Problem Set 4

7.2 Answer : c

7.7

	Year 1	Year 2	Year 3	Year 4	Year 5
Sales revenue	400,000	420,000	441,000	463,050	486,200
Operating costs	200,000	220,000	242,000	266,200	292,820
Depreciation	80,000	80,000	80,000	80,000	80,000
Income before tax	120,000	120,000	119,000	116,850	113,380
Taxes at 34%	40,800	40,800	40,460	39,729	38,549
Net income	79,200	79,200	78,540	77,121	74,831
Cash flow from operation (sales revenue-operating cost-taxes)	159,200	159,200	158,540	157,121	154,831
Investment -400,000 in Year 0					

NPV = -\$400,000+159,200 / 1.15+159,200 / 1.15^2+\$158,540 / 1.15^3+\$157521 / 1.15^4 +154,831 / 1.15^5

= \$129,868.29

7.12

	t=0	t=1-3	t=4
Revenues		\$1,200,000	\$1,200,000
- Expenses		300,000	300,000
-Depreciation		400,000	400,000
Earnings before taxes		**\$500,000**	**\$500,000**
-Taxes(35%)		175,000	175,000
Net income		\$325,000	\$325,000
+ Depreciation		400,000	400,000
Capital investment	-\$2,000,000		+\$150,000
NWC	-100,000		+\$100,000
Capital loss			-\$250,000
A/T-NCF	-\$2,100,000	\$725,000	\$725,000

NPV = -\$2,100,000+\$725,000 $A^4_{0.1655}$

= -\$93,391

7.33 a. Tamper A

PV $= \$600,000+\$110,000\ A^{5}_{0.12}$
$= \$996,525.38$

EAC $= \$996,525.38 / A^{5}_{0.12}$
$= \$276,445.84$

Tamper B

PV $= \$750,000+\$90,000\ A^{7}_{0.12}$
$= \$1,160,738.09$

EAC $= \$1,160,738.09 / A^{7}_{0.12}$
$= \$254,338.30$

Choose tamper B

b. The two assumptions behind replacement chains are:

1. The time horizon is long
2. Replacement at the end of the cycle is possible.

8.3 Price more aggressively: $-\$1,300,000+(0.55*0)+0.45*(-\$550,000)$
$= -\$1,547,500$

Hire lobbyist: $-\$800,000+(0.75*0)+0.25*(-\$2,000,000)$
$= -\$1,300,000$

Tandem should hire the lobbyist

8.8 Depreciation $= \$200,000 / A^{5}_{0.12} = \$200,000 / 3.60478 = \$55,482$
BEP $= \{\$55,482+\$350,000*0.75-\$40,000*0.25\} / \{(\$25-\$5)*0.75\}$
$= 20,532.13$ or 20,533 approx

8.10 NPV $= -\$420,000+\sum^{7}_{t=1}\{23,000(\$38-\$21)-\$320,000\}*0.65+\$60,000*0.35 / 1.13^{t}$
$= -\$123,021.71$

Expected NPV $= -\$420,000+\sum^{7}_{t=1}\{25,000(\$40-\$20)-\$300,000\}*0.65+\$60,000*0.35 / 1.13^{t}$
$= \$247,814.17$

Optimistic NPV $= -\$420,000+\sum^{7}_{t=1}\{27,000(\$42-\$19)-\$280,000\}*0.65+\$60,000*0.35 / 1.13^{t}$
$= \$653,146.42$

Even though the NPV of pessimistic case is negative, if we change one input while all others are assumed to meet their expectation, we have all positive NPVs like the one before. Thus, the project is profitable.

Pessimistic		**NPV**
Unit Sales	23,000	$132,826.30
Price	$38	$104,079.33
Variable costs	$21	$175,946.75
Fixed costs	$320,000	$190,320.24