



# Concordia SOLUTIONS

FALL 2015  
BLUE VERSION

LAST NAME →		FIRST NAME →		ID NUMBER →
COURSE COMM	NUMBER 308/2		SECTIONS → (Circle your section) A, AA, B, BB, C, D, F	
EXAMINATION FINAL VERSION BLUE	DATE December 12, 2015	TIME 14:00 – 17:00 (3 Hours)	# OF PAGES = 11 Including this cover	
INSTRUCTOR → (Circle your Instructor's name) H. Ghanbari, S. Kolahgar, M. Mohebshahedin, I. Rakita, J. Slater, M. Wahhab			DIVISION JOHN MOLSON SCHOOL OF BUSINESS	

## INSTRUCTIONS:

- **PRINT YOUR NAME and I.D. #** in the space provided above. **PRINT and MARK (FILL IN THE CIRCLES) IN PENCIL** your NAME and ID# on the computer answer (scantron) sheet. If you fail to follow these instructions, marks may be deducted.
- Students with a seven digit ID should add "2" in front to make it an eight digit ID. (eg. 1234567 becomes 21234567).
- Circle your section and Instructor's name in the space above.
- **PART I:** Your responses to **PART I (multiple choice questions)** MUST be marked in **PENCIL** on the computer answer sheet. **ONLY THE RESPONSES MARKED ON THIS SHEET WILL BE GRADED. IF YOU DO NOT FILL IN THE ANSWERS ON THE SCANTRON SHEET, A SCORE OF ZERO IS AWARDED.** There are no part marks. Questions with no answer or multiple answers will not receive credit. You can use the examination itself for any rough work.
- **PART II:** Qualitative questions – point form is acceptable.
- **PART II:** Quantitative questions – **SHOW ALL YOUR CALCULATIONS** to ensure that you receive full/proper credit. If you use a financial calculator, be sure to show the formula and the inputs used.
- **PART II:** All answers must be recorded in **INK** on the exam paper itself. Please do not use red ink. If you are using the back of the exam for your answers, please label it clearly.
- **ONLY non-programmable, non-text, no-tape, noiseless calculators are permitted.** Financial calculators are permitted. ENCS sticker not required. Handheld devices capable of storing text and having calculator functionality (eg. Palm) are **not permitted**. Programmable and graphical calculators are **not permitted**.
- Your calculator cover and calculator user guide are **NOT** permitted.
- **YOUR CELL PHONE MUST BE TURNED OFF AND MUST NOT BE WITH YOU AT YOUR EXAM SEAT.**
- **NO DICTIONARIES** of any kind are permitted.
- **NO SCRAP PAPER** is permitted.
- This exam consists of a 2 page formula sheet, 32 MC questions in part I, and 2 questions in part II. There are 11 pages including the cover page. You should have a **BLUE** scantron sheet. Ensure that you have a complete exam before starting.
- The time allotted for this exam is 3 hours. **YOU WILL NOT GET ANY EXTRA TIME TO FILL IN YOUR SCANTRON SHEET AT THE END OF THE EXAM**
- Put your scantron sheet inside your exam when submitting the exam to the invigilator. Verify that your name and ID are on the cover page and the computer answer sheet (with the circles filled in).
- **THE EXAMINATION PAPER AND SCANTRON SHEET MUST BE RETURNED and NOT TAKEN FROM EXAMINATION ROOM NOR MUTILATED IN ANY MANNER. DO NOT RIP OUT THE FORMULA SHEETS.**

**GOOD LUCK!**

## SCORES (FOR INTERNAL USE ONLY)

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PART I MC	PART II		TOTAL
	Numerical and Short Answer Questions		
	Question 1	Question 2	
(Max = 80 Marks)	(Max = 10 Marks)	(Max = 10 Marks)	(Max = 100 Marks)

$$PV \times (1+r)^t = FV_t \quad [5.3]$$

$$PV_0 = \frac{FV_t}{(1+r)^t}$$

$$\text{Annuity present value} = \frac{C}{r} \times (1 - \text{Present value factor}) = \frac{C}{r} \times \left\{ 1 - \frac{1}{(1+r)^t} \right\} \quad [6.1]$$

$$\text{Annuity FV factor} = (\text{Future value factor} - 1) / r = \left( \frac{(1+r)^t - 1}{r} \right) \quad [6.2]$$

