Chapter 10 Homework Problems

1. Your accountant has provided you with the following table of salvage values for a certain type of apricot squeezing machine, which you are considering for use in your Sour Apricot Sherbet Shop.

Year	Salvage value
1	$22,000
2	21,000
3	20,000
4	16,000
5	10,000

Calculate the economic life (years) of this piece of equipment. The first cost is $25,000 and MARR is 12%.

Hint: EAC for five year life is $5361.

2. A construction equipment for Tech Builders Inc has a first cost of $25,000 and the following salvage values and annual operating costs:

t	S (t)	Op. cost (t)
1	$22,000	$10,000
2	21,500	10,500
3	20,000	11,000
4	19,500	11,500
5	10,000	12,000
6	0	12,500

Use a MARR of 10% and determine the EAC of keeping the equipment for all possible years and determine the optimal economic life of the equipment.

Hint: EAC at year 3 = 14,479.

3. Packaging problem

   a. A packaging machine that has been used for 2 years has a salvage value of $12,000 now which will drop by $2000 per year. Over the next 5 years, the maintenance costs for the machine are expected to be $2500, $2900, $3500, 4500, and 4500. If the MARR is 8%, determine the marginal cost to extend service for each of the next 5 years.

   Hint: MC_2 = $5700

   b. A replacement piece of equipment can be purchased for the machine above at a first cost of $25,000. Annual maintenance costs the first year are expected to be $1000 and increase by $300 each year. If this equipment were to be sold after 1 year, income of 20,000 could be realized. Each year the machine is kept, the salvage value would decrease by $3500. What is the optimal economic life and associated EAC of this equipment?

   Hint: EAC_3=$6981

   c. Should the new equipment be purchased now? Why?

4. A multipurpose stadium in “Music City" has about 400 light bulbs. Each light bulb costs $150. Based on historical data, it has been established the failure pattern is as below.
   40 bulbs fail at 3000 hours.
   60 bulbs fail at 4500 hours.
   The remaining 300 bulbs fail at 6000 hours.

Cost to replace a bulb is $100. If the bulbs are replaced as a group, it costs $60/bulb.
On an average the stadium is lighted up for 1800 hours/ year for various events.
Compare group replacement at 4000 hours with individual replacement using an interest rate of 11% per year.

(Round years to nearest whole number to determine factors – do not need to interpolate. If you use excel, also be sure to round years before calculating EAC.)

Hint: EAC for bulk replacement of a bulb = $122