Introduction to Finance

Problem Set 3

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 is the minimum revenue needed from these sales for the project to break even in net present value (NPV) terms?

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 new processor requires an upfront investment of $1.1 million (year 0). You anticipate revenues of $901,000 in year 1 and $1.57 million in year 2. Starting in year 3, revenues decline by 35% annually for 3 years, after which the product is obsolete. In years 1 through 5, fixed costs are $107,000 per year and variable costs are 57% of revenues.

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

Question 3

Innovatech, Inc. is funded by 35% debt, 11% preferred shares, and 54% common equity. Its debt costs 6.1%. Preferred stock pays an annual dividend of $2.01 and has a current market price of $35 per share. The company also pays $1.90 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 use 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 4.1% per year indefinitely. What's the NPV of the investment?

Question 5

Suppose a firm uses its company cost of capital to evaluate all 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 drilling several new wells along the edge of an operating oil field. Around 35% of the wells are expected to be dry. Among successful wells, 40% are expected to produce 1,000 barrels per day and 60% are expected to produce 4,000 barrels per day.

- a. Forecast annual cash revenues using a future oil price of $95 per barrel. [Compute expected cash revenues using the probabilities of each outcome.]
- b. A geologist suggests discounting the cash flows at 28% to account for dry-hole risk. The oil company's typical cost of capital is 10%. Does the recommendation seem reasonable? Explain briefly.

Question 7

TechVision Corp. has a $1 billion budget for capital investments. Which projects should TechVision pursue while remaining within the limit? What does the budget limit cost the company in forgone NPV? The opportunity cost of capital for each project is 11%.

[Hint: Rank projects by profitability (NPV/Investment).]

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