

FIN 6100

Summer 2018 Exam 1

Name

Answer Key

NOTE: Type your name in cell G1

Multiple Choice

- | | |
|----|----------|
| 1 | E |
| 2 | B |
| 3 | C |
| 4 | B |
| 5 | A |
| 6 | B |
| 7 | E |
| 8 | B |
| 9 | C |
| 10 | E |

Answer Key

Problem #1 (11 points) When you retire in 37 years you would like to be able to withdraw \$8,000 per month in real terms for the 30 years you expect to be in retirement. You currently have \$20,000 in your retirement account. Additionally, you expect to receive a trust payment in 20 years. The current value of the trust is \$125,000 and you expect the value of the trust to keep pace with inflation until you receive it. You will then move the trust funds to your retirement account. To fund your retirement you will make monthly deposits. Before you retire, you expect to earn an 11 percent nominal EAR and you expect a 7 percent nominal EAR after you retire. Inflation will be a 3.2 percent EAR over the entire period. How much must you save each month to fund your retirement account?

Years until retirement		37
Monthly real withdrawal	\$	8,000
Months per year		12
Years in retirement		30
Current value of retirement acct	\$	20,000
Year for payment of trust		20
Current value of trust account	\$	125,000
Pre-retirement EAR (Nominal)		11%
Post-retirement EAR (Nominal)		7%
Inflation (EAR)		3.2%

Pre-retirement real EAR	7.5581%	Post-retirement real EAR	3.6822%
Pre-retirement real APR	7.3083%	Post-retirement real APR	3.6215%

Amount needed at retirement \$1,754,957.05

Value at retirement of:

Current savings	\$296,368.07		
Trust payment	\$431,365.89	Trust value when distributed in real terms	\$ 125,000

Amount short at retirement \$1,027,223.09

Monthly deposit **\$452.73**

Answer Key

Problem 2 (10 points) You have won the Perpetual Winner Lottery. The lottery will make payments of \$100,000 every other year beginning one year from now, and payments of \$200,000 every other year beginning two years from now. Both payments last forever. If the interest rate is an 8 percent APR compounded quarterly, what is the value of your winnings today?

Payments beginning in one year	\$	100,000
Payments beginning in two years	\$	200,000
APR		8%
Periods in a year		4
Years between payments		2

EAR		8.243%
Rate for 2 years		17.166%

PV of first CF at time -1	\$	582,549.00
Value today	\$	630,569.77

PV of second CF today	\$	1,165,097.99
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Total Value today		\$ 1,795,667.76
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Answer Key

Problem 4 (10 points) Elizabeth Hughes is responsible for financial planning at the Faulty Widget Company. The company has just developed a new widget and Elizabeth has been instructed to develop a fund to cover all necessary repair costs over the next two years. Below are the estimated repair costs each month:

Month	Repair cost per month
1 – 4	\$250,000
5 – 18	\$500,000
19 – 24	\$400,000

Elizabeth already has \$1,500,000 in a fund to cover repair costs. The appropriate interest rate is a 6 percent EAR. How much does the company have to deposit each month in order to cover all repair costs?

Month 1-4 cost	\$	250,000
Month 5-18 cost	\$	500,000
Month 19-24 corst	\$	400,000
Amount in fund	\$	1,500,000
EAR		6%
Periods per year		12

APR	5.841%
Rate per month	0.487%

Month	CF	PV of costs	Value today
1	\$ 250,000	1-4	\$987,948.59
2	\$ 250,000	5-18	\$6,750,952.78
3	\$ 250,000	19-24	\$2,359,637.54
4	\$ 250,000		\$9,771,196.40
5	\$ 500,000		
6	\$ 500,000		
7	\$ 500,000		
8	\$ 500,000		
9	\$ 500,000		
10	\$ 500,000		
11	\$ 500,000		
12	\$ 500,000		
13	\$ 500,000		
14	\$ 500,000		
15	\$ 500,000		
16	\$ 500,000		
17	\$ 500,000		
18	\$ 500,000		
19	\$ 400,000		
20	\$ 400,000		
21	\$ 400,000		
22	\$ 400,000		
23	\$ 400,000		
24	\$ 400,000		

