Fall 2016; Fin 3310; Final B   Name ___Key_____

Short Answer (15 points each)

1. When calculating a project's free cash flow in year 4 as $500, you mistakenly assumed a corporate tax rate of 50%. Will lowering the tax rate to the correct rate of 35% raise or lower your estimate of the project's free cash flow in year 4?

+15 raise

2. When you calculated Big Corp.'s stock price as $36.74, you assumed that the firm will earn $1.50 per share a year from today and that over the next 5 years Big will pay out 10% of its earnings and reinvest 90% of its earnings in projects earning a return of 30%. You have also assumed that 6 years from today Big's return on new investments will fall to equal its 9% cost of capital and that Big will at that time boost its payout to 75% of earnings. Will assuming that Big's cost of capital is 12% (instead of 9%) raise or lower your estimate of Big's stock price?

+15   lower

3. When using the Capital Asset Pricing Model to calculate Sony's cost of capital, you assumed the risk-free rate equaled 3%, that Sony's beta was 0.9, and that the market risk premium equaled 7%. Would using a risk-free rate of 4% raise or lower your estimate of Sony's cost of capital?

+15   raise

4. How does the disposition effect (where investors tend to hang on to stocks that have lost value and sell stocks that have risen in value since the time of purchase) affect an investor's taxes?

+15 raises

5. Which of the firm's investors tends to gain and which tends to lose when a firm pays a dividend?

+8/+7   SIH gain; BIH lose

Problems (75 points each)

Note: Unless I specifically state "calculations required", you can just set up all problems. Setting up means writing down the appropriate equations and plugging in the correct numbers. Tell me if you are solving for something other than the left-hand side of the equation. If you are using the result of an unsolved equation in a later step, just make that clear. One way to do this is to set up the equation and call your result "A" or "B", etc. If you prefer, you can solve everything.

1. You estimate that Trico's free cash flow will equal $400 million a year from today and that its free cash flow will grow by 12% per year through six years from today. Thereafter you expect Trico's free cash flow to grow at a rate of 2% per year forever. Trico's cost of capital equals 7%, its outstanding debt equals $900 million and it holds a cash balance today of $300 million. Set up the calculations needed to determine Trico's price per share if the firm has 250 million shares outstanding.

$$V_0 = \left(\frac{400}{.07 - .12} \right)\left(1 - \left(\frac{1.12}{1.07} \right)^5 \right) + \left(\frac{C_6}{.07 - .02} \right)\left(\frac{1}{1.07} \right)^5$$

$$C_6 = 400(1.12)^5$$

$$P_0 = \frac{V_0 - 900 + 300}{250}$$

2. Geralt Inc. is considering whether to invest $12 million in a new plant. The plant is expected to generate revenues a year from today of $96 million. Thereafter, revenues are expected to grow at a rate of 2% per year for the next 10 years. Variable costs will equal 85% of sales and fixed costs will equal $7 million a year from today. The new plant will fall into the 15-year MACRS class. Geralt's marginal tax rate equals 30%. Given the components of Geralt's net working capital below, set up the calculations needed to determine the plant's free cash flow three years from today.

Year	0	1	2	3	4	5	6	7
Cash	11.30	11.94	12.27	12.33	12.17	12.71	12.67	12.52
Accts. Rec.	8.71	8.61	9.07	9.23	9.69	10.25	10.29	10.86
Inventory	47.26	47.76	49.98	50.13	52.84	52.08	51.58	52.61
Accts. Pay.	10.80	11.28	11.65	11.91	11.77	11.60	12.03	11.86

$$UNI_3 = (R_3 - E_3 - D_3)(1 - .3) \quad \text{+14}$$

$$R_3 = 96(1.02)^2 \quad \text{+11}$$

$$E_3 = .85(R_3) + 7 \quad \text{+11}$$

$$D_3 = 12(.0855) \quad \text{+11}$$

$$FCF_3 = UNI_3 + D_3 - CE_3 - \Delta NWC_3 \quad \text{+14}$$

$$CE_3 = \emptyset \quad \text{+3}$$

$$\text{+11} \quad \begin{cases} \Delta NWC_3 = NWC_3 - NWC_2 \\\\ NWC_3 = 12.33 + 9.23 + 50.13 - 11.91 \\\\ NWC_2 = 12.27 + 9.07 + 49.98 - 11.65 \end{cases}$$

3. Assume that you invest 40% of your funds in Blackstone (BX) ad 60% of your funds in Tyson Foods (TSN). Using the returns on BX and TSN below, set up the calculations needed to determine the return on your portfolio for each of the years 2012 through 2015, the average return on your portfolio over the years 2012 through 2015, and the standard deviation of returns on your portfolio over this period.

