Weeks 1 – 7 homework answer key

FI516 – WEEK 1 – HOMEWORK ANSWER KEY Problem 14-10 14-10 a. 1. 2011 Dividends = (1. 10)(2010 Dividends) = (1. 10)($3, 600, 000) = $3, 960, 000 2. 2010 Payout = $3, 600, 000/$10, 800, 000 = 0. 33 = 33% 2011 Dividends = (0. 33)(2009 Net income) = (0. 33)($14, 400, 000) = $4, 800, 000 (Note: If the payout ratio is rounded off to 33%, 2011 dividends are then calculated as $4, 752, 000.) 3. Equity financing = $8, 400, 000(0. 60) = $5, 040, 000 2011 Dividends = Net income – Equity financing = $14, 400, 000 – $5, 040, 000 = $9, 360, 000 All of the equity financing is done with retained earnings as long as they are available. 4.

The regular dividends would be 10% above the 2010 dividends: Regular dividends = (1. 10)($3, 600, 000) = $3, 960, 000. The residual policy calls for dividends of $9, 360, 000. Therefore, the extra dividend, which would be stated as such, would be: Extra dividend = $9, 360, 000 – $3, 960, 000 = $5, 400, 000. An even better use of the surplus funds might be a stock repurchase. b. Policy 4, based on the regular dividend with an extra, seems most logical. Implemented properly, it would lead to the correct capital budget and the correct financing of that budget, and it would give correct signals to investors. Problem 19-6 19-6 a.

Balance Sheet Alternative 1 Total current liabilities Long-term debt Common stock, par $1 Paid-in capital Retained earnings Total claims Total assets $800, 000 $150, 000 -162, 500 437, 500 50, 000 $800, 000 Alternative 2 Total current liabilities Long-term debt Common stock, par $1 Paid-in capital Retained earnings Total claims Total assets $800, 000 $ 150, 000 -150, 000 450, 000 50, 000 $ 800, 000 Alternative 3 Total current liabilities Long-term debt (8%) Common stock, par $1 Paid-in capital Retained earnings Total

claims Plan 1 80, 000 162, 500 49% Plan 2 80, 000 150, 000 53% Total assets b. Number of shares Total shares Percent ownership 1, 300, 000 Original 80, 000 100, 000 80% $ 150, 000 500, 000 150, 000 450, 000 50, 000 $1, 300, 000 Plan 3 80, 000 150, 000 53% c. Total assets EBIT Interest EBT Taxes (40%) Net income Number of shares Earnings per share d. Total liabilities TL/TA Original Plan 1 Plan 2 Plan 3 $ 550, 000 $800, 000 $800, 000 $1, 300, 000 $ 110, 000 $160, 000 $160, 000 $ 260, 000 20, 000 0 0 40, 000 $ 90, 000 $160, 000 $160, 000 $ 220, 000 36, 000 64, 000 64, 000 88, 000 $ 54, 000 $ 96, 000 $ 96, 000 $ 132, 000 100, 000 162, 500 150, 000 150, 000 $0. 59 $0. 64 $0. 88 $0. 54 Original $400, 000 73% Plan 1 $150, 000 19% Plan 2 Plan 3 $150, 000 $650, 000 19% 50% . Alternative 1 results in loss of control (to 49%) for the firm. Under it, he loses his majority of shares outstanding. Indicated earnings per share increase, and the debt ratio is reduced considerably (by 54 percentage points). Alternative 2 results in maintaining control (53%) for the firm. Earnings per share increase, while a reduction in the debt ratio like that in Alternative 1 occurs. Under Alternative 3, there is also maintenance of control (53%) for the firm. This plan results in the highest earnings per share (88 cents), which is an increase of 63% on the original earnings per share.

The debt ratio is reduced to 50%. Conclusions. If the assumptions of the problem are borne out in fact, Alternative 1 is inferior to 2, since the loss of control is avoided. The debt-to-equity ratio (after conversion) is the same in both cases. Thus, the analysis must center on the choice between 2 and 3. The differences between these two alternatives, which are illustrated in Parts c and d, are that the increase in earnings per share is substantially greater

under Alternative 3, but so is the debt ratio. With its low debt ratio (19%), the firm is in a good position for future growth under Alternative 2.

