**IE 260 CLASS EXERCISES - WEEK 10**

1. In the Rawhide Company (a leather products distributor), decisions regarding approval of proposals for capital investment are based upon a stipulated MARR of 15% per year. The five packaging devices listed in the following table were compared, assuming a 10-year life and zero market value for each at that time. Which one (if any) should be selected? Use incremental analysis using IRR.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Packaging Equipment | | | | |
|  | *A* | *B* | *C* | *D* | *E* |
| Capital Investment | $50,000 | $60,000 | $55,000 | $65,000 | $57,000 |
| Annual revenues less expenses | $9,000 | $12,700 | $11,300 | $13,800 | $12,200 |

**SOLUTION**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Packaging Equipment | | | | |
|  | *A* | *B* | *C* | *D* | *E* |
| Capital Investment | $50,000 | $60,000 | $55,000 | $65,000 | $57,000 |
| Annual revenues less expenses | $9,000 | $12,700 | $11,300 | $13,800 | $12,200 |
| IRR | 12.41% | 16.62% | 15.81% | 16.70% | 16.92% |

A is not acceptable (IRR < MARR) and it is eliminated. C is the base alternative (with the least capital investment).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Increment Considered | C | ∆ (E - C) | ∆ (B -E) | ∆ (D - E) |
| ∆ Capital investment | $55,000 | $2,000 | $3,000 | $8,000 |
| ∆ Annual revenues less expenses | $11,300 | $900 | $500 | $1,600 |
| IRR∆ | 15.81% | 43.81% | 10.56% | 15.10% |
| Is increment justified? | Yes | Yes | No | Yes |

Best option is D.

Note that neither the alternative with the highest IRR nor the one with the highest difference is the best option.

1. If MARR = 10% per year, show which alternative is more desirable by using equivalent-worth if
2. you can use the repeatability assumption.
3. you can not use the repeatability assumption.

|  |  |  |
| --- | --- | --- |
|  | **A** | **B** |
| **Capital investment ($)** | 6000 | 8000 |
| **Annual cash flow** | 1900 | 1700 |
| **Useful life (years)** | 7 | 11 |

**SOLUTION**

1. You are free to use any equivalent worth method. However, when repatibility is in place, it is more practical to use AW.

|  |  |  |
| --- | --- | --- |
|  | **A** | **B** |
| **Capital investment ($)** | 6000 | 8000 |
| **Annual cash flow** | 1900 | 1700 |
| **Useful life (years)** | 7 | 11 |
| AW | $667.57 | $468.29 |

So, A will be selected.

1. Now, The future worth of alternative A is reinvested for 4 years at the end of the seventh year.

A

B

*F*A is reinvested

7

11

|  |  |  |
| --- | --- | --- |
|  | **A** | **B** |
| **Capital investment ($)** | 6000 | 8000 |
| **Annual cash flow** | 1900 | 1700 |
| **Useful life (years)** | 7 | 11 |
| FW | $7,663.32 | $8,678.05 |

So, B will be selected in this case.