

FIN 3210

Fall 2017

Name

Answer Key

**NOTE: Type your name in cell G1**

Multiple Choice

1	<b>B</b>	0
2	<b>C</b>	0
3	<b>E</b>	0
4	<b>D</b>	0
5	<b>D</b>	0
6	<b>D</b>	0
7	<b>B</b>	0
8	<b>E</b>	0
9	<b>B</b>	0
10	<b>B</b>	0
11	<b>C</b>	0
12	<b>C</b>	0
13	<b>C</b>	0
14	<b>C</b>	0
15	<b>D</b>	0
16	<b>A</b>	0
17	<b>B</b>	0
18	<b>D</b>	0
19	<b>B</b>	0

Total missed 0

Points off 0

Answer Key

**Problem #1 (11 points)**

You are considering a new product launch. The plant and equipment will cost \$1,200,000, have a five year life, and be depreciated on a straight line basis to zero salvage value. Sales are projected at 1,400 units per year, price per unit will be \$9,500, variable cost per unit will be \$6,700, and fixed costs will be \$600,000 per year. The project will require an investment in inventory of \$150,000 to be returned at the end of the project. The required return on the project is 12% and the tax rate is 35%. Based on your knowledge, you feel that the price and quantity are accurate to within +/- 10% and fixed costs and variable costs are accurate to within +/- 15%. Show a table with the base case, best case and worst case values for the project. Also, calculate the payback period, NPV and IRR for the worst-case scenario.

Equipment	\$	1,200,000
Project life (years)		5
Units per year		1,400
Price per unit	\$	9,500
Variable cost per unit	\$	6,700
Fixed costs	\$	600,000
NWC	\$	150,000
Required return		12%
Tax rate		35%
Uncertainty		
Price		10%
Units per year		10%
Variable cost		15%
Fixed cost		15%

		Base	Best	Worst
Quantity per year		1,400	1,540	1,260
Price/unit	\$	9,500.00	10,450.00	8,550.00
Variable costs/unit	\$	6,700.00	5,695.00	7,705.00
Fixed costs	\$	600,000	510,000	690,000
Sales	\$	10,773,000	16,093,000	
VC	\$	9,708,300	8,770,300	
Fixed costs	\$	690,000	510,000	
Depreciation	\$	240,000	240,000	
EBT	\$	134,700	6,572,700	
Tax	\$	47,145	2,300,445	
NI	\$	87,555	4,272,255	
+ Dep	\$	240,000	240,000	
OCF	\$	327,555	4,512,255	
0	\$	(1,350,000)	(1,350,000)	
1	\$	327,555	4,512,255	
2	\$	327,555	4,512,255	
3	\$	327,555	4,512,255	
4	\$	327,555	4,512,255	
5	\$	477,555	4,662,255	
NPV		(\$84,123.50)	\$15,000,783.47	
IRR		9.58%	334.05%	
Payback period		4.083 years	.299 years	

Answer Key

**Problem #2 (11 points)**

A four year project has an initial investment in plant and equipment of \$520,000, which will be depreciated on a straight line basis over the four year life of the project. The company will sell 80,000 units at a price of \$74 each and a variable cost of \$36. Fixed costs are \$2,100,000, the tax rate is 35% and the cost of capital is 16%. What is the NPV of this project? How sensitive is NPV to changes in quantity sold? What does this number mean?

Equipment	\$	520,000
Project life (years)		4
Sales (units)		80,000
Price/unit	\$	74
Variable cost/unit	\$	36
Fixed costs	\$	2,100,000
Tax rate		35%
Required return		16%

New quantity 100,000

Time 0:

Equipment	\$	(520,000)
Total	\$	(520,000)

Sales	\$	5,920,000	\$	7,400,000
VC		2,880,000		3,600,000
Fixed costs		2,100,000		2,100,000
Depreciation		130,000		130,000
EBT	\$	810,000	\$	1,570,000
Tax		283,500		549,500
NI	\$	526,500	\$	1,020,500
+ Dep		130,000		130,000
OCF	\$	656,500	\$	1,150,500

0	\$	(520,000)	\$	(520,000)
1		656,500		1,150,500
2		656,500		1,150,500
3		656,500		1,150,500
4	\$	656,500	\$	1,150,500

NPV \$1,317,005.59 \$2,699,306.82

Sensitivity \$ 69.12

For unit increase in quantity, NPV will increase by \$69.12 and for every dollar decrease in quantity NPV will decrease by \$69.12.

