**PROBLEMS**

1. A firm is considering some projects. Use a cost of capital of 10%.

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| --- | --- | --- | --- | --- |
| **Time** | **0** | **1** | **2** | **3** |
| Day | -200,000 | 100,000 | 100,000 | 100,000 |
| Night | -150,000 | 50,000 | 105,000 | 85,000 |
| Sun | -100,000 | 0 | 0 | 190,000 |

1. If the projects are independent, which one(s) do you select?
2. If the projects are mutually exclusive, which one do you select?
3. If the firm has a maximum payback of 2 years, which projects do you select?
4. Carol’s Cookies is considering replacing its #2 oven. The oven was installed 10 years ago at a cost of $300,000 and has been fully depreciated. The current market value of the old oven is $70,000. A new high efficiency oven would cost $120,000. It would be fully depreciated over 5 years using straight-line depreciation to a zero book value. Annual sales would increase by $22,000 due to the increased productivity of the new oven. Improved energy efficiency would reduce annual operating costs by $20,000. Tax rate is 40%. Cost of capital is 12%. Find the NPV. Should they replace the #2 oven with a new one? Assume a 5-year planning horizon and a horizon value of zero.
5. Acme. is interested in acquiring some equipment. Machine A costs $30,000 up front and will last 5 years. It costs $4000 per year to run. Machine B costs $15,000 up front and will last 2 years. B costs $6000 per year to run. Acme plans to replace the equipment as needed. The 2 machines perform exactly the same function. The interest rate is 12%. Which machine should they choose? Why?
6. Fanfare Corp. may invest in a new project. They will need to buy new equipment costing $150,000. By the end of year 1, they will know the following:

|  |  |  |
| --- | --- | --- |
| **State** | **Cash Flows in perpetuity starting in year 2** | **Sell Equipment at time 1** |
| Boom | $24,000 | $140,000 |
| Expected | $10,200 | $120,000 |
| Bust | $4,000 | $60,000 |

If it is a boom, they will make $24,000 per year in perpetuity starting in year 2 or they can sell the equipment for $140,000 at time 1 (The other states are similar). There is a 15% chance it will be a boom; a 50% chance it will turn out as expected and a 35% chance it will be a bust. The cost of capital is 8%. What should they do?

1. Goblin Inc. is considering a new project. The project requires an additional machine that costs $24 million dollars. The machine will be fully depreciated to a zero book value over 4 years. The salvage value is $3,000,000. Goblin will have to add about $2,000,000 initially to its net working capital to meet inventory demands. Goblin expects to add $1,000,000 per year to its working capital in years 1, 2, and 3. At the end of the project (year 4), $4 million in accumulated net working capital will be recovered. Sales for year 1 are $23 million and are expected to grow by 3% per year. Variable operating costs are 50% of sales and do not include depreciation. Fixed operating costs are $2 million for year 1 and are expected to grow by 1% per year. There is no horizon value. The tax rate is 40% and the cost of capital is 12%. What is the net present value of the project? Should they take the project? Why?