$$\text{Annuity due value} = \text{Ordinary annuity value} \times (1+r) \quad [6.3]$$

$$\text{Perpetuity present value} \times \text{Rate} = \text{Cash flow} \quad [6.4]$$

$$PV \times r = C$$

$$\text{Annuity present value factor} = \frac{1}{r} \times (1 - \text{Present value factor}) \quad [6.5]$$

$$PV = \frac{C}{r-g} \quad [6.6]$$

$$PV = \frac{C}{r-g} \left[ 1 - \left( \frac{1+g}{1+r} \right)^t \right] \quad [6.7]$$

$$EAR = \left( 1 + \frac{QR}{m} \right)^m - 1 \quad [6.8]$$

$$EAR = e^r - 1 \quad [6.9]$$

$$1+R = (1+r) \times (1+h) \quad [7.2]$$

$$R \approx r + h \quad [7.4]$$

$$r = (D_1/P_0) + g \quad [8.5]$$

$$PV \text{ tax shield on CCA} = \frac{[IdT^c]}{d+k} \times \frac{[1+.5k]}{1+k} - \frac{S_0 d T^c}{d+k} \times \frac{1}{(1+k)^n} \quad [10.5]$$

$$\text{Total dollar return} = \text{Dividend income} + \text{Capital gain (or loss)} \quad [12.1]$$

$$\text{Var}(R) = \left( \frac{1}{(T-1)} \right) \times \left[ (R_1 - \bar{R})^2 + \dots + (R_T - \bar{R})^2 \right] \quad [12.3]$$

$$\text{Geometric average return} = [(1+R_1) \times (1+R_2) \times \dots \times (1+R_T)]^{1/T} - 1 \quad [12.4]$$

$$\text{Risk premium} = \text{Expected return} - \text{Risk-free rate} = E(R_U) - R_f \quad [13.1]$$

$$E(R) = \sum_j R_j \times P_j \quad [13.2]$$

$$\sigma^2 = \sum_j [R_j - E(R)]^2 \times P_j \quad [13.3]$$

$$\sigma = \sqrt{\sigma^2}$$

$$E(R_p) = x_1 \times E(R_1) + x_2 \times E(R_2) + \dots + x_n \times E(R_n) \quad [13.4]$$

$$\text{Covariance of returns: } COV_{L,U} = \sum_{i=1}^n \text{Prob}_i (r_{L,i} - E(r_L)) (r_{U,i} - E(r_U))$$

$$\sigma_p^2 = x_L^2 \sigma_L^2 + x_U^2 \sigma_U^2 + 2x_L x_U \text{CORR}_{L,U} \sigma_L \sigma_U \quad [13.5]$$

$$\sigma_p = \sqrt{\sigma_p^2}$$

$$\text{Covariance}_{L,U} = \text{CORR}_{L,U} \sigma_L \sigma_U \quad [13.6]$$

$$\text{Total return} = \text{Expected return} + \text{Unexpected return} \rightarrow R = E(R) + U$$

$$\text{Announcement} = \text{Expected part} + \text{Surprise} \quad [13.7]$$

$$R = E(R) + \text{Systematic portion} + \text{Unsystematic portion} \quad [13.8]$$

$$\text{Total risk} = \text{Systematic risk} + \text{Unsystematic risk} \quad [13.9]$$

$$E(R_i) = R_f + [E(R_M) - R_f] \times \beta_i \quad [13.10]$$

$$\beta_2 = \frac{\text{COV}(R_2, R_M)}{\sigma^2(R_M)} \quad [13A.4]$$

$$R_E = R_f + \beta_E \times [R_M - R_f] \quad [14.2]$$

$$\text{WACC} = \left(\frac{E}{V}\right) \times R_E + \left(\frac{P}{V}\right) \times R_P + \left(\frac{D}{V}\right) \times R_D \times (1 - T_C) \quad [14.6]$$

$$C_1 = 0 \text{ if } (S_1 - E) \leq 0 \quad [25.1]$$

$$C_1 = S_1 - E \text{ if } (S_1 - E) > 0 \quad [25.2]$$

$$C_0 \geq 0 \text{ if } S_0 - E < 0 \quad [25.4]$$

$$C_0 \geq S_0 - E \text{ if } S_0 - E \geq 0$$

**PART I – MC QUESTIONS (80 MARKS)** Part I consists of 32 multiple choice questions. Put your response on the computer answer sheet using PENCIL – ONLY these answers will be graded. Each correct response is worth 2.5 marks.

