**INTEGRATIVE PROBLEM**

It’s been two months since you took a position as an assistant financial analyst at Caledonia Products.

Although your boss has been pleased with your work, he is still a bit hesitant about unleashing you without supervision. Your next assignment involves both the calculation of the cash flows associated with a new investment under consideration and the evaluation of several mutually exclusive projects.

Given your lack of tenure at Caledonia, you have been asked not only to provide a recommendation, but also to respond to a number of questions aimed at judging your understanding of the capital budgeting process. The memorandum you received outlining your assignment follows:

TO: The Assistant Financial Analyst

FROM: Mr. V. Morrison, CEO, Caledonia Products

RE: Cash Flow Analysis and Capital Rationing

We are considering the introduction of a new product. Currently we are in the 34 percent marginal tax bracket with a 15 percent required rate of return or cost of capital. This project is expected to last five years and then, because this is somewhat of a fad project, to be terminated.

The following information describes the new project:

Cost of new plant and equipment: $7,900,000

Shipping and installation costs: $ 100,000

Unit sales: Year Units Sold

1 70,000

2 120,000

3 140,000

4 80,000

5 60,000

Sales price per unit: $300/unit in years 1–4, $260/unit in year 5

Variable cost per unit: $180/unit

Annual fixed costs: $200,000

Working-capital requirements: There will be an initial working-capital requirement of $100,000 just to get

production started. For each year, the total investment in net working capital will be equal to 10 percent of the

dollar value of sales for that year. Thus, the investment in working capital will increase during years 1 through 3,

then decrease in year 4. Finally, all working capital is liquidated at the termination of the project at the end of

year 5.

The depreciation method: Use the simplified straight-line method over five years. It is assumed that the plant and

equipment will have no salvage value after five years.

**11.** Caledonia is considering two investments with one-year lives. The more expensive of the two

is the better and will produce more savings. Assume these projects are mutually exclusive and

that the required rate of return is 10 percent. Given the following after-tax net cash flows:

**YEAR PROJECT A PROJECT B**

0 −$195,000 −$1,200,000

1 240,000 1,650,000

**a.** Calculate the net present value.

**b.** Calculate the profitability index.

**c.** Calculate the internal rate of return.

**d.** If there is no capital-rationing constraint, which project should be selected? If there is a

capital-rationing constraint, how should the decision be made?

**12.** Caledonia is considering two additional mutually exclusive projects. The cash flows associated

with these projects are as follows:

**YEAR PROJECT A PROJECT B**

0 −$100,000 −$100,000

1 32,000 0

2 32,000 0

3 32,000 0

4 32,000 0

5 32,000 $200,000

The required rate of return on these projects is 11 percent.

**a.** What is each project’s payback period?

**b.** What is each project’s net present value?

**c.** What is each project’s internal rate of return?

**d.** What has caused the ranking conflict?

**e.** Which project should be accepted? Why?

**13.** The final two mutually exclusive projects that Caledonia is considering involve mutually

exclusive pieces of machinery that perform the same task. The two alternatives available provide

the following set of after-tax net cash flows:

**YEAR EQUIPMENT A EQUIPMENT B**

0 −$100,000 −$100,000

1 65,000 32,500

2 65,000 32,500

3 65,000 32,500

4 32,500

5 32,500

6 32,500

7 32,500

8 32,500

9 32,500