Homework IV

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EE 382C Requirements Engineering

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1

(a)

Item	$
Revenue	18000
COGS	6750
Gross Margin	11250
G&A Costs	6000
Depreciation	750
Net Income	4500
Income Tax (@ 30%)	1350
Net Income After Tax	**3150**

Table 1: Net Income After Tax

(b)

Assests		**Liabilities**	
Cash	15650	Loan	10000
Equipment	7000	**Total Liabilities**	10000
Inventory	2500		
AR	3000	**Equity**	
		Initial	15000
		Retained Earnings	3150
		Total Equity	18500
Total Assests	28150	**Total Liabilities + Equity**	28150

Table 2: Balance Sheet

(c)

Flows	$
Inward	
Loan	10000
Collected Sales	15000
In	25000
Outward	
Equipment	8000
Product (2500 @ 4.50)	9000
G&A	6000
Tax	1350
Out	24350
Net	650

Table 3: Cash Flow

2

(a)

$$
\begin{aligned}
PW &= 5000 \\
&\quad + 1000[(P/F, 9\%, 1) + (P/F, 9\%, 2) + (P/F, 9\%, 3)] \\
&\quad + 3000[(P/F, 9\%, 4) + (P/F, 9\%, 5) + (P/F, 9\%, 6) + (P/F, 9\%, 7) + (P/F, 9\%, 8)] \\
&= 5000 + 1000(2.53129) + 3000(3.00353) \\
&= 16541.88
\end{aligned}
$$

(b)

$$
\begin{aligned}
FW &= 5000(F/P, 9\%, 8) \\
&\quad + 1000[(F/P, 9\%, 7) + (F/P, 9\%, 6) + (F/P, 9\%, 5)] \\
&\quad + 3000[(F/P, 9\%, 4) + (F/P, 9\%, 3) + (F/P, 9\%, 2) + (F/P, 9\%, 1) + (F/P, 9\%, 0)] \\
&= 5000(1.99256) + 1000(5.04376) + 3000(5.98471) \\
&= 32960.69
\end{aligned}
$$

3

$$
\begin{aligned}
F/A = (F/A, 9\%, 18) &= 41.30134 \\
41.30134A &= 20,000[1 + (P/A, 9\%, 3)] \\
41.30134A &= 20,000(3.53129) \\
A &= 1710.01
\end{aligned}
$$

4

$$
\begin{aligned}
200,000/25,000 &= 8yrs \\
NPW(9\%) &= \sum_{t=0}^{N} \frac{R_t}{(1+i)^t} \\
&= -200000 + 22935.78 + 21042.00 + 19304.59 \\
&\quad + 17710.63 + 16248.28 + 14906.68 + 13675.86 \\
&\quad + 12546.66 + 11510.69 + 10560.27 + 9688.32 \\
&\quad + 8888.37 + 8154.47 + 7481.16 + 6863.45 \\
&= -200000 + 201517.21 \\
&= 1517.21
\end{aligned}
$$

5

$$
\begin{aligned}
F/P &= 30000/12000 \\
&= 2.5 \\
IRR &= (F/P)^{1/6} - 1 \\
&= 2.5^{1/6} - 1 \\
&= 0.165 \rightarrow 16.5\% \\
NPW(9\%) &= \sum_{t=0}^{N} \frac{R_t}{(1+i)^t} \\
&= -200000 + 0 + 0 + 0 \\
&+ 0 + 0 + 17888.02 \\
&= -12000 + 17888.02 \\
&= 5888.02
\end{aligned}
$$

(6)

We first find the AEW for A:

$$
\begin{aligned}
AEW_A &= 600000(A/P, 12\%, 3) - 320000 \\
&= 600000(0.41635) - 320000 \\
&= -70190/yr
\end{aligned}
$$

We then find the AEW for B:

$$
\begin{aligned}
AEW_B &= 1000000(A/P, 12\%, 4) - 200000(A/F, 12\%, 4) - 350000 \\
&= 1000000(0.32923) - 200000(0.20923) - 350000 \\
&= -62616/yr
\end{aligned}
$$

Thus choose A, since it will save the company more.