1. You hold three stocks in your portfolio: X, Y, and Z. The portfolio beta is 1.50. Stock Y comprises 20% of the dollar value of your holdings and has a beta of 1.0. If you sell all of your investment in Y and invest the proceeds in the risk-free asset, your new portfolio beta will be:

A. 1.025  
B. 1.200  
C. 1.300  
D. 1.625  
E. 1.850

$$\beta_P = 1.5 = 0.20(1) + 0.80(\beta_{Y+Z})$$

$$\beta_{Y+Z} = 1.625$$

$$\beta_{P(\text{new})} = 0.20(0) + 0.80(1.625) = \underline{\underline{1.30}}$$

2. A firm purchases Class 8 equipment for \$1,000,000 (CCA Rate 30%) for a 10 year project. What will be the CCA tax shield in year 3? The tax rate is 35%.

A. \$51,450  
B. \$52,500  
C. \$62,475  
D. \$89,250  
E. \$178,500

$$\text{CCA TS yr 3} = (\$1M)(0.85)(0.70)(0.30)(0.35) = \underline{\underline{\$62,475}}$$

3. You purchase a bond with a coupon rate of 4.8%, and a clean price of \$1,073. If the next semi-annual coupon payment is due in one month, what is the invoice price?

A. \$1,073  
B. \$1,077  
C. \$1,093  
D. \$1,113  
E. None of the above is correct.

$$IP = \$1,073 + \left(\frac{5}{6}\right)\left(\frac{\$48}{2}\right) = \underline{\underline{\$1,093}}$$

4. Eaton Inc. invested \$1.325 million in a project that earned an 8.25% rate of return. Eaton sold their investment for \$3,713,459. How much sooner could Eaton have sold if they only wanted \$2 million from the project? Assume the firm still earned 8.25%.

A. 2.69 years  
B. 5.17 years  
C. 6.67 years  
D. 7.81 years  
E. None of the above is correct.

$$\Delta T = \left\{ \frac{\log\left(\frac{3,713,459}{1,325,000}\right)}{\log(1.0825)} \right\} - \left\{ \frac{\log\left(\frac{2,000,000}{1,325,000}\right)}{\log(1.0825)} \right\} = \frac{\log\left(\frac{3,713,459}{2,000,000}\right)}{\log(1.0825)} = \underline{\underline{7.81 \text{ yrs}}}$$

5. Security A has an expected return of 12% and a standard deviation of 15%. Security B has an expected return of 10% and a standard deviation of 9%. The correlation between A and B is 0.70. If you invest 30% in A and the rest in B, what is the standard deviation of your portfolio?

A. 1.00%  
B. 9.98%  
C. 10.80%  
D. 11.00%  
E. 12.00%

$$\sigma_P = \left\{ (0.3^2)(0.15^2) + (0.7^2)(0.09^2) + 2(0.3)(0.7)(0.7)(0.15)(0.09) \right\}^{1/2}$$

$$= \underline{\underline{0.0998 \text{ (9.98\%)}}}$$

6. You hold \$25,000 in Treasury Bills with your broker. You ask him to short 1,000 shares of Bomb-Bar-Day, and the stock's current market price is \$50. Your broker has a short sale maintenance margin of 30%. You will get a margin call if the stock:
- A. Rises above \$50.00  
 B. Rises above \$57.69  
 C. Rises above \$65.00  
 D. Falls below \$35.00  
 E. Falls below \$50.00

$$MR = \frac{EQ}{Value} = 0.30 = \frac{75,000 - 1,000P}{1,000P}$$

$$P = \$57.6933$$

7. You are paying an effective annual rate of 17% on your credit card. The interest is compounded monthly. What is the annual percentage rate on your account?
- A. 15.8%  
 B. 17.9%  
 C. 18.4%  
 D. 18.5%  
 E. None of the above is correct.

$$\left(1 + \frac{APR}{12}\right)^{12} = 1.17$$

$$APR = \underline{\underline{0.1580 \text{ (15.80\%)}}}$$

8. Black Kat Inc. is expecting a period of intense growth, so it has decided to retain more of its earnings to help finance that growth. As a result it is going to reduce its annual dividend by 10% a year for the next three years. After that it will maintain a constant dividend of \$0.75 a share. The company just paid a dividend of \$1.80 per share. What is the market value of this stock if the required rate of return is 13%?
- A. \$6.79  
 B. \$7.22  
 C. \$7.48  
 D. \$8.87  
 E. None of the above is correct.

