5.1 (a) Jim forgot the impact of interest, that is, the time value of money, which will increase the annual recovery amount.

(b) Use Equation [5.3] to find the capital recovery amount with S = 0.

CR = AW = -20,000(A/P,15%,5)
= -20,000(0.29832)
= $-5,966 per year

5.9 Calculate AW values to select machine R.

AW_R = -250,000(A/P,9%,3) + 20,000(A/F,9%,3) - 40,000
= -250,000(0.39505) + 20,000(0.30505) – 40,000
= $-132,662

AW_S = -370,500(A/P,9%,5) + 20,000(A/F,9%,5) - 50,000
= -370,500(0.25709) + 20,000(0.16709) – 50,000
= $-141,910

By spreadsheet, enter single cell functions.
R: = -PMT(9%,3,-250000,20000) – 40000 Display: $-132,663
S: = -PMT(9%,5,-370500,20000) - 50000 Display: $-141,911

5.14 From Example 4.2, bond P = $-4750; I = $150 each 6 months; n = 20; i = 3.35% per 6 months.

AW = -4750(A/P,3.35%,20) + 150 + 5000(A/F,3.35%,20)
= -4750(0.06941) + 150 + 5000(0.03591)
= $-.15

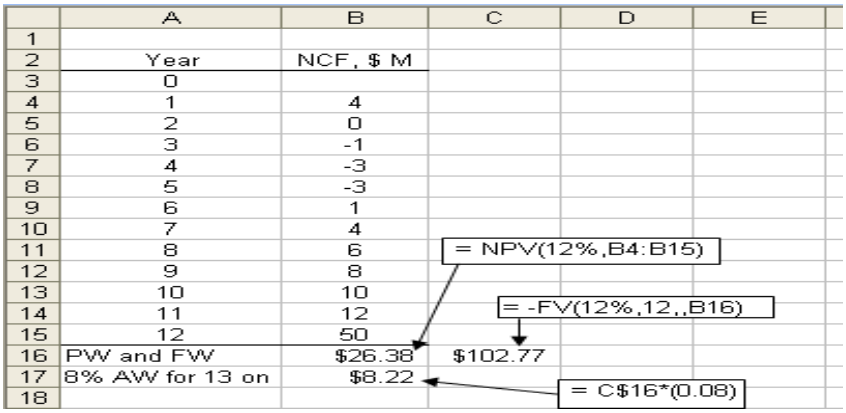
The return is approximately that desired based on AW value.

5.17 Find F in year 12; treat it as a CC value; find A forever.

F_{12} = 4(F/P,12%,11) -1(F/P,12%,9) -3(F/P,12%,8) -3(F/P,12%,7)
+1(F/P,12%,6) +4(F/P,12%,5) +6(F/P,12%,4) +8(F/P,12%,3)
+10(F/P,12%,2) +12(F/A,12%,2) + 38
= 4(3.4785) -1(2.7731) -3(2.4760) -3(2.2107)
+1(1.9738) +4(1.7623) +6(1.5735) +8(1.4049)
+10(1.2544) +12(2.1200) + 38
= $102.768

A = CC(i) = F_{12}(i) = 102.768(0.08)
= $ 8.22 per year ($8,221,440 per year)

A spreadsheet solution follows.



	A	B	C	D	E
1					
2	Year	NCF, $ M			
3	0				
4	1	4			
5	2	0			
6	3	-1			
7	4	-3			
8	5	-3			
9	6	1			
10	7	4			
11	8	6			
12	9	8			
13	10	10			
14	11	12			
15	12	50			
16	PW and FW	$26.38	$102.77		
17	8% AW for 13 on	$8.22			
18					

5.22 Monetary terms are $ million. Effective i = $(1.025)^4 - 1 = 10.38\%$. Select A.

$AW_A = -10(A/P,10.38\%,5) + 0.7(A/F,10.38\%,5) - 0.8$
$= -10(0.26636) + 0.7(0.16256) - 0.8$
$= \$-3.35$ ($3.35 million)

$AW_B = -50(0.1038) - 0.6$
$= \$-5.79$ ($5.79 million)