Answer Key

**Problem #3 (7 points)**

You have the following two projects available to you. What is the crossover rate for these projects? Over what range of required returns would you choose each project?

Year		Project A	Project B
0	\$	(75,000)	(75,000)
1	\$	25,000	50,000
2	\$	30,000	40,000
3	\$	40,000	30,000
4	\$	50,000	20,000

Year		Difference
0	\$	-
1	\$	25,000
2	\$	10,000
3	\$	(10,000)
4	\$	(30,000)

Crossover rate 5.57%

Rate	Project A	Project B
0%	\$70,000.00	\$65,000.00
5%	\$51,709.04	\$51,269.40
10%	\$36,723.93	\$39,712.11
15%	\$24,311.75	\$29,884.56
20%	\$13,927.47	\$21,450.62
IRR	28.37%	37.15%

You would take Project A for rates up to 5.57% and Project B for rates between 5.58% and 37.15%

Answer Key

**Problem #4 (14 points)**

RDH, Inc., manufactures high quality ladies boots. The company is considering the launch of a new boot style. The company believes that it would sell 47,000, 45,000, 41,000, and 36,000 pairs per year over the next four years, respectively. The new boots would sell for \$345, with variable costs of \$153 per pair. Fixed production costs are \$3.75 million per year and the equipment necessary for the new line costs \$8.5 million. The equipment will be depreciated on a 5-year MACRS schedule. The line would require an initial investment in NWC of \$2.5 million, which would be returned at the end of the project. The tax rate is 40 percent, and the required return is 9 percent. The company expects that because of changes in styles, the new design can only be sold for the next four years. In four years, the equipment can be sold for \$2.2 million, although the company believes it will keep the machinery for another product line. What is the NPV and IRR of the new

Units sold per year		47,000	45,000	41,000	36,000
Price per pair	\$	345			
VC per unit	\$	153			
Fixed costs	\$	3,750,000			
Equipment	\$	8,500,000			
Depreciation		20.00%	32.00%	19.20%	11.52%
Salvage value	\$	2,200,000			
NWC	\$	2,500,000			
Tax rate		40%			
Required return		9%			

Book value \$ 6,800,000 \$ 4,080,000 \$ 2,448,000 \$ 1,468,800

	<i>Year 0</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>
Sales		\$ 16,215,000	\$ 15,525,000	\$ 14,145,000	\$ 12,420,000
VC		7,191,000	6,885,000	6,273,000	5,508,000
FC		3,750,000	3,750,000	3,750,000	3,750,000
Depreciation		1,700,000	2,720,000	1,632,000	979,200
EBT		\$ 3,574,000	\$ 2,170,000	\$ 2,490,000	\$ 2,182,800
Tax		1,429,600	868,000	996,000	873,120
Net income		\$ 2,144,400	\$ 1,302,000	\$ 1,494,000	\$ 1,309,680
+Depreciation		1,700,000	2,720,000	1,632,000	979,200
OCF		\$ 3,844,400	\$ 4,022,000	\$ 3,126,000	\$ 2,288,880

Capital spending \$ (8,500,000) 1,907,520  
 NWC (2,500,000) 2,500,000  
 Total cash flow \$ (11,000,000) \$ 3,844,400 \$ 4,022,000 \$ 3,126,000 \$ 6,696,400

Salvage  
 Sell old \$ 2,200,000  
 Taxes (292,480)  
 Aftertax salvage value \$ 1,907,520

NPV \$3,069,953.55  
 IRR 20.16%