$$P_0 = \left\{ \frac{1.80(0.90)}{0.13 - (-0.10)} \right\} \left\{ 1 - \left( \frac{0.90}{1.13} \right)^3 \right\} + \left( \frac{0.75}{0.13} \right) \left( \frac{1}{1.13} \right)^3 = \underline{\underline{\$7.4833}}$$

9. Your job pays you at the end of the year and today, December 31, you just received your salary of \$50,000 and you plan to spend all of it. However, you want to start saving for retirement beginning next year. You have decided that one year from today you will begin depositing 5% of your annual salary in an account that will earn 11% per year. Your salary will increase 4% per year throughout your career. How much money will you have when you retire 40 years from today?
- A. \$34,399  
 B. \$2,149,995  
 C. \$2,235,994  
 D. \$2,325,434  
 E. None of the above is correct.

$$FV_{40} = \left\{ \frac{50,000(1.04)(0.05)}{0.11 - 0.04} \right\} \left\{ 1 - \left( \frac{1.04}{1.11} \right)^{40} \right\} (1.11)^{40} = \underline{\underline{\$2,235,994.3052}}$$

10. A stock has year-end prices and dividends as below. What is the geometric average return?

Year	1	2	3	4
Price	\$60.18	\$73.66	\$94.18	\$89.35
Dividend	-	\$0.60	\$0.64	\$0.72

- A. 14.08%  
 B. 14.96%  
 C. 15.04%  
 D. 15.92%  
 E. None of the above is correct.

$$ROR_2 = \frac{73.66 - 60.18 + 0.60}{60.18} = 0.2340$$

$$ROR_3 = \frac{94.18 - 73.66 + 0.64}{73.66} = 0.2873$$

$$ROR_4 = \frac{89.35 - 94.18 + 0.72}{94.18} = -0.0436$$

$$\bar{R}_{geom} = \left[ (1.2340)(1.2873)(0.9564) \right]^{1/3} - 1$$

$$= \underline{\underline{0.1496 \text{ (14.96\%)}}}$$

11. Sandy Claws is a JMSB student who is financing his education with a student loan. Suppose Sandy owes \$20,000 when he graduates. His loan has an interest rate of 6% with equal monthly payments over 10 years. Which of the following is correct?

- I. The monthly payment is \$166.67  $\times$   
 II. The interest paid over the life of the loan is approximately \$6,645  $\checkmark$   
 III. The EAR on this loan is 6.17%  $\checkmark$
- A. Only I is correct  
 B. Only III is correct  
 C. Only I and III are correct  
 D. Only II and III are correct  
 E. All of I, II, and III are correct

$$20,000 = C \left\{ \frac{1 - \frac{1}{(1 + \frac{0.06}{12})^{120}}}{(0.06/12)} \right\}$$

$$C = \$222.0410$$

$$Int = (222.0410)(120) - 20,000 = \$6,644.9205$$

$$EAR = \left(1 + \frac{0.06}{12}\right)^{12} - 1 = 0.0617 (6.17\%)$$

12. Billy Gates Industries issues bonds with a 6% coupon rate and \$1,000 face value. Interest is paid semi-annually and the bond has 20 years to maturity. However, the bond does not pay the first two coupon payments and instead makes these payments at maturity. If investors require an 8% return, what is the bond's value?

- A. \$757.99  
 B. \$802.07  
 C. \$803.64  
 D. \$814.57  
 E. None of the above is correct.

$$B_0 = 30 \left\{ \frac{1 - \frac{1}{(1.04)^{40}}}{0.04} \right\} + (1,000 + 30 + 30) \left\{ \frac{1}{(1.04)^{40}} \right\} - 30 \left\{ \frac{1 - \frac{1}{(1.04)^2}}{0.04} \right\} = \$757.99$$

