Sample: Finance - Corporate Finance Problems

Problem #1

Given:

BALANCE SHEET 2013

ASSETS		**LIABILITIES & EQUITY**	
Cash	560.00	Notes payable	800.00
Accounts receivable	890.00	Accounts payable	1,340.00
Inventories	2,300.00	Accrued expenses	230.00
Total current assets	3,750.00	Total current liabilities	2,370.00
		Long term debt	1,200.00
		Total long term liabilities	1,200.00
Net property, plant & equipment	3,450.00		
Intangible assets	980.00	Common stock	1,400.00
Total fixed assets	4,430.00	Capital surplus	900.00
		Accumulated retained earnings	2,310.00
		Total equity	4,610.00
Total assets	8,180.00	Total liabilities and shareholders' equity	8,180.00

INCOME STATEMENT

Sales	7,600.00
Cost of Goods Sold	4,300.00
Selling, general, & administrative expense	700.00
Depreciation	200.00
EBIT	2,400.00
Interest Expense	1,200.00
EBT	1,200.00
Current tax	480.00
Net income	720.00
Dividends	216.00
Addition to retain earnings	504.00

Assume the following for Boost Inc.:

- Sales for 2014 are projected to double
- Interest expense, tax rate, and dividend payout ratio remain the same
- Costs, other expenses, current assets, fixed assets, accruals and accounts payable grow with sales
- Firm is operating at full capacity and will continue to do so

Solution:

a) We will use the formula:

$$EFN = \frac{A_0^*}{S_0}\cdot(S_1 - S_0) - \frac{L_0^*}{S_0}\cdot(S_1 - S_0) - \frac{Net\ Income}{S_0}\cdot S_1 \cdot \frac{Additional\ to\ retained\ earnings}{Net\ Income}$$

Where: EFN – External Funds Needed

$$S_0 - sales\ in\ year\ 2013;$$

$$S_1 - sales\ in\ year\ 2014;$$

$$A_0^* - assets\ (year\ 2013) which\ vary\ directly\ with\ sales;$$

$$L_0^* - liabilities\ (year\ 2013) which\ vary\ directly\ with\ sales.$$

We know that sales for 2014 are projected to double. So, in our case: $S_1 = 2 \cdot S_0 = 2 \cdot ww\$7{,}600 = \$15{,}200$. Liabilities which vary directly with sales include accounts payable and accrued expenses: $L_0^* = Accounts\ Payable + Accrued\ Expenses = \$1{,}340 + \$230 = \$1{,}570$. Also we have that: $Net\ Income = \$720$, $Additional\ to\ Retained\ Earnings = \$504$.

So, we will have:

$$EFN = \frac{\$8{,}180}{\$7{,}600}\cdot(\$15{,}200 - \$7{,}600) - \frac{\$1{,}570}{\$7{,}600}\cdot(\$15{,}200 - \$7{,}600) - \frac{\$720}{\$7{,}600}\cdot \$15{,}200 \cdot \frac{\$504}{\$720} = \$5{,}602.$$

<u>Answer:</u> $EFN = \$5{,}602$.

b) When the firm was operating at 60% capacity in 2013 and will operate at 95% capacity in 2014, we will have that:

Forecast sales are $S_{FC} = \frac{S_0}{\%\ of\ Capacity} = \frac{\$7{,}600}{0.6} = \$12{,}666.67$. Sales for the year 2014 are $S_1 = 2 \cdot S_0 = 2 \cdot \$7{,}600 = \$15{,}200$.

We will use the formula:

$$EFN_1 = \frac{TCA_0^*}{S_0}\cdot(S_{FC} - S_0) - \frac{L_0^*}{S_0}\cdot(S_{FC} - S_0) - \frac{Net\ Income}{S_0}\cdot S_{FC} \cdot \frac{Additional\ to\ retained\ earnings}{Net\ Income}.$$

$$EFN_2 = \left(\frac{TCA_0^*}{S_0} + \frac{FA_0^*}{S_{FC}}\right)\cdot(S_1 - S_{FC}) - \frac{L_0^*}{S_0}\cdot(S_1 - S_{FC}) - \frac{Net\ Income}{S_0}\cdot(S_1 - S_{FC}) \cdot \frac{Additional\ to\ retained\ earnings}{Net\ Income}.$$

$$EFN = EFN_1 + EFN_2$$

So, we will have:

$$EFN_1 = \frac{\$3{,}750}{\$7{,}600}\cdot(\$12{,}666.67 - \$7{,}600) - \frac{\$1{,}570}{\$7{,}600}\cdot(\$12{,}666.67 - \$7{,}600) - \frac{\$720}{\$7{,}600}\cdot \$12{,}666.67 \cdot \frac{\$504}{\$720} = \$613.33.$$