However, the 50% ratio under 3 is not prohibitive and is a great improvement over the original situation. The combination of increased earnings per share and reduced debt ratios indicates favorable stock price movements in both cases, particularly under Alternative 3. There is the remote chance that the firm could lose its commercial bank financing under 3, since it was the bank which initiated the permanent financing suggestion. The additional funds, especially under 3, may enable the firm to become more current on its trade credit. Also, the bonds will no doubt be subordinated debentures.

Both Alternatives 2 and 3 are favorable alternatives. If the principal owner is willing to assume the risk of higher leverage, then 3 is slightly more attractive than 2. The actual attractiveness of Alternative 3 depends, of course, on the assumption that funds can be invested to yield 20% before interest and taxes. It is this fact that makes the additional leverage favorable and raises the earnings per share. Problem 15-9: Capital Structure Analysis Present situation (50% debt): WACC = wd rd(1-T) + wcers = (0. 5)(10%)(1-0. 15) + (0. 5)(14%) = 11. 25%. V = FCF/WACC = (EBIT)(1 ? T)/WACC = ($13. 24)(1 0. 5)/ 0. 1125 = $100million 70 percent debt: WACC = wd rd(1-T) + wcers = (0. 7)(12%)(1-0. 15) + (0. 3)(16%) = 11. 94%. V = FCF/WACC = (EBIT)(1 ? T)/WACC = ($13. 24)(1 0. 15)/ 0. 1194 = $94. 26million 30 percent debt: WACC = wd rd(1-T) + wcers = (0. 3)(8%)(1-0. 15) + (0. 7)(13%) = 11. 14%. V = FCF/WACC = (EBIT)(1 ? T)/WACC = ($13. 24)(1 0. 15)/ 0. 1114 = $101. 2million Problem 15-10: Optimal Capital Structure with Hamada a.

BEA’s unlevered beta is 0. 870 bU = b/(1+ (1-T)(D/S)) = 1. 0/(1+(1-0. 40) (20/80)) = 0. 870 b. b = bU (1 + (1-T)(D/S)) At 40 percent debt: bL = 0. 87 (1 + 0. 6(40%/60%)) = 1. 218 rS = 6 + 1. 18(4) = 10. 872% = wd rd(1-T) + wcers = (0. 4)(9%)(1-0. 4) + (0. 6)(10. 872%) = 8. 683%. c. WACC V = FCF/WACC = (EBIT)(1 ? T)/WACC = ($14. 933)(1- 0. 4)/ 0. 08683 = $103. 19 million Problem 26-8: MM Extension with Growth a. Vu = EBIT/WACC = EBIT/ rSU = $500000/(. 13-. 09) = $12. 5million b. VL = VU + (rD*TD)/(rSu –g) = $12. 5million + (. 07*. 40*$5million)/(. 13-. 09) = $16 million S = VL –D = $16million – $5million = $11million rSl = rSu + (rSu –rD)* (D/S) = . 13 + (. 13-. 07)*($5million/$11million) = . 1573 = 15. 73% = VU + TD = $12. 5million + (. 4*$5million) = $14. 5million c. VL S = VL –D = $14. million – $5million = $9. 5million rSl = rSu + (rSu –rD)(1-T)(D/S) = . 13 + (. 13-. 07) (1-. 4)($5million/$9. 5million) = . 1489 = 14. 89% Problem 8-1: Options Exercise value = current stock price – strike price = $30 – $25 = $5 Time value = option price – exercise value = $7 – $5 = $2 Problem 8-2: Options Time value = market value of option – exercise value $5 = market value of option – $22 Market value of option = $27 Exercise value = P0 – strike price $22 = P0 – $15 P0 = $37 Problem 15-8: Capital Structure Analysis a) The use of leverage on the firm increases value from $3million to $3, 348, 214. 9 V = D+S = 0 + (15)(20, 000) = $3, 000, 000 WACC= wd rd(1-T) + wcers = 0 +(1. 0)(10%) = 10% With financial leverage, then WACC = wd rd(1-T) + wcers = (0. 3)(7%)(1-0. 40) + (0. 7)(11%) = 8. 96% V = FCF/WACC = (EBIT) (1 ? T)/WACC = ($500, 000)(1-0. 15)/ 0. 0896 = $3, 398, 214. 29 b) Price of Rivoli’s stock is $16. 74 S = (1-wD)V = . 70($3, 398, 214. 29) = $2, 343, 750 P = (S + (D – D0))/n0 = ($2, 343, 750 + ((. 30*$3, 398, 214. 29) – 0)/200, 000 = $16. 74 c) After recapitalization, the earnings per share increased by

