**Homework Set 3**

**EGR 310**

1. (10 pts) Compute the internal rate of return (IRR) for the following cash flows: (Chapter 7)

|  |  |
| --- | --- |
| Year | Alt A |
| 0 | -$2,033 |
| 1 | $0 |
| 2 | $0 |
| 3 | $500 |
| 4 | $700 |
| 5 | $900 |
| 6 | $1,100 |

1. (10 pts) Compute the internal rate of return (IRR) for the following cash flows: (Chapter 7)

|  |  |
| --- | --- |
| Year | Alt A |
| 0 | $30,000 |
| 1 | -$8,071 |
| 2 | -$8,071 |
| 3 | -$8,071 |
| 4 | -$8,071 |

1. (10 pts) A 20 year bond with a face value of $1000 has an 8% coupon rate compounded quarterly. If the bond was purchased for $1107 and held to maturity, what is the IRR of the bond? (Chapter 7)
2. (10 pts) A $1000 face value 10 year bond returns $50 semiannually. If the bond was purchased when issued for $1011, and then sold after 6 years for $1020, what was the IRR the purchaser received? (Chapter 7)
3. (10 pts) A car dealer gives you 2 options to buy a $50,000 new car. Option 1 is no money down, but pay back in equal monthly installments for 5 years at 0% interest. The second option is to pay cash for the car and get a $6895 rebate. What is the IRR of the payment option? (Chapter 7)
4. (10 pts) Use incremental analysis to evaluate the 2 alternatives. Assume a seven year life and a MARR of 15%. (IRRs for each is given) Would picking the highest IRR give you the best investment decision? (Chapter 7)

|  |  |  |
| --- | --- | --- |
|   | **Alt A** | **Alt B** |
| **Initial Investment** | $21,000 | $16,000 |
| **O&M Costs** | $2000 | $3,000 |
| **Annual Benefit** | $8,000 | $7,500 |
| **Salvage Value** | $5,000 | $8,000 |
| **IRR** | 23.2% | 24.8% |

1. (10 pts) Use incremental challenger-defender analysis to determine the best of the 3 mutually exclusive alternatives. Assume a MARR of 7% and a 5 year life. (Chapter 8)

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Alt A** | **Alt B** | **Alt C** |
| **Initial Investment** | $5,000 | $3,000 | $4,000 |
| **O&M Costs** | $200 | $400 | $400 |
| **Annual Benefit** | $1,200 | $1,000 | $1,200 |
| **Salvage Value** | $1,300 | $700 | $1,200 |

1. (10 pts) A person is considering investing in a startup company. There are 3 possible outcomes being considered. Probability of the company failing within 2 years is 60%.The probability the company continues to grow after 2 years is 30%. The third possibility (the one the investor is hoping for), is the company will be bought within 2 years giving the investor a large profit. Construct a probability distribution table showing each possible outcome and the probability for each outcome. (Chapter 10)
2. (10 pts) An investment in a new product has 4 possible annual benefits and 2 possible annual costs with the probabilities of each shown in the following table. Construct a joint probability distribution table of benefits – costs. Which benefit – cost is most likely? Which is the highest benefit - cost. The lowest benefit - cost? What is the expected return (annual benefit – annual cost)? (Chapter 10)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Annual Benefits** | **Prob** |  | **Annual Costs** | **Prob** |
| $8,000 | 25% |  | $5,000 | 70% |
| $9,000 | 20% |  | $8,000 | 30% |
| $10,000 | 45% |  |  |  |
| $15,000 | 10% |  |  |  |

1. (10 pts) An investment of 4 possible returns after 3 years as shown in the following table. What is the expected value of the return? Should the investment be made? (Chapter 10)

|  |  |
| --- | --- |
| **Return** | **Prob** |
| -$-6,000 | 10% |
| $0 | 35% |
| $1000 | 35% |
| $2000 | 20% |