FIN 6100 Summer 2018 Exam 2 Name Answer Key

NOTE: Type your name in cell G1

Multiple Choice

1	**E**
2	**A**
3	**D**
4	**C**
5	**B**
6	**A**
7	**B**
8	**E**
9	**C**
10	**D**

Answer Key

Problem #1 (10 points)

You are told the WACC for the following firm is 7.95 percent. The company pays no dividends. What is the beta for the company's stock?

Debt: 100,000 bonds with a par value of $1,000 and a quoted price of 112.30. The bonds have coupon rate of 6.1 percent and 25 years to maturity. 250,000 zero coupon bonds with a quoted price of 18.70, 30 years to maturity, and a par value of $1,000.

Preferred Stock: 95,000 shares of 5.2 percent preferred selling at a price of $105.

Common Stock: 2,600,000 shares of stock selling at a market price of $81.

Market: The market risk premium is 7 percent and the risk-free rate is 2.8 percent. The company is in the 40 percent tax bracket.

WACC		7.95%	
Debt:		Bond 1	Bond 2
Number of bonds		100,000	250,000
Par value (% of par)		100	100
Coupon rate		6.10%	0.00%
Quoted price		112.30	18.70
Settlement date		1/1/2000	1/1/2000
Maturity date		1/1/2025	1/1/2030
Coupons per year		2	2
Preferred stock			
Number of shares		95,000	
Dividend		5.20%	
Price	$	105	
Common stock			
Number of shares		2,600,000	
Price	$	81	
Market			
Market risk premium		7.0%	
Risk-free rate		2.8%	
Tax rate		40%	

		Bond 1	Bond 2
YTM		5.21%	5.67%
Aftertax cost		3.13%	3.40%
Cost of preferred		4.95%	
		Market value	Weight
Bond 1	$	112,300,000	0.2958
Bond 2		46,750,000	0.1231
Preferred		9,975,000	0.0263
Equity		210,600,000	0.5548
	$	379,625,000	1.00
Using Solver:			
Beta		**1.27**	
Cost of equity		11.67%	
WACC		7.95%	

Microsoft Excel 15.0 Answer Report
Worksheet: [FIN 6100 Exam 2 Summer 2018 with answers.xlsx]#1
Report Created: 8/6/2018 3:53:47 PM
Result: Solver found a solution. All Constraints and optimality conditions are satisfied.
Solver Engine

Engine: GRG Nonlinear
Solution Time: 0.031 Seconds.
Iterations: 1 Subproblems: 0

Solver Options

Max Time 100 sec, Iterations 100, Precision 0.000001
Convergence 0.0001, Population Size 100, Random Seed 0, Derivatives Forward, Require Bounds
Max Subproblems Unlimited, Max Integer Sols Unlimited, Integer Tolerance 5%, Solve Without Integer C

Objective Cell (Value Of)

Cell	Name	Original Value	Final Value
B48	WACC Market value	6.91%	7.95%

Variable Cells

Cell	Name	Original Value	Final Value	Integer
B45	Beta Market value	1.00	1.27	Contin

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
B48	WACC Market value	7.95%	B48=0.0795	Binding	0

Answer Key

Problem #2(10 points)

You are in charge of deciding whether or not to undertake a new project for your company. The marketing staff has determined that your product will have a price of $39.99 per unit and a variable cost of $24.50 per unit. Equipment for production will cost $1,800,000 and be depreciated on a five year MACRS schedule over the 6-year life of the product. You can sell the equipment for $120,000 at the end of the project. Fixed costs are $240,000 per year and an inventory of $100,000 is required to begin the project and will be returned at the end of the project's life. The tax rate is 35% and the required return is 10%. What is the minimum number of units sold per year necessary to accept the project?

