(14)

$i\%$ annual $\doteq$ 0.5% monthly

$$F = (50 + 50 (P|A, 0.5\%, 3)) (F|P, 0.5\%, 17)$$
$$+ 100 (F|P, 0.5\%, 17) + 100 (F|A, 0.5\%, 14)$$

$$= (150 + 50 (P|A, 0.5\%, 17)) (F|P, 0.5\%, 17)$$
$$+ 100 (F|A, 0.5\%, 17)$$
$$= (150 + 50 (2.9701)) (1.088) + 100 (17.697)$$
$$= \boxed{\$2094.42}$$

(33) arranged in ascending first cost order.

	C	B	A
First cost	\$120	\$340	\$560
UAB	40	100	140
salvage value	0	0	40

First consider the incremental investment B − C

first cost $220

UAB $60

salvage 0

$$EUAC = 220\,(A|P,10\%,6)$$

$$= 220\,(0.2296) = \boxed{\$50.5}$$

$$EUAB = \$60$$

$$\frac{\Delta B}{\Delta C} = \frac{60}{50.5} > 1 \Rightarrow \text{select } B$$

Now consider: A − B

first cost $220

UAB $40

salvage $.40

$$EUAC = 50.5$$

$$EUAB = 40 + 40\,(A|F,10\%,6)$$

$$= 40\,(1 + 0.1296)$$

$$= 51.84$$

$$\frac{\Delta B}{\Delta C} = \frac{EUAB}{EUAC} = \frac{51.84}{50.5} > 1 \Rightarrow \text{select } A.$$

Compute $\frac{B}{C}$ for A

$$\begin{cases} EUAC = 128.6 \\ EUAB = 140 + 40\,(0.1296) \\ EUAB > 1 \end{cases}$$

So the choice

(44)

a) $NFW_A = -75\,(F|P,10\%,5) + 18.8\,(F|A,10\%,5)$

$NFW_B = -50\,(F|P,10\%,5) + 13.9\,(F|A,10\%,5)$

$NFW_C = -15\,(F|P,10\%,5) + 4.5\,(F|A,10\%,5)$

$NFW_D = -90\,(F|P,10\%,5) + 23.8\,(F|A,10\%,5)$

$NFW_A = \boxed{-\$6.05}$ $NFW_B = \boxed{\$4.3}$

$NFW_C = \boxed{\$3.3}$ $NFW_D = \boxed{\$0.3}$

The alternative with highest a Maximum future worth is (B).

b) The alternatives arranged in ascending cost order will be.

	C	B	A	D
cost	\$15	\$50	\$75	\$90
UAB	4.5	13.9	18.8	23.8

Since NFW for A from part (a) is < 0, $\Rightarrow$

NPW for A < 0 $\Rightarrow$ NPW of benefits < Net present worth of cost

$\Rightarrow \left(\frac{B}{C}\right)$ for A or benefit-cost ratio < 1

$\Rightarrow$ A could removed and

Then remains

	C	B	D
cost	\$15	\$50	\$90
UAB	4.5	13.9	23.8

Consider: B − C

cost \$35

UAB 9.4

$$EUAC = 35\,(A|P, 10\%, 5) = 35\,(0.2638) = 9.233$$

$$\frac{\Delta B}{\Delta C} = \frac{9.4}{9.233} > 1 \Rightarrow \text{select B.}$$

Consider D − B

cost \$40

UAB 9.9

$$EUAC = 40\,(0.2638) = 10.55$$

$$\frac{\Delta B}{\Delta C} = \frac{9.9}{10.55} < 1 \Rightarrow \text{select B.}$$

Now compute $\frac{B}{C}$ for the select B.

$$EUAC = 50\,(0.2638) = 13.19$$

$$\frac{B}{C} = \frac{13.9}{13.19} > 1 \Rightarrow \text{B is the choice}$$

c) payback period for A = $\frac{75}{18.8}$ = 3.98 years

" " for B = $\frac{50}{13.9}$ = 3.59 "

" " " C = $\frac{15}{4.5}$ = 3.33 "

" " " D = $\frac{90}{23.8}$ = 3.78 years.

$\Rightarrow$ select C

(3)

a) payback period = $\frac{5240}{1000}$ = 5.24 years.

b) Find "m" such that:

$$1000\left[\frac{e^{0.1m}-1}{e^{0.1m}(e^{0.1}-1)}\right] = 5240$$

$$\Rightarrow \frac{e^{0.1m}-1}{e^{0.1m}(e^{0.1}-1)} = 5.24$$

Let $e^{0.1m} = x \Rightarrow \frac{x-1}{x(e^{0.1}-1)} = 5.24$

$$\Rightarrow x - 1 = 5.24(e^{0.1}-1)x$$

$$\Rightarrow x[1 - 5.24(e^{0.1}-1)] = 1$$

$$\Rightarrow x = \frac{1}{0.4489} = 2.2277$$

$$\Rightarrow e^{0.1m} = 2.2277 \Rightarrow 0.1m = \ln(2.2277)$$

$$\Rightarrow m = \frac{\ln(2.2277)}{0.1} \simeq 8 \text{ years.}$$

(b) is more correct for it takes the