$0. 342 N = 200, 000 – ((. 30*$3, 398, 214. 29)/$16. 74 = 60, 000. 56 shares repurchased EPS = ((EBIT – Interest)*(1-T))/n0 = (($500, 000 – 0)*(1-0. 40))/200, 000 shares = $1. 50 With financial leverage, EPS = ((EBIT – Interest)*(1-T))/n0 = (($500, 000 – . 70($1, 004, 464. 29))*(1-0. 40))/(200, 000 – 60, 000 shares) = $1. 842 EPSfinal = EPS1 – EPS0 = $1. 842 – $1. 50 = $0. 342 d) TIE = EBIT/I Probability 10%: TIE = (100, 000)/70, 312. 5 = (1. 42) Probability 20%: TIE = 200, 000/70, 312. 5 = 2. 84 Probability 40%: TIE = 500, 000/70, 312. 5 = 7. 11 Probability 20%: TIE = 800, 000/70, 312. 5 = 11. 38 Probability 10%: TIE = 1, 100, 000/70, 312. 5 = 15. 64

Problem 23-3: Futures PV = 1. 005*$1000 = $1005 N = 40 PV = -1005 PMT= 30 FV = 1000 N = 40 I = 6. 9569/2 PMT = 30 FV = 1000 I = 2. 9784% * 2 = 5. 9569% PV = $897. 4842 * 100BONDS = $89, 748. 42 Problem 23-4: Swaps Carter: issue floating rate debt and then swaps (LIBOR + 2%) + 7. 95% – LIBOR = 9. 95%; since 9. 95% is less than the fixed rate debt of 10%, then the swap is a better choice. Brence: issue floating rate debt and then swap (LIBOR + 3. 1%) + 7. 95% – 11% = – LIBOR + 3. 05%; since LIBOR + 3. 05% is less than the fixed rate debt of (LIBOR 3. 1%), then the swap is a better choice.

Problem 20-3: New Stock Issue a) EPS2010 = $1, 200, 000/100 shares = $12, 000 EPS2005 = $816, 000/100 shares = $8, 160 DPS2010 = $600, 000/100 shares = $6, 000 DPS2005 = $420, 000/100 shares = $4, 200 BPS2010 = $9, 000, 000/100 shares = $9, 000 b) gEPSK = 5v(EPS2010/ EPS2005) – 1 = 5v($4. 50/ $3. 00) – 1 = 0. 084 8. 4% gEPSS = 5v(EPS2010/ EPS2005) – 1 = 5v($7. 50/$5. 50) – 1 = 0. 064 6. 4% gEPSE = 5v(EPS2010/ EPS2005) – 1 = 5v($12, 000/$8, 160) – 1 = 0. 080 8. 0% gDPSK =