13. Calculate the expected return on the following portfolio.

Stock	(1) Return	(2) #Shares	(3) Stock Price	(4) $MV = (2)(3)$	(5) $W_i = \frac{MV_i}{\sum MV}$	(6) $E(R_p) = \sum E(R_i)(W_i)$
A	11%	300	\$22	300 (22) = 6,600	6,600 / 19,100 = 0.3455	0.11 (0.3455) = 0.0380
B	16%	100	\$65	100 (65) = 6,500	6,500 / 19,100 = 0.3403	0.16 (0.3403) = 0.0545
C	7%	400	\$15	400 (15) = 6,000	6,000 / 19,100 = 0.3141	0.07 (0.3141) = 0.0220
			$\Sigma$	\$19,100	$\approx 1$	$E(R_p) = 0.1145 (11.45\%)$

A. 9.63%  
 B. 9.91%  
 C. 10.08%  
 D. 10.62%  
 E. 11.45%

14. Suppose you have the following information on two stocks. Laurel Inc. has a beta of 1.8 and an E(R) of 22%. Hardy Inc. has a beta of 1.6 and an E(R) of 20.44%. What would the risk free rate have to be for these stocks to be correctly priced according to the CAPM?

- A. 7.00%  
 B. 7.96%  
 C. 8.00%  
 D. 8.96%  
 E. 9.00%

$$\frac{0.22 - R_f}{1.8} = \frac{0.2044 - R_f}{1.6}$$

$$R_f = 0.0796 (7.96\%)$$

15. Suppose that Ziggy Industries has a cost of equity of 14% and a before tax cost of debt of 9%. If the target debt/equity ratio is 75%, and the tax rate is 34%, what is Ziggy's weighted average cost of capital (WACC)?

- A. 7.96%  
 B. 9.31%  
 C. 10.25%  
 D. 10.55%  
 E. 11.86%

$$WACC = 0.14 \left( \frac{1}{1.75} \right) + 0.09 (1 - 0.34) \left( \frac{0.75}{1.75} \right) = 0.1055 (10.55\%)$$

Use this information to answer the following three questions.

Strike (\$)	Expiration	Call Volume	Call Price (\$)	Put Volume	Put Price (\$)
45	Oct	91	2.80	59	0.80
45	Nov	59	4.30	54	2.30
47.50	Oct	80	1.00	22	3.12
47.50	Nov	42	2.30	20	5.25
50	Oct	28	0.30	15	7.12
50	Nov	23	2.00	12	9.00

16. You want to purchase one October \$45 call contract. The option contract will cost you:
- A. \$30.00  
 B. \$100.00  
 C. \$280.00  
 D. \$430.00  
 E. \$900.00
- Call Prem =  $\$2.80 (100) = \underline{\underline{\$280}}$
17. Suppose you bought 10 Nov \$50 put contracts. Just before the option expires, the stock is selling for \$55. What is your net profit (or loss)? Ignore commissions.
- A. -\$14,000.00  
 B. -\$9,000.00  
 C. -\$2,200.00  
 D. \$1,200.00  
 E. \$16,312.50
- $$\pi = (\$50 - \$55)(10)(100) - \$9(10)(100)$$

$$= \emptyset - 9,000$$

$$= \underline{\underline{-\$9,000}}$$
18. Assuming the stock price is \$46.25, which of the options shown in the quote are in-the-money?
- I. The October \$45 call ✓  
 II. The November \$50 call ✗  
 III. The October \$45 put ✗  
 IV. The November \$47 1/2 put ✓
- A. I and II only  
 B. I and III only  
 C. I and IV only  
 D. II and III only  
 E. III and IV only
19. Which of the following is implied by the evidence regarding market efficiency?
- A. There is a simple way to identify mispriced stocks when they exist. ✗  
 B. Prices in well-organized capital markets are unfair. ✗  
 C. Prices don't respond rapidly to new information. ✗  
 D. Insiders cannot make money from their private information. ✗  
 E. It is difficult to predict future price movements based on public information. ✓
20. Lark Inc. currently has 400,000 shares of stock outstanding, with a market price of \$20 and a book value of \$2. The firm would prefer to have its stock trade at a value between \$29 and \$35 per share. Of the following choices, which would allow the firm to achieve its objective?
- A. 50% stock dividend ✗  
 B. 2-for-1 stock split ✗  
 C. 1-for-2 reverse stock split ✗  
 D. 2-for-3 reverse stock split ✓  
 E. \$2 per share cash dividend ✗
- (A)  $20 (1/1.5) = \$13.33$  ✗  
 (B)  $20 (1/2) = \$10.00$  ✗  
 (C)  $20 (2/1) = \$40.00$  ✗  
 (D)  $20 (3/2) = \$30.00$  ✓  
 (E) ✗



