Name:

|  |  |  |
| --- | --- | --- |
| Problem | Points | Score |
| 1 | 25 |  |
| 2 | 25 |  |
| 3 | 25 |  |
| 4 | 25 |  |
| Total | 100 |  |

Notes:

1. The exam is closed books and notes except for one double-sided sheet of notes. You are allowed the use of a calculator, interest tables or MS Excel on this exam.
2. Please indicate clearly your answer to the problem. Circle your answers.
3. The details of your solutions are more important than the answers. Please explain your solutions clearly and include as many details as possible.
4. Consider the two one-shot investment alternatives shown in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Investment** | **0** | **1** | **2** | **3** |
| **A** | -$100,000 | $50,000 | $50,000 | $100,000 |
| **B** | -$125,000 | $50,000 | $100,000 | $50,000 |

Assuming a MARR of 10%, which is preferred? Show all your work and justify your answers.

**2.** Consider a palletizer at a bottling plant that has an initial cost of $150,000, operating and maintenance costs of $17,500 per year, and an estimated net salvage value of $25,000 at the end of 3 years (the machine has a three-year life). Assume an interest rate of 8 percent. What is the present equivalent cost (present worth) of the investment if the planning horizon is 6 years? Construct a cash flow diagram and spreadsheet that demonstrates your calculations.

**3.** $5,000 is deposited in an account that pays 6 percent interest per year. Two years from today (end of year 2), another $5,000 is deposited. Three years from today (end of year 3), $10,000 is withdrawn from the account. How much money is in the account 4 years from today?

**4.** The operating and maintenance expenses for a mining machine are expected to be $11,000 in the first year and increase by $800 per year during the 3-year life of the machine. What uniform series of payments would cover these expenses over the life of the machine? Interest is 10 percent/year compounded annually.