5v(DPS2010/ DPS2005) – 1 = 5v($2. 25/ $1. 50) – 1 = 0. 084 8. 4% gDPSS = 5v(DPS2010/ DPS2005) – 1 = 5v($3. 5/$2. 75) – 1 = 0. 064 6. 4% gDPSE = 5v(DPS2010/ DPS2005) – 1 = 5v($6, 000/$4, 200) – 1 = 0. 074 7. 4% c) In the range of $25 – $100 per share, the Edelman stock wouldn’t sell because the number of outstanding shares shows its EPS, DPS, and BPS growth rates are inflated in comparison to the Kennedy and Strasburg stocks d) Edelman should split the stock to obtain EPS, DPS, and BPS values closer to those of Kennedy and Strasburg; in addition, this will also bring stock price in a more reasonable range ($25 – $100 range) e) EPS2010 = $1, 200, 000/400, 000 shares = $3 EPS2005 = $2. 4 DPS2010 = $600, 000/400, 000 shares = $1. 50 DPS2005 = $1. 05 BPS2010 = $9, 000, 000/400, 000 shares = $22. 50 f) ROEK = EPS/BPS = $4. 50/$30 = 0. 15 15% ROES = EPS/BPS = $7. 50/$55 = 0. 136 13. 6% ROEE = EPS/BPS = $3/$22. 50 = 0. 133 13. 3% g) For Kennedy: DivPR2010 = DivPS/EPS = 2. 25/4. 5 = 0. 50 50% DivPR2005 = DivPS/EPS = 1. 5/3 = 0. 50 50% For Strasburg: DivPR2010 = DivPS/EPS = 3. 75/7. 50 = 0. 50 DivPR2005 = DivPS/EPS = 2. 75/5. 50 = 0. 50 50% 50% For Edelman: DivPR2010 = DivPS/EPS = 12, 000/6, 000 = 0. 0 50% DivPR2005 = DivPS/EPS = 8, 160/4, 200 = 0. 51 51% h) For Kennedy: Debt/total assets ratio = 12million/28million = 0. 43 For Strasburg: Debt/total assets ratio = 30million/82million = 0. 37 For Edelman: Debt/total assets ratio = 11million/20million = 0. 55 i) For Kennedy: P/E ratio = 36/4. 50 = 8 For Strasburg: P/E ratio = 65/7. 50 = 8. 67 These P/E aren’t consistent with g and ROE; factors that could have affected these ratios might be the debt ratios and the number of outstanding shares j) Edelman’s price based on Kennedy data: 43% 37% 55%

EPSe = (P/Ek)(EPSe) = 8*3 = $24 DivPSe = (P/Divk)(DivPSe) = (36/2. 25)*1. 5 = $12 BPSe = (P/BPSk)(BPSe) = (36/30)*22. 5 = $27 Edelman's price based on Strasburg data: EPSe = (P/Es)(EPSe) = 8. 67*3 = $26. 01 DivPSe = (P/Divs)(DivPSe) = (65/3. 75)*1. 5 = $26 BPSe = (P/BPSs)(BPSe) = (65/55)*22. 5 = $26. 55 k) Kennedy: rhat = D0(1+g)/P0 +g = 2. 25(1. 084)/36 + 8. 4% = 15. 18% Strasburg: rhat = D0(1+g)/P0 +g = 3. 75(1. 064)/65 + 6. 4% = 12. 54% Constant growth stock price model based on Kennedy: P0 = P1/r-g = 1. 5(1. 077)/(. 152-. 777) = $21. 54 Constant growth stock price model based on Strasburg: P0 = P1/r-g = 1. 5(1. 077)/(. 125-. 0777) = $33. 66 l) Edelman's stock price range should be between $21. 54 and $33. 66 a share. Since Edelman has a high debt ratio, I would suggest the stock price should start either at or a little below the lowest price of $21. 54. Problem 20-4: Refunding Analysis a) Total dollar call premium = 0. 11($40, 000, 000) = $4, 400, 000. Since this is tax-deductible, then the after-tax cost is $4, 400, 000(1 – T) = $4, 400, 000(0. 0) = $2, 640, 000. b) The dollar flotation cost on the new issue is 0. 04($40, 000, 000) = $1, 600, 000. Since this cost is not immediately tax deductible, then the after-tax cost is also $1, 600, 000. c) The flotation costs on the old issue were 0. 06($40, 000, 000) = $2, 400, 000. Since the bonds were issued 5 years ago, (5/25)($2, 400, 000) = $480, 000 of the flotation costs have already been expensed, and (20/25)($2, 400, 000) = $1, 920, 000 remain unexpensed. tax savings: T($1, 920, 000) = 0. 40($1, 920, 000) = $768, 000.) The net after-tax cash outlay is $3, 472, 000 Old issue call premium $2, 640, 000 New issue flotation cost 1, 600, 000 Tax savings on old issue flotation costs (768, 000) Net cash outlay $3, 472, 000 e) new issue flotation costs amortized over the 20-year life: $1, 600, 000/20 = $80, 000/yr or $40, 000/6 months tax

