UNIVERSITÉ Concordia UNIVERSITY

Solution

Examination Cover Sheet

Print Name: ➔		**ID Number:** ➔	
COURSE FINANCE	**NUMBER** COMM 308	**SECTIONS: (➔ Circle your section)** CA, CB	
EXAMINATION Final Exam **VERSION BLUE**	**DATE** August 22, 2014	**TIME** 3 hours 19:00 to 22:00	**# OF PAGES 16** Including this cover
INSTRUCTOR: **(➔ Underline your instructor's name)** Hamed Ghanbari Somayeh Kaviani		**DIVISION** John Molson School of Business Concordia University	

INSTRUCTIONS: Please read these carefully

1. **Please ensure you have 16 pages (including this cover page) in this exam.**
2. **For Part I of this exam (Multiple Choice Questions): All answers must be recorded IN PENCIL on the computer sheet. Only the computer sheet will be graded.**
3. **For Part II: Show your calculations to earn part marks. Write in the space provided. If you are using the back of the exam for answering any question, you should label it clearly**
4. **For Part II: All answers must be recorded IN INK within this exam.**

MATERIALS ALLOWED:

1. **You must submit a BLUE computer answer sheet.**
2. **You are allowed to bring one or more calculators (ENCS sticker not necessary)**
3. **You are allowed to bring one language dictionary (no finance/ mathematics/economics etc. dictionary)**

SCORES (FOR INTERNAL USE ONLY)

Part I MCQ	**Part II Numerical and Short Answer Questions**				
	Question 1	Question 2	Question 3	Question 4	
(Max: 70 Points)	(Max: 6 Points)	(Max: 8 Points)	(Max: 10 Points)	(Max: 6 Points)	**Total**

Part I: Multiple Choice Questions (28 Questions, 70 Points Total):

- This part consists of 28 Multiple Choice Questions.
- Each question is worth 2.5 points for a total of 70 points.
  - **Only answers on the computer answer sheet will be graded.**
  - **Use a pencil to mark your answers on the Computer Sheet.**

1. You are going to pay $800 into an account at the beginning of each year for the next 20 years. The account will then be left to compound for an additional 20 years. At the end of the 41st year you will begin receiving a perpetuity from the account. If the account pays 14%, how much each year will you receive from the perpetuity (round to nearest $1,000)?

A. $140,000
B. $150,000
(C) $160,000
D. $170,000
E. None of the above

$$\frac{800}{0.14}*\left[1-\frac{1}{1.14^{20}}\right]*1.14=\frac{C}{0.14}*\frac{1}{1.14^{40}}$$

$C = \$159,727.70$

2. Addico Corp just announced its earnings per share of $2 for the financial year 2013-2014. The EPS is expected to decline at the rate of 11.0% per year for all foreseeable future. How long would it take for Addico's EPS to half?

A. - 6.64 years
(B) 5.95 years
C. 6.64 years
D. 6.81 years
E. None of the above

$EPS_0 = \$2 \quad g = -0.11$

$2*(1-0.11)^n = 1$

$n\ln(0.89) = \ln(0.5)$

$n = 5.948$ years.

3. Which of the following is most correct?

A. The present value of a 5-year annuity due will exceed the present value of a 5-year ordinary annuity. (Assume that both annuities pay $100 per period and there is no chance of default.)

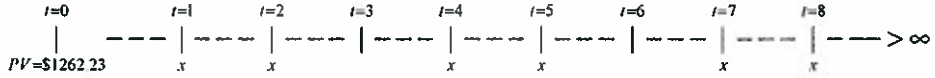
B. If a loan has a effective rate of 10 percent, then the nominal rate can never be less than 10 percent.

C. If there is annual compounding, then the effective annual, and annual quoted rates of interest are the same.

(D) Statements a and c are correct.

E. All of the statements above are correct.

4. The present value (t = 0) of the following cash flow stream is $1,262.23 when discounted at 12 percent annually. What is the value of the missing cash flows (x)? Assume the pattern of payments will continue in perpetuity (Every third year there is no payment).



A. $39.47

B. $151.47

C. $195.67

D. $215.26

E. $511.11

Effective 3 year rate $= (1.12)^3 - 1 = 0.404928$

$PV_0 = 1262.23 = \frac{x}{0.12} - \frac{x}{0.404928} = x(5.86376)$

$\therefore x = \$215.26$

5. A $10,000 loan is to be amortized over 5 years, with annual end-of-year payments. Given these facts, which of these statements is most correct?

A. The annual payments would be larger if the interest rate were higher.

B. If the loan were amortized over 10 years rather than 5 years, and if the interest rate were the same in either case, the first payment would include less dollars of principal under the 10-year amortization plan.

C. The proportion of interest versus principal repayment would be the same for each of the 5 payments.

D. The proportion of each payment that represents interest as opposed to repayment of principal would be lower if the interest rate were higher.

E. Statements A and B are correct.

6. Which of the following investments will have the highest future value at the end of 5 years? Assume that the effective annual rate for all investments is the same.

A. A pays $50 at the end of every 6-month period for the next 5 years (a total of 10 payments).

B. B pays $50 at the beginning of every 6-month period for the next 5 years (a total of 10 payments).

C. C pays $500 at the beginning of 5 years (a total of one payment).

D. D pays $100 at the end of every year for the next 5 years (a total of 5 payments).

E. E pays $100 at the beginning of every year for the next 5 years (a total of 5 payments).

7. Suppose someone offered you the choice of two equally risky annuities, each paying $10,000 per year for five years. One is an ordinary annuity, the other is an annuity due. Which of the following statements is most correct?

   A. The present value of the ordinary annuity must be less than the present value