$EFN_2 = \left(\frac{\$3{,}750}{\$7{,}600} + \frac{\$4{,}430}{\$12{,}666.67}\right) \cdot (\$15{,}200 - \$12{,}666.67) - \frac{\$1{,}570}{\$7{,}600} \cdot (\$15{,}200 - \$12{,}666.67) - \frac{\$720}{\$7{,}600} \cdot (\$15{,}200 - \$12{,}666.67) \cdot \frac{\$504}{\$720} = \$1{,}444.67.$

$EFN = EFN_1 + EFN_2 = \$613.33 + \$1{,}444.67 = \$2{,}058.$

Answer: $2,058.

Problem #2

After my first child will go to the college the expenses will be:

Year	Child 1	Child 2
1	$50,500	-
2	$50,500	-
3	$50,500	-
4	$50,500	-
5	-	-
6	-	$60,000
7	-	$60,000
8	-	$60,000
9	-	$60,000

The PV of the college costs in Year when second child will finished college:

$$PV = \sum_{i=1}^{9} \frac{CF_i}{\left(1 + \frac{0.06}{12}\right)^{12\cdot(i-1)}} =$$

$= \$50{,}500 \cdot \left(1 + \frac{0.06}{12}\right)^{-0} + \$50{,}500 \cdot \left(1 + \frac{0.06}{12}\right)^{-12} + \$50{,}500 \cdot \left(1 + \frac{0.06}{12}\right)^{-24} + \$50{,}500 \cdot \left(1 + \frac{0.06}{12}\right)^{-36} + 0 \cdot \left(1 + \frac{0.06}{12}\right)^{-48} + \$60{,}000 \cdot \left(1 + \frac{0.06}{12}\right)^{-60} + \$60{,}000 \cdot \left(1 + \frac{0.06}{12}\right)^{-72} + \$60{,}000 \cdot \left(1 + \frac{0.06}{12}\right)^{-84} + \$60{,}000 \cdot \left(1 + \frac{0.06}{12}\right)^{-96} = \$50{,}500 + \$47{,}566.22 + \$44{,}802.88 + \$42{,}200.07 + 0 + \$44{,}482.33 + \$41{,}898.15 + \$39{,}464.09 + \$37{,}171.43 = \$348{,}085.2.$

We will find PMT needed to accumulate $348,085.2 in 15 year from now (and we will make first payment in 1 year from now – so, it's 14 years long deposit):

$FVA_{14} = PMT \cdot FVIFA_{6\%,14} \rightarrow PMT = \frac{FVA_{14}}{FVIFA_{6\%,14}} = \frac{FVA_{14}}{\frac{(1+0.06)^{14}-1}{0.06}} = \frac{\$348{,}085.2}{\frac{(1+0.06)^{14}-1}{0.06}} = \$16{,}563.6.$

Answer: I must deposit $16,563.6 in an account each year.

Problem #3

PV of growing perpertuity:

$PV = \frac{C}{(i-g)}$

We need to find IRR (the Internal Rate of Return) :

$NPV = -800000 + \frac{C}{(IRR-g)} = 0.$

$IRR = \frac{C}{800000} + g = \frac{8200}{800000} + 0.04 = 0.05025.$

So, the IRR is 5.025% and the discount rate is 9.5% which is greater than IRR. So, I think, that company should reject this project.

Answer: reject.

Problem #4

Year	Cash Flow	Cumulative Cash Flow
0	($1,500,000)	($1,500,000)
1	0	($1,500,000)
2	0	($1,500,000)
3	$135,000	($1,365,000)
4	$400,000	($965,000)
5	$500,000	($465,000)
6	$255,000	($210,000)
7	$255,000	$45,000

a) So, the payback period for this project is:

$Payback\ Period = 6 + \frac{\$210,000}{\$255,000} = 6.82\ years.$ As the company required a payback period of 5 years, then we should reject this project.

Answer: 6.82 years. Reject this project.

b) If we take the discount rate of 14.3%, we will have:

Year	Cash Flow	PV factor	Discounted CF	Cumulative Discounted Cash Flow
0	($1,500,000)	1	($1,500,000)	($1,500,000)
1	0	0.87	0	($1,500,000)
2	0	0.77	0	($1,500,000)
3	$135,000	0.67	$90,406	($1,409,594)
4	$400,000	0.59	$234,355	($1,175,239)
5	$500,000	0.51	$256,294	($918,945)
6	$255,000	0.45	$114,357	($804,588)
7	$255,000	0.39	$100,050	($704,538)

So, as we see the discounted payback period is much greater than 7 years (if we took the discount rate of 14.3%.