Price	$	39.99					
Variable costs	$	24.50					
Equipment	$	1,800,000					
		Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Year 6*
Depreciation		20.00%	32.00%	19.20%	11.52%	11.52%	5.76%
Pretax salvage value	$	120,000					
Fixed costs	$	240,000					
Initial inventory	$	100,000					
Tax rate		35%					
Required return		10%					

To answer this question, we must calculate the cash flows with a hypothetical quantity and then use Solver or Goal Seek to find the quantity that results in a zero NPV. Doing so, the minimum quantity is:

Quantity	**45,421.83**

Aftertax salvage value		
Pretax salvage value	$	120,000
Taxes		(42,000)
Aftertax salvage value	$	78,000

	Year 0	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Year 6*
Sales		$ 1,816,419	$ 1,816,419	$ 1,816,419	$ 1,816,419	$ 1,816,419	$ 1,816,419
VC		1,112,835	1,112,835	1,112,835	1,112,835	1,112,835	1,112,835
FC		240,000	240,000	240,000	240,000	240,000	240,000
Dep		360,000	576,000	345,600	207,360	207,360	103,680
EBT		$ 103,584	$ (112,416)	$ 117,984	$ 256,224	$ 256,224	$ 359,904
Tax		36,254	(39,346)	41,294	89,678	89,678	125,966
NI		$ 67,330	$ (73,070)	$ 76,690	$ 166,546	$ 166,546	$ 233,938
+Dep		360,000	576,000	345,600	207,360	207,360	103,680
OCF		$ 427,330	$ 502,930	$ 422,290	$ 373,906	$ 373,906	$ 337,618
Capital spending	$ (1,800,000)						78,000
NWC	(100,000)						100,000
Total cash flow	$ (1,900,000)	$ 427,330	$ 502,930	$ 422,290	$ 373,906	$ 373,906	$ 515,618

NPV	$0.00

Microsoft Excel 15.0 Answer Report
Worksheet: [FIN 6100 Exam 2 Summer 2018 with answers.xlsx]#2
Report Created: 8/6/2018 3:54:54 PM
Result: Solver found a solution. All Constraints and optimality conditions are satisfied.
Solver Engine
Engine: GRG Nonlinear
Solution Time: 0.015 Seconds.
Iterations: 1 Subproblems: 0
Solver Options
Max Time 100 sec, Iterations 100, Precision 0.000001
Convergence 0.0001, Population Size 100, Random Seed 0, Derivatives Forward, Require Bounds
Max Subproblems Unlimited, Max Integer Sols Unlimited, Integer Tolerance 5%, Solve Without Integer Constraints

Objective Cell (Value Of)

Cell	Name	Original Value	Final Value
B40	NPV Year 0	($237,752.55)	$0.00

Variable Cells

Cell	Name	Original Value	Final Value	Integer
B18	Quantity Year 1	40,000.00	45,421.83	Contin

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
B40	NPV Year 0	$0.00	B40=0	Binding	0

Answer Key

Problem #3 (10 points)

Wildcat Oil is evaluating the decision to drill wells at the perimeter of an existing oil field. Each well will cost $9.5 million to drill and the company expects to drill 20 of these wells. Even though the perimeter wells are being drilled adjacent to an existing oil field, there is a 40 percent probability that any particular perimeter well will come up dry, in which case no oil will be found at that well. If the well does produce oil, there is a 25 percent chance that the well will produce 25,000 barrels per year and a 75 percent chance that the well will produce 130,000 barrels per year. The producing wells will last for 7 years and the oil will create an aftertax cash flow of $45 per barrel. The required return on the project is 15 percent. What is the NPV of the decision to drill the perimeter wells?

Dry well probability		40%	
Producing wells		Probability	Barrels/year
Low production		25%	25,000
High production		75%	130,000
Years of production		7	
Cost per well	$	9,500,000	
Number of wells		20	
Oil price/barrel	$	45	
Required return		15%	

Cash flow low production	$	1,125,000
Cash flow high production	$	5,850,000
Present value		
Low production	$	4,680,472.20
High production	$	24,338,455.44
Expected value of producing well	$	19,423,959.63
Expected value of well before drilling	$	11,654,375.78
NPV per well	$	2,154,375.78
NPV of project	**$**	**43,087,515.59**

Answer Key

Problem #4 (15 points)

Regatta Sailboats has a new sailboat that is evaluating before bringing to market. The new sailboat would sell for $115,000 today and sales of 650 sailboats per year are expected to last for 6 years. The equipment necessary for production will cost $35 million and be depreciated on a 5-year MACRS schedule. The company projects that fixed costs will be $12.5 million per year and the variable costs will be $54,000 per boat in real terms. Inflation is projected to be 3.5 percent per year over the next 6 years. The price and fixed costs are expected to increase at the inflation rate, but variable costs are expected to increase at 1 percent over the inflation rate. The equipment can be sold for $3.5 million in real terms at the end of the project. The nominal required return is 12 percent and the tax rate is 38 percent. What is the NPV for this new sailboat?