21. Risk that affects at most a small number of assets is called:

- A. Portfolio risk.  $\times$
- B. Undiversifiable risk.  $\times$
- C. Market risk.  $\times$
- ☒ D. Unsystematic risk.  $\checkmark$  not sys. related to mkt.
- E. Total risk.  $\times$

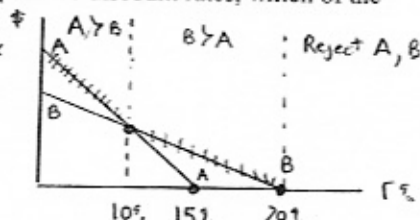
22. A firm currently has a debt-equity ratio of 0.75, an after-tax cost of debt of 4%, and a cost of equity of 14%. The firm changes its debt-equity ratio to 0.50, all else constant. This change will:

- A. Decrease the firm's WACC.  $\times$
- B. Increase the cost of equity financing.  $\times$
- C. Increase the total debt level of the firm.  $\times$
- D. Not affect the firm's capital budgeting decisions.  $\times$
- ☒ E. Cause the NPV of projects under consideration to decrease.  $\checkmark$

$$\text{WACC} \uparrow \Rightarrow \text{NPV} \downarrow$$

23. Suppose Movember Shaving Supplies Inc. has two mutually exclusive projects. The IRR of project A is 15% and of project B is 20%. The NPV of project A equals that of project B at a 10% discount rate. Assuming positive discount rates, which of the following is correct?

- A. The firm will always prefer project B over A because B's IRR is higher than that of A.  $\times$
- B. The firm will always accept both projects as their IRRs are both greater than 10%.  $\times$
- C. The firm will always prefer project B over A for discount rates less than 15%.  $\times$
- ☒ D. The firm will always prefer project A over B for discount rates less than 10%.  $\checkmark$
- E. The firm will always accept project B for discount rates greater than 10%.  $\times$



24. You have \$1,000 that you would like to invest. You have two choices: Savings account A which earns 9% compounded annually, or savings account B which earns 8.75% compounded semi-annually. Which would you choose and why?

- A. B because it has the higher quoted rate.  $\times$
- B. B because the future value in one year is lower.  $\times$
- C. B because it has a higher effective annual rate.  $\times$
- D. A because the future value in one year is lower.  $\times$
- ☒ E. A because it has a higher effective annual rate.  $\checkmark$

$$\text{EAR}(A) = (1.09)^1 - 1 = 0.09 \quad (9\%)$$

$$\text{EAR}(B) = \left(1 + \frac{0.0875}{2}\right)^2 - 1 = 0.0894 \quad (8.94\%)$$

$$\text{EAR}(A) > \text{EAR}(B)$$

25. On January 2, the board of directors of ABBA Inc. declared a dividend of \$0.75 per share payable on Monday, January 28 to shareholders of record as of Monday, January 14. If you bought 500 shares of ABBA stock on Friday, January 4 for \$7.50 per share, how much will you receive in dividends?

- A. \$0.00
- B. \$1.50
- C. \$37.50
- D. \$55.00
- ☒ E. \$375.00

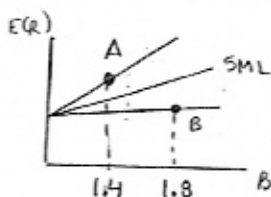
$$\text{Bought shares} \times \text{div} \Rightarrow \text{Rec'd } 500(\$0.75) = \$375$$

26. A stock split:

- A. decreases the value of the retained earnings account.  $\times$
- B. decreases the total owners' equity on the balance sheet.  $\times$
- C. increases the total value of the common stock account.  $\times$
- D. increases the value of the retained earnings account.  $\times$
- ☒ E. does not affect the total value of any of the equity accounts.  $\checkmark$



27. The reward-to-risk ratio for stock A exceeds the reward-to-risk ratio of stock B. Stock A has a beta of 1.4 and stock B has a beta of 0.90. This information implies that:
- A. both stock A and stock B are correctly priced since stock A is riskier than stock B.  $\times$
  - ☒ B. either stock A is underpriced or stock B is overpriced or both.  $\checkmark$
  - C. either stock A is overpriced or stock B is underpriced or both.  $\times$
  - D. stock A is riskier than stock B and both stocks are fairly priced.  $\times$
  - E. stock A is less risky than stock B and both stocks are fairly priced.  $\times$



