price of \$35 per share. The company also pays \$1.9 per share in dividends to common shareholders, and these dividends are expected to grow by 2.5% annually. Innovatech's tax rate is 31%.

What is its after-tax WACC?

[Note: Assume that the firm will always be able to utilize its full interest tax shield.]

Question 4

SummitCorp, with a WACC of 11.5%, is considering acquiring Peak Adventures, which has a WACC of 13.3%. The acquisition would cost \$94 million and is projected to generate cash flows beginning at \$12.2 million in one year, increasing at a rate of 4.1% per year indefinitely.

Question 5

Suppose a firm uses its company cost of capital to evaluate all of its projects. Will it underestimate or overestimate the NPV of new projects that are riskier than the firm's average projects?

Question 6

A petroleum company is in the process of drilling several new wells along the edge of an operational oil field. It is anticipated that around 35% of these wells will not yield any oil. For those that do strike oil, there remains variability in production levels: 40% of the successful wells are expected to generate a modest output of just 1,000 barrels per day, while 60% are projected to produce a higher volume of 4,000 barrels per day.

- a. Forecast the annual cash revenues. Use a future oil price of \$95 per barrel.
[Note: You must compute the expected cash revenues taking into account the probabilities of realization of each event.]
- b. A geologist suggests applying a discount rate of 28% to the cash flows to account for the risk associated with potential dry holes. Given that the oil company's typical cost of capital is 10%, does this recommendation seem reasonable? Provide a brief explanation for your answer.

Question 7

TechVision Corp. has a budget of \$1 billion set aside for capital investments. Which projects should TechVision pursue in order to remain within this limit? Additionally, what is the impact of this budget constraint on the company in terms of missed NPV opportunities? The opportunity cost of capital for each project is 11%.

[Hint: You need to rank projects by their profitability (NPV/Investment).]

Project	Investment (in million USD)	NPV (in million USD)
1	270	60
2	250	-7
3	290	40
4	90	15
5	110	9
6	350	63
7	400	45