Price	$	115,000					
Quantity per year		650					
Equipment	$	35,000,000					
Depreciation		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		20.00%	32.00%	19.20%	11.52%	11.52%	5.76%
Fixed costs	$	12,500,000					
Variable costs/boat	$	54,000					
Inflation		3.5%					
VC increase over inflation		1%					
Equipment salvage (real)	$	3,500,000					
Nominal required return		12%					
Tax rate		38%					

REAL CASH FLOWS

Real required return		8.213%
Time 0		
Equipment	$	(35,000,000)
Total	$	(35,000,000)

Variable cost/boat	$	54,540	$	55,085.40	$	55,636.25	$	56,192.62	$	56,754.54	$	57,322.09
Nominal depreciation	$	7,000,000	$	11,200,000	$	6,720,000	$	4,032,000	$	4,032,000	$	2,016,000

Year		1		2		3		4		5		6
Sales	$	74,750,000	$	74,750,000	$	74,750,000	$	74,750,000	$	74,750,000	$	74,750,000
VC		35,451,000		35,805,510		36,163,565		36,525,201		36,890,453		37,259,357
FC		12,500,000		12,500,000		12,500,000		12,500,000		12,500,000		12,500,000
Dep		6,763,285		10,455,320		6,061,055		3,513,655		3,394,836		1,640,017
EBT	$	20,035,715	$	15,989,170	$	20,025,380	$	22,211,144	$	21,964,711	$	23,350,625
Tax		7,613,572		6,075,885		7,609,644		8,440,235		8,346,590		8,873,238
NI	$	12,422,143	$	9,913,285	$	12,415,736	$	13,770,909	$	13,618,121	$	14,477,388
+Dep		6,763,285		10,455,320		6,061,055		3,513,655		3,394,836		1,640,017
OCF	$	19,185,428	$	20,368,605	$	18,476,791	$	17,284,564	$	17,012,957	$	16,117,405

Salvage value		
Selling price	$	3,500,000
Taxes		(1,330,000)
Aftertax salvage	$	2,170,000

Year		CF
0	$	(35,000,000)
1		19,185,428
2		20,368,605
3		18,476,791
4		17,284,564
5		17,012,957
6		18,287,405

NPV	**$**	**50,164,472.22**

NOMINAL CASH FLOWS

Nominal increase in VC		4.54%

Time 0		
Equipment	$	(35,000,000)
Total	$	(35,000,000)

Nominal price	$	119,025.00	$	123,190.88	$	127,502.56	$	131,965.15	$	136,583.93	$	141,364.36
Variable cost/boat	$	56,449	$	59,009	$	61,685	$	64,482	$	67,407	$	70,463
Fixed costs	$	12,937,500	$	13,390,313	$	13,858,973	$	14,344,038	$	14,846,079	$	15,365,692

Year		1		2		3		4		5		6
Sales	$	77,366,250	$	80,074,069	$	82,876,661	$	85,777,344	$	88,779,551	$	91,886,836
VC		36,691,785		38,355,757		40,095,191		41,913,508		43,814,286		45,801,263
FC		12,937,500		13,390,313		13,858,973		14,344,038		14,846,079		15,365,692
Dep		7,000,000		11,200,000		6,720,000		4,032,000		4,032,000		2,016,000
EBT	$	20,736,965	$	17,127,999	$	22,202,497	$	25,487,799	$	26,087,187	$	28,703,881
Tax		7,880,047		6,508,640		8,436,949		9,685,364		9,913,131		10,907,475
NI	$	12,856,918	$	10,619,359	$	13,765,548	$	15,802,435	$	16,174,056	$	17,796,406
+Dep		7,000,000		11,200,000		6,720,000		4,032,000		4,032,000		2,016,000
OCF	$	19,856,918	$	21,819,359	$	20,485,548	$	19,834,435	$	20,206,056	$	19,812,406