28. Your company currently sells oversized tennis racquets. The Board of Directors wants you to look at replacing them with a line of supersized racquets. Which of the following is NOT relevant?
- A. \$75,000 you will receive by selling the existing equipment which must be upgraded if you produce the new product.  $\uparrow CF$
  - B. \$60,000 you will pay to Fred Flinstone to promote your new product.  $\downarrow CF$
  - C. A reduction in revenues of \$100,000 from terminating the old product.  $\downarrow CF$
  - ☒ D. Land you own that cost \$750,000 that may be used for the project.  $\times$  sunk cost
  - E. Costs of \$50,000 to train employees to use the new equipment.  $\downarrow CF$
29. Which of the following statements are true?
- ☒ I. Bond prices are inversely related to market interest rates.  $\checkmark$
  - II. A low coupon bond is less interest rate sensitive than a high coupon bond.  $\times$  more
  - III. The yield to maturity will be greater than the coupon rate when a bond is selling at a premium.  $\times$  less than
  - ☒ IV. The coupon rate will be less than the yield to maturity when a bond sells at a discount.  $\checkmark$
- A. I and II only
  - B. I and III only
  - ☒ C. I and IV only
  - D. II and III only
  - E. III and IV only
30. You discover that you can make greater than expected returns by buying stock in firms whenever the growth rate in sales predicted by an investment survey exceeds the stock's current price-earnings ratio. Which of the following describes this event?
- A. This would be a violation of all forms of market efficiency.  $\times$
  - B. This would not be a violation of market efficiency.  $\times$
  - C. This would be a violation of strong form efficiency but not of semi-strong form efficiency.  $\times$
  - ☒ D. This would be a violation of semi-strong form efficiency.  $\checkmark$  public info
  - E. This would be a violation of weak form efficiency.  $\times$
31. In a highly diversified portfolio, the standard deviation of the portfolio will be equal to:
- A. The risk premium of the portfolio.  $\times$
  - ☒ B. The systematic risk.  $\checkmark$
  - C. The portfolio beta.  $\times$
  - D. One.  $\times$
  - E. Zero.  $\times$
- $$Tot\ Risk = Sys\ Risk + Unsys\ Risk$$

$$If\ N \rightarrow \infty\ Tot\ Risk = Sys\ Risk + 0$$
32. WACC is the:
- ☒ A. Required rate of return on a firm.  $\checkmark$
  - B. Average rate of return needed to increase the value of a firm's stock.  $\times$
  - C. Average IRR of the firm's current projects.  $\times$
  - D. Cost of obtaining equity financing.  $\times$
  - E. Discount rate based on the pre-tax cost of capital.  $\times$

**PART II - NUMERICAL AND SHORT ANSWER QUESTIONS****QUESTION 1 - PART A (4 MARKS)**

Snoopy Inc. is considering a project that will result in initial after-tax cash savings of \$1.9 million at the end of the first year, and these savings will grow at 1% per year indefinitely. The firm has a target debt to equity ratio of 0.8, a cost of equity of 14%, and an after tax cost of debt of 3.8%. This project is riskier than the firm, so management applies an adjustment factor of +3% to the cost of capital. Under what circumstances should the firm take on the project?

$$WACC = \left(\frac{1}{1.80}\right)(0.14) + \left(\frac{0.80}{1.80}\right)(0.038) = 0.094\bar{6} \text{ (9.46\%)}$$

$$\text{Project Disc Rate} = WACC + 3\% = 0.124\bar{6} \text{ (12.46\%)}$$

$$PV(\text{Future CF}) = \frac{\$1,900,000}{0.124\bar{6} - 0.01} = \$16,569,767.4418$$

$$\text{Accept project if } NPV > 0 \Rightarrow \underline{\text{Accept project if cost} < \$16,569,767.4418}$$

**QUESTION 1 - PART B (6 MARKS)**

Holmes Security Systems forecasts sales of 100,000 units per year at \$160 each. They cost \$145 per unit to manufacture, and fixed production costs are \$225,000 per year. The necessary equipment costs \$1,285,000 and has a 25% CCA rate. The equipment will have zero salvage at the end of the 8 year life of the project. The firm needs to invest \$180,000 in net working capital up front, and no additional net working capital investment is required. The appropriate discount rate is 18%, and the tax rate is 40%. What is the NPV of this project?