NPV	\$9,771,196.40
Value with current amt	\$8,271,196.40

Monthly deposit **\$365,992.40**

Answer Key

Problem 4 (10 points) Dahlia Florists is expected to grow rapidly over the next several years. Sales, which will be \$42.5 million in one year, are expected to grow at 15 percent, 13 percent, 10 percent, and 7 percent per year over the next four years, respectively. After this period, cash flows are expected to grow at 5 percent in perpetuity. Expenses including depreciation are 55 percent of revenues. Net investment, including net working capital and capital spending less depreciation, is 10 percent of revenues. Dahlia is an all-equity firm with 3.1 million shares outstanding and has a discount rate of 11 percent. What is the price per share of the company's stock?

Revenue in 1 year	\$	42,500,000			
Revenue growth rate		15%	13%	10%	7%
Terminal growth rate		5%			
Expenses (% of sales)		55%			
Net investment (% of sales)		10%			
Shares outstanding		3,100,000			
Required return		11%			
Tax rate		35%			

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
Revenues	\$ 42,500,000	\$ 48,875,000	\$ 55,228,750	\$ 60,751,625	\$ 65,004,239
Expenses	23,375,000	26,881,250	30,375,813	33,413,394	35,752,331
EBT	\$ 19,125,000	\$ 21,993,750	\$ 24,852,938	\$ 27,338,231	\$ 29,251,907
Taxes	6,693,750	7,697,813	8,698,528	9,568,381	10,238,168
Net income	\$ 12,431,250	\$ 14,295,938	\$ 16,154,409	\$ 17,769,850	\$ 19,013,740
Net investme	4,250,000	4,887,500	5,522,875	6,075,163	6,500,424
Net CF	\$ 8,181,250	\$ 9,408,438	\$ 10,631,534	\$ 11,694,688	\$ 12,513,316

Year 6 cash flow \$ 13,138,981.76

Value in Year 5 of terminal casl \$ 218,983,029.29

Year	Cash flow
1	\$ 8,181,250
2	\$ 9,408,438
3	\$ 10,631,534
4	\$ 11,694,688
5	\$ 231,496,345.25

Preent value \$167,865,747.36

Price per share \$ 54.15

Answer Key

Problem 5 (9 points) A general manager in 1971 earned \$10,300 per year. In 2018, his salary had increased to \$92,000. Over the same period, the average price of goods has increased by 4.73 times. What is his real income in 1971 dollars?

Salary	1971	\$	10,300
	2018	\$	92,000
Increase in price of goods			4.73

Years passed 47

Nominal increase 4.77%

Inflation rate 3.36%

Real increase 1.36%

Real price in 1971 dollars **\$19,450.32**

Answer Key

Problem 6 (12 points) You are planning to save for your retirement in 35 years and the college tuition for your two children. Your current monthly salary is \$9,000 per month and you expect your salary to keep pace with inflation. You expect inflation to be a 3.5 percent EAR for the rest of your life. You plan to deposit 12 percent of your salary each month into a retirement account. Additionally, your employer will deposit 4 percent of your salary into the account. You expect to earn a 10.8 nominal nominal EAR in your retirement savings account until retirement. Your children will begin college 15 years and 17 years from now. The university that you plan for your children to attend has started a new legacy program where for a minimal donation today, the school will guarantee that the tuition for your first child will be \$130,000 and the tuition for your second child will be \$135,000. Each of these tuition payments will be made when your child starts college and will cover the entire four years of tuition. If you can earn an 8.7 percent EAR after you retire, how much can you withdraw each month in real terms for the 25 years of your retirement?