Salvage value		
Selling price	$	4,302,394
Taxes		(1,634,910)
Aftertax salvage	$	2,667,484

Year	CF
0	$ (35,000,000)
1	19,856,918
2	21,819,359
3	20,485,548
4	19,834,435
5	20,206,056
6	22,479,890

NPV	**$ 50,164,472.22**

Answer Key

Problem #5 (25 points)

Initial equipment cost	$	140,000,000			
Equipment salvage value	$	54,000,000			
		Year 1	*Year 2*	*Year 3*	*Year 4*
Depreciation		14.29%	24.49%	17.49%	12.49%
OEM market:					
Price	$	38			
Variable cost	$	22			
Automobile production		5,600,000	6,200,000	6,700,000	7,500,000
Market share		11.00%			
Replacement market:					
Price	$	59			
Variable cost	$	22			
Market sales		14,000,000	15,000,000	15,800,000	16,900,000
Market share		8.00%			
Marketing and general costs	$	26,000,000			
Tax rate		40.00%			
Required return		13.00%			
Initial NWC	$	9,000,000			
NWC percentage of sales		15%			

	Year 0	Year 1	Year 2	Year 3	Year 4
OEM:					
Automobiles sold		5,600,000	6,200,000	6,700,000	7,500,000
Tires for automobiles sold		22,400,000	24,800,000	26,800,000	30,000,000
SuperTread tires sold		2,464,000	2,728,000	2,948,000	3,300,000
Replacement market:					
Total tires sold in market		14,000,000	15,000,000	15,800,000	16,900,000
SuperTread tires sold		1,120,000	1,200,000	1,264,000	1,352,000
Revenue:					
OEM market		$ 93,632,000	$ 103,664,000	$ 112,024,000	$ 125,400,000
Replacement market		66,080,000	70,800,000	74,576,000	79,768,000
Total		$ 159,712,000	$ 174,464,000	$ 186,600,000	$ 205,168,000
Variable costs:					
OEM market		$ 54,208,000	$ 60,016,000	$ 64,856,000	$ 72,600,000
Replacement market		24,640,000	26,400,000	27,808,000	29,744,000
Total		$ 78,848,000	$ 86,416,000	$ 92,664,000	$ 102,344,000
Revenue		$ 159,712,000	$ 174,464,000	$ 186,600,000	$ 205,168,000
Variable costs		78,848,000	86,416,000	92,664,000	102,344,000
Marketing and general costs		26,000,000	26,000,000	26,000,000	26,000,000
Depreciation		20,006,000	34,286,000	24,486,000	17,486,000
EBT		$ 34,858,000	$ 27,762,000	$ 43,450,000	$ 59,338,000
Tax		13,943,200	11,104,800	17,380,000	23,735,200
Net income		$ 20,914,800	$ 16,657,200	$ 26,070,000	$ 35,602,800
OCF		$ 40,920,800	$ 50,943,200	$ 50,556,000	$ 53,088,800
New working capital:					
Beginning	0	$ 9,000,000	$ 23,956,800	$ 26,169,600	$ 27,990,000
Ending	9,000,000	23,956,800	26,169,600	27,990,000	-
NWC cash flow	$ (9,000,000)	$ (14,956,800)	$ (2,212,800)	$ (1,820,400)	$ 27,990,000
Book value of equipment	$ 140,000,000	$ 119,994,000	$ 85,708,000	$ 61,222,000	$ 43,736,000
Aftertax salvage value:					
Market value	$ 54,000,000				
Taxes	(4,105,600)				
Total	$ 49,894,400				

	Year 0	Year 1	Year 2	Year 3	Year 4
Operating cash flow		$ 40,920,800	$ 50,943,200	$ 50,556,000	$ 53,088,800
Capital spending	$ (140,000,000)				49,894,400
Net working capital	(9,000,000)	(14,956,800)	(2,212,800)	(1,820,400)	27,990,000
Total cash flows	$ (149,000,000)	$ 25,964,000	$ 48,730,400	$ 48,735,600	$ 130,973,200

NPV	**$ 26,244,574.16**
IRR	**19.40%**