**IE 260 CLASS EXERCISES - WEEK 12**

1. An electronics components manufacturer is considering the replacement of a machine required in its assembly line. A planning horizon of 8 years is to be used in the replacement study. The old machine (defender) has a current market value of $25,000. If the defender is retained, it is anticipated to have annual operating and maintenance (O&M) costs of $40,000. It will have a zero market value at the end of eight additional years of service. The new machine (challenger) will cost $75,000 and will have annual O&M costs of $15,000. It will have an MV of $10,000 at the end of planning horizon. Determine the preferred alternative using PW comparison and MARR (before tax) of 20% per year.
2. A biogas plant has a five-year-old equipment that was initially purchased for $80,000. The equipment can be kept in service for an additional five years, or it can be sold for $45,000 and replaced by a new equipment. The purchase price of the replacement equipment is $65,000. The projected MVs and operating and maintenance costs over the five year planning horizon are shown in the following table. Assuming the MARR is 8%,

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Defender | | Challenger | |
| Year | MV at EOY | O&M Costs | MV at EOY | O&M Costs |
| 1 | $40,000 | $25,000 | $55,000 | $18,000 |
| 2 | $36,000 | $28,000 | $48,000 | $22,000 |
| 3 | $30,000 | $32,000 | $42,000 | $27,000 |
| 4 | $28,000 | $25,000 | $36,000 | $31,000 |
| 5 | $25,000 | $38,000 | $30,000 | $34,000 |

* 1. determine the economic life of the challenger.
  2. determine the economic life of the defender.