savings: (0. 40)$40, 000 = $16, 000 per semiannual period. Forgone semiannual cost: $2, 400, 000/25 = $96, 000/yr or $48, 000/6 months tax savings: 0. 40($48, 000) = $19, 200 f) The interest on the old issue is 0. 11($40, 000, 000) = $4, 400, 000/yr After-tax amount is 0. 3($4, 400, 000) = $1, 320, 000. annual interest with coupon rate: 0. 8($40, 000, 000) = $3, 200, 000 after-tax cost: 0. 3($1, 600, 000) = $960, 000. after-tax net interest savings with refunding: $1, 320, 000 – $960, 000 = $360, 000 semiannually. g) The net amortization tax effects are -$3, 200 per year for 20 years, while the net interest savings are $360, 000 per year for 20 years. Semiannual tax savings on new flotation: $16, 000 Tax benefits lost on old flotation: (19, 200) Net amortization tax effects ($ 3, 200) Semiannual interest on old bond: $1, 320, 000 Semiannual interest on new bond: (960, 000) Net interest savings $ 360, 000 Semiannual cash flow: $ 356, 800 Input N = 40, I = 2. , PMT = -356800, FV = 0, PV = ? PV = $9, 109, 413. h) NPV of refunding is $5, 637, 413 PV of net benefits $9, 109, 413 Cost (3, 472, 000) Refunding NPV $5, 637, 413 Problem 18-3: Balance Sheet Effects a) Balance sheets for both firms after the assets increase Energen Current Assets $25, 000 Fixed Assets 175, 000 Total Assets $200, 000 Debt $100, 000 Equity 100, 000 Total claims $200, 000 Debt/assets ratio = $100, 000/$200, 000 = 50%. Hastings Corporation Current Assets $25, 000 Fixed Assets 125, 000 Total Assets $150, 000 Debt $50, 000 Equity 100, 000 Total claims $150, 000 Debt/assets ratio = $50, 000/$150, 000 = 33%.) Balance sheet after lease is capitalized: Hastings Corporation Current Assets $25, 000 Value of leased asset 50, 000 Fixed Assets 125, 000 Total Assets $200, 000 Debt $50, 000 Present value of lease payments 50, 000 Equity 100, 000 Total claims $200, 000 Debt/assets ratio = $100, 000/$200, 000 = 50%. Problem 18-4: Lease vs. Buy Buy

machinery: 0 * After-tax loan payments ** 1 ($135, 000) $198, 000 2 3 ($135, 000) ($135, 000) $270, 000 $90, 000 4 ($1, 635, 000) $42, 000 $250, 000 ($100, 000) ($1, 443, 000) Depr. tax savings Residual value Tax on residual Net cash flow $63, 000 $135, 000 ($45, 000)

PV cost of owning at 9% ($885, 580. 87) *After-tax interest payments = (0. 15)($1, 500, 000)(1-0. 40) = $135, 000. ** Depreciation tax savings, base on MACRS 3-year life and $1, 500, 000 cost of new machinery:. MACRS Depreciated Tax Savings Year Allowance Factor Depreciation T (Depreciation) 1 0. 33 $495, 000 $198, 000 2 0. 45 675, 000 270, 000 3 0. 15 225, 000 90, 000 4 0. 07 105, 000 42, 000 Lease machinery: 0 Lease payment (AT) Net cash flow 1 (240, 000) (240, 000) 2 (240, 000) (240, 000) 3 (240, 000) (240, 000) 4 (240, 000) (240, 000) PV cost of leasing at 9% ($777, 532. 77) Net advantage to leasing (NAL) PV cost of owning – PV cost of leasing = $885, 580. 87- $777, 532. 77 = $108, 048. 10 therefore, Big Sky Mining should lease the equipment Problem 21-1: Valuation = r + RP (b) r sL RF M = 5% + 6%(1. 4) = 13. 4% WACC = w r (1-T) + w r d d s s = 0. 30(8%) (0. 60) + 0. 70(13. 4%) = 10. 82% V ops = FCF0(1+g)/ (WACC – g) = $2. 1million/(0. 1082-. 05) = $36. 08 million V S = V ops – debt = 36. 08million – 10. 82million = $25. 26 million Price = vs/shares = 25. 26 million / 1 million shares = $25. 26 / share Problem 21-2: Merger Valuation r = r + RP (b) sL RF M = 5% + 6%(1. 4) = 13. 4% r sU = w r +wr d d sL = 0. 30(8%) + 0. 70(13. 4%) = 11. 78% Tax shields: TS = TS = TS 1 2 3 = Interest x T = $1, 500, 000(0. 40) = $600, 000 TS = $1, 472, 000 (0. 40) = $588, 800 4 Tax shield horizon value = TS (1+g)/(r -g) 4 sU = 0. 5888 (1. 05)/(0. 1178-0. 05) = 9. 12 Value of tax shields = 0. 600/1. 1178+0. 600/1. 11782+0. 600/1. 11783+(0.