	Returns on:	
Year	BX	TSN
2015	-7%	34%
2014	14%	21%
2013	114%	74%
2012	15%	-5%

Returns:

$$2015 = .4(-7) + .6(34)$$

$$2015 = .4(14) + .6(21)$$

$$2013 = .4(114) + .6(74)$$

$$2012 = .4(15) + .6(-5)$$

$$\overline{R} = \frac{1}{4}(2015 + 2014 + 2013 + 2012)$$

$$SD = \sqrt{\frac{1}{3}\left((2015 - \overline{R})^2 + (2014 - \overline{R})^2 + (2013 - \overline{R})^2 + (2012 - \overline{R})^2\right)}$$

4. Assume that Noctis Corp. and Lucis Inc. have identical assets that will generate identical cash flows one year from today. Noctus has outstanding debt that matures one year from today for $300 million and Lucis has outstanding debt that matures one year from today for $75 million. Noctus' debt trades for $270 million and Lucis' debt trades for $70 million. The market value of Noctus' common stock equals $600 million and the market value of Lucis' common stock equals $780 million. Assuming also that markets are perfect, set up a table that shows the trades you could make today that would create an arbitrage profit, your total arbitrage profit, and that net cash flows equal $0 a year from today if the assets held by Noctis and Lucis pay $225 million a year from today. Note: Calculations required.

$$V = D + E$$

$$N = 270 + 600 = 870 \Rightarrow \text{short sell}$$

$$L = 70 + 780 = 850 \Rightarrow \text{buy}$$

Transaction	CF_0	$CF_1 = 225$
Short N Debt	$+270$ $^{+4}$	-225 $+7$
Short N Stock	$+600$ $^{+4}$	$\emptyset$ $+7$
Buy L Debt	-70 $^{+4}$	$+75$ $+4$
Buy L Stock	-780 $^{+4}$	$+150$ $+4$
Total	$+20$	$\emptyset$
	$+5$	

5. Assume the corporate tax rate equals 40%, that the personal tax rate on income from debt equals 45%, and that the personal tax rate on income from equity equals 20%. Assume also that S.P.E.C.I.A.L. Corp has four possible levels of annual earnings: a 15% chance of earning $200 million, a 30% chance of earning $350 million, a 35% chance of earning $600 million, and a 20% chance of earning $800 million. S.P.E.C.I.A.L. currently has debt of $3 billion that carries an interest rate of 10% per year. Should S.P.E.C.I.A.L. increase or reduce its debt? Justify your answer. Note: Calculations necessary.

$$\text{Interest} = 3000 \times .1 = 300$$

$$T^* = 1 - \frac{(1 - .85 \times .4)(1 - .2)}{(1 - .45)} = .04 \Rightarrow \text{increase}$$

6. Joel Ellie Corp. is financed with only equity and is considering investing $20 million in a new facility that will generate its first monthly cash flow of $300,000 six months from today. These cash flows will grow at a rate of 1% per month through the final cash flow six years from today. The facility will have the same risk as the assets of Last Corp. which is a firm financed only with equity. The beta of Last's equity is 1.25 while Joel Ellie's equity beta of 1.1. The risk-free rate equals 3% and the market risk premium equals 5%. Joel Ellie will issue $15 million of equity and will use $5 million of cash to fund the new facility. Set up the calculations needed to determine the net present value of the facility.

$$NPV = -20 + \left[\frac{0.3}{r(\frac{1}{12}) - .01}\right]\left(1 - \left(\frac{1.01}{1 + r(\frac{1}{12})}\right)^{67}\right)\left(\frac{1}{1 + r(\frac{1}{12})}\right)^{5}$$

$$r\left(\frac{1}{12}\right) = (1 + r)^{1/12} - 1$$

$$r = .03 + 1.25(.05)$$

7. Your boss at Nathan Drake Corp. is calculating the firm's weighted average cost of capital and wants you to determine the firm's debt cost of capital. The firm has outstanding bonds that mature 10 years from today for $1000. The coupon rate on the bonds equals 4% but coupons are paid semiannually. The market value of the bonds equals $850. Your boss has also told you that there is a 6% chance that Nathan Drake will default on its bonds and that the expected loss per dollar of debt in the event of default is 60%. Set up the calculations needed to determine Nathan Drake's debt cost of capital.

$$CPN = \frac{.04 \times 1000}{2} = 20 \quad \text{(12)}$$

$$+12 \quad 850 = \frac{CPN}{y}\left(1 - \left(\frac{1}{1+y}\right)^{20}\right) + \frac{1000}{(1+y)^{20}} \Rightarrow \text{solve for } y \quad \text{(11)}$$

$$+6 \quad Y = (1+y)^2 - 1 \quad \text{(10)} \quad \text{Note: using } Y \text{ as annualized } y \text{ (YTM} = 2y \text{ is an APR)}$$

$$+6 \quad r_d = Y - .06(.6) \quad \text{(14)}$$