Problem #5

Initial cost is $15,000,000.

Annual maintenance is $196,000.

Life-time is 17 years.

Required return is r = 17%.

The equivalent annual cost (EAC) of this machine:

$EAC = \frac{Initial\ Cost}{\frac{\left(1-\frac{1}{(1+r)^{17}}\right)}{r}} + annual\ maintenance = \frac{\$15{,}000{,}000}{\frac{\left(1-\frac{1}{(1+0.17)^{17}}\right)}{0.17}} + \$196{,}000 = \$2{,}739{,}924 + \$196{,}000 = \$2{,}935{,}924.$

Answer: EAC = $2,935,924.

Problem #6

a) The annual discount rate is $r = \left(1 + \frac{0.18}{360}\right)^{360} - 1 = 0.1972 = 19.72\%.$

The price of one share of this stock for the first year:

$P1 = \frac{\$3+\$6}{0.1972} + \frac{\$6 \cdot 1.07^{11} \cdot 1.06^{7} \cdot 1.025}{0.1972-0.025} = \$158.67.$

Answer: $158.67.

b) The stock price in year 9 will be:

$P1 = \frac{\$3+\$6}{0.1972} + \frac{\$6 \cdot 1.07^{5}}{0.1972-0.07} = \$111.80.$

Answer: $111.80.

Problem #7

The price of the first bond:

$$P = \sum_{t=1}^{n} \frac{C_t}{(1+r)^t} + \frac{M}{(1+r)^n}$$

$C_t = \frac{0.075 \cdot \$10000}{4} = \$187.5.$

$M = 0.09 \cdot \$10000 = \$900.$

$r = 6\%.$

$n = 25\ years.$

$P = C_t \cdot \frac{\left(1 - \frac{1}{(1+r)^n}\right)}{r} + \frac{M}{(1+r)^n} = \$187.5 \cdot \frac{\left(1 - \frac{1}{(1+0.015)^{100}}\right)}{0.015} + \frac{\$900}{(1+0.015)^{100}} = \$9{,}882.70.$

We need to sell for $7,500,000. So:

$n_1 = \frac{\$7500000}{\$9882.70} = 759.$

For the second bond:

$$P = \sum_{t=1}^{n} \frac{C_t}{(1+r)^t} + \frac{M}{(1+r)^n}$$

$C_t = \frac{0.09 \cdot \$5000}{4} = \$112.5.$

$M = 0.$

$r = 6\%.$

$n = 5\ years.$

$P = C_t \cdot \frac{\left(1 - \frac{1}{(1+r)^n}\right)}{r} = \$112.5 \cdot \frac{\left(1 - \frac{1}{(1+0.03)^{10}}\right)}{0.03} = \$959.65.$

We need to sell for $7,500,000. So:

$n_2 = \frac{\$7500000}{\$959.65} = 7815.$

Answer: 759 of first bond and 7815 of second bond.

Problem #8

Debt:

$P = C_t \cdot \frac{\left(1 - \frac{1}{(1+r)^n}\right)}{r} = \frac{0.09 \cdot \$10000}{4} \cdot \frac{\left(1 - \frac{1}{(1+0.025)^{140}}\right)}{0.025} = \$8716.27.$

Total debt amount:

$TD = \$8716.27 \cdot 19500 = \$169{,}967{,}315.$

Stocks:

$P = \frac{\$9 \cdot 1.03}{0.04} = \$231.75.$

$TS = \$231.75 \cdot 250500 = \$58{,}053{,}375.$

Market value of the firm debt:

$TD = 0.04 \cdot \$169{,}967{,}315 = \$6{,}798{,}692.6.$

Market value of equity:

$TS = 0.07 \cdot \$58{,}053{,}375 = \$4{,}063{,}736.25.$

$V = TS + TD = \$10{,}862{,}428.85.$

$WACC = \frac{\$4063736.25}{\$10862428.85} + \frac{\$6798692.6}{\$10862428.85} \cdot 0.65 = 0.78.$

Answer: 0.78.

Problem #9

a) Solution:

$Equity + Debt = \$650{,}000{,}000.$

$0.075 \cdot Equity + 0.03 \cdot Debt = \$29{,}500{,}000.$

So, we have that:

$\frac{Debt}{Equity} = 1.925.$

Answer: 1.925.

b) The cost are $307,777,778.

Answer: $307,777,778.

Problem #10

For 35% of the Summer's Equity we can buy shares for $5,687,500 and it's 142188 shares.

Dollar return of the strategy will be the same because both summer's and fall's stocks has the same interest rate, price, EBIT.