588+9. 12)/1. 11784 = $7. 67 million = FCF (1+g)/(r -g) 4 sU Unlevered horizon value = 3. 57(1. 05)/(0. 1178-0. 05) = 55. 29 Unlevered Vops = 2. 5/1. 1178+2. 9/1. 11782+3. 4/1. 11783+(3. 57+55. 29)/1. 11784 = $44. 69 = unlevered Vops + value of tax shields = 44. 69 + 7. 67 = 52. 6 million = V ops Value of operations Equity value to Harrison – Debt = 52. 36 million – 10. 82 million = $41. 54 million/1 million shares = $41. 54/share Problem 21-5: Merger Analysis a) current cost of equity r = 6% + 1. 3(4. 5%) sL = 11. 85% r = w r +wr sU d d s sL = 0. 25(9%) + 0. 75 (11. 85%) = 11. 14% Tax Yr 5 Interest = Debt (9. 5%) = $22. 27 (9. 5%) = 2. 116 TS = Interest(Tax rate) = 2. 116(0. 35%) = 0. 7405 Tax Yr 1 TS = 1. 2(0. 35) = 0. 42 Tax Yr 2 TS = 0. 595 Tax Yr 3 TS = 0. 98 Tax Yr 4 TS = 0. 735 4 HVTS = TS /(r – g) = TS (1 + g)/(r – g) 5 6 sU 5 sU = 0. 7405(1. 06)/(0. 1114 – 0. 6) = $15. 28 million value of the tax shields = 0. 42/1. 1114+0. 595/1. 11142+0. 980/1. 11143+0. 735/1. 11144+(0. 741+15. 28)/1. 11145 = $11. 50 million unlevered horizon value HVUL = FCF (1+g)/(r – g) 5 5 sU = 2. 12(1. 06)/(0. 1115-0. 06) = $43. 74 million unlevered value of operations = 1. 3/1. 1114+1. 5/1. 11142+1. 75/1. 11143+2/1. 11144+(2. 12+43. 74)/1. 11145 = $32. 02million b) value of operations = 11. 50 + 32. 02 = $43. 52 million value of equity = 43. 52 – 10. 00 = $33. 52 million Problem 17-2: Interest Rate Parity ft/e0 = (1+rh)/ (1+rf) ft/$0. 009 = (1+(. 07/2))/ (1+(. 055/2)) = $0. 00907 ft Problem 17-3: Purchasing Power Parity Ph = Pf(e0) $500 = 550 euros(e0) e0 = $0. 9091 Problem 17-10: Results of Exchange Rate Changes a) The price of the automobile has increased because the dollar has declined in value to the yen. b) Dollar price of car is $18, 148. 15 Today’s price = 245/108*$8000 = $18, 148. 15 Problem 17-11: Spot and Forward Rates a) Price of watchesspot rate = 1million francs * 1. 6590 = $1, 659, 000 b) Price of watchesspot rate

90f = 1million francs * 1. 6460 = $1, 646, 000 c) With the exchange rate,

price of watches = 1million francs/. 500 francs * $1 = $2million