$$\text{AT Rev : } CF_{1-8} = [(160 - 145)(100,000) - 225,000](1 - 0.40) = \$765,000$$

$$\text{Cap Invest : } \frac{CF_0}{CF_8} = \frac{-\$1,285,000}{\emptyset}$$

\* Also have PV(CCATS)

$$\text{ANWC : } \frac{CF_0}{CF_8} = \frac{-\$180,000}{+\$180,000}$$

$$\begin{aligned} NPV &= 765,000 \left\{ \frac{1 - \frac{1}{(1.18)^8}}{0.18} \right\} - 1,285,000 - 180,000 + \frac{180,000}{(1.18)^8} + \left\{ \frac{1,285,000(0.25)(0.40)}{0.25 + 0.18} \right\} \left[ \frac{1 + 0.5(0.18)}{1.18} \right] - \\ &= 3,119,337.8041 - 1,465,000 + 47,886.8695 + 276,041.5408 \end{aligned}$$

$$\underline{\underline{NPV = \$1,978,269.2144}}$$

**QUESTION 2 – PART A (4 MARKS)**

Spectre Inc. needs to raise \$50 million and they want to issue 25-year bonds for this purpose. The required return on this bond issue will be 6%. The firm is evaluating two alternative issues: a 6% annual coupon bond and a zero coupon bond.

- I. (2 marks) To raise the funds, how many coupon bonds would the firm need to issue? How many zero coupon bonds?  
 II. (2 marks) In 25 years, what will be the firm's repayment if they issued coupon bonds? What if they issued zero coupon bonds?

$$\text{I. \# Coupon Bonds : } \because C = r \Rightarrow B_0 = F = \$1,000 \quad \therefore \# \text{ coupon bonds} = \frac{\$50 \text{ M}}{\$1,000} = \underline{\underline{50,000 \text{ bonds}}}$$

$$\# \text{ Zero Coupons : } B_0 = \frac{\$1,000}{(1.06)^{25}} = \$232.9986 \quad \# \text{ zero bonds} = \frac{\$50 \text{ M}}{\$232.9986} = \underline{\underline{214,593.5360 \text{ bonds}}}$$

$$\text{II. Repayment Coupon Bond} = 50,000 [ \$1,000 + \$60 ] = \underline{\underline{\$53,000,000}}$$

$$\text{Repayment Zero Coupons} = 214,593.5360 (\$1,000) = \underline{\underline{\$214,593,564.082}}$$

**QUESTION 2 – PART B (6 MARKS)**

Bond Inc. just paid a dividend of \$2.50 per common share. The growth rate in dividends is expected to be 4% per year for the first three years, and 2% per year thereafter. Investors require a 14% return per year on this stock for the first three years, and 12% per year thereafter. Calculate the current share price.

$$D_0 = \$2.50 \quad \begin{array}{l} g(yr 1-3) = g_1 = 0.04 \\ g(yr 4-\infty) = g_2 = 0.02 \end{array} \quad \begin{array}{l} r(yr 1-3) = r_1 = 0.14 \\ r(yr 4-\infty) = r_2 = 0.12 \end{array}$$

$$P_0 = PV(D_1 \text{ to } D_3) + PV(D_4 \text{ to } D_\infty)$$

$$= \frac{D_1}{r_1 - g_1} \left\{ 1 - \left( \frac{1+g_1}{1+r_1} \right)^T \right\} + \frac{D_4}{r_2 - g_2} \left\{ \frac{1}{(1+r_1)^T} \right\} \quad \begin{array}{l} \text{where: } D_1 = D_0(1+g_1)^1 \\ D_4 = D_0(1+g_1)^3(1+g_2)^1 \end{array}$$

$$= \frac{2.50(1.04)}{0.14 - 0.04} \left\{ 1 - \left( \frac{1.04}{1.14} \right)^3 \right\} + \frac{2.50(1.04)^3(1.02)}{0.12 - 0.02} \left\{ \frac{1}{(1.14)^3} \right\}$$

$$= 6.2595 + 19.3609$$

$$\underline{\underline{P_0 = \$25.6204}}$$