Year until retirement		35
Salary payments per year		12
Monthly salary	\$	9,000
Inflation (EAR)		3.5%
Percentage of salary to save		12.0%
Employer deposit amount		4.0%
Pre-retirement return (EAR)		10.8%
1st child starts college (years)		15
2nd child starts college (years)		17
1st child tuition	\$	130,000
2nd child tuition	\$	135,000
Post-retirement return (EAR)		8.7%
Years in retirement for withdrawals		25

Pre-retirement EAR	7.0531%	Post-retirement EAR	5.0242%
Pre-retirement APR	6.8349%	Post-retirement APR	4.9120%

Monthly deposit	\$	1,080.00
Employer deposit	\$	360.00
Total deposit	\$	1,440.00

Real value of tuition in 15 years	\$77,595.78
Real value of tuition in 17 years	\$75,222.51

FV of savings in 15 years	\$449,932.46
After tuition	\$ 372,336.68

FV of savings in 17 years	\$463,632.95
After tuition	\$ 388,410.44

Value of savings in 35 years at retirement	\$1,933,951.63
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Amount of monthly real retirement withdrawal	\$11,206.80
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Answer Key

Problem 7 (11 points) The most recent financial statements a company are shown below. Sales for next year are projected to grow by 15 percent. Interest expense, notes payable, long-term debt and depreciation will remain constant; the tax rate and the dividend payout rate will also remain constant. Costs, other expenses, current assets, and accounts payable increase spontaneously with sales. Suppose the company is operating at 85 percent capacity. Prepare the pro forma financial statements and calculate the EFN. Fixed assets can only be increased in increments of \$25 millio and cannot be sold.

Projected growth rate	15%		
Tax rate	35%		
Operating capacity	85%		
Fixed asset increase	\$ 25,000,000		
Sales	\$ 94,300,000		
Cost of goods sold	61,900,000		
Other expenses	1,535,000		
Depreciation	4,125,000		
EBIT	<u>\$ 26,740,000</u>		
Interest	1,955,000		
EBT	<u>\$ 24,785,000</u>		
Taxes (35%)	8,674,750		
Net income	<u>\$ 16,110,250</u>		
Dividends	\$ 6,500,000		
Additions to retained earnings	9,610,250		
	Assets		Liabilities & Equity
Current assets		Current liabilities	
Cash	\$ 535,000	Accounts payable	\$ 978,000
Accounts receivable	1,935,000	Notes payable	2,314,000
Inventory	4,873,600	Total	<u>\$ 3,292,000</u>
Total	<u>\$ 7,343,600</u>	Long-term debt	\$ 26,500,000
Fixed asstes	\$ 43,950,000	Owners' equity	
		Common stock and paid-in surplus	\$ 3,200,000
		Accumulated retained earnings	18,301,600
		Total	<u>\$ 21,501,600</u>
Total assets	<u><u>\$ 51,293,600</u></u>	Total liabilities and owners' equity	<u><u>\$ 51,293,600</u></u>

NOTE: I have included the outline for the pro forma financial statements below to save time. However, other calculations may be required.

Payout ratio	40.347%
Full capacity sales	\$ 110,941,176
Full capacity ratio = Fixed assets / Full capacity sales	0.396155885

Sales	\$ 108,445,000
Cost of goods sold	71,185,000
Other expenses	1,765,250
Depreciation	4,125,000
EBIT	<u>\$ 31,369,750</u>
Interest	1,955,000
EBT	<u>\$ 29,414,750</u>
Taxes (35%)	10,295,163
Net income	<u>\$ 19,119,588</u>
Dividends	\$ 7,714,177
Additions to retained earnings	11,405,411

	Assets
Current assets	
Cash	\$ 615,250
Accounts receivable	2,225,250
Inventory	5,604,640
Total	<u>\$ 8,445,140</u>
Fixed assets	
Net plant and equipment	\$ 43,950,000
Total assets	<u><u>\$ 52,395,140</u></u>

	Liabilities & Equity
Current liabilities	
Accounts payable	\$ 1,124,700
Notes payable	2,314,000
Total	<u>\$ 3,438,700</u>
Long-term debt	\$ 26,500,000
Owners' equity	
Common stock and paid-in surplus	\$ 3,200,000
Accumulated retained earnings	29,707,011
Total	<u>\$ 32,907,011</u>
Total liabilities and owners' equity	<u><u>\$ 62,845,711</u></u>

EFN	<u><u>\$ (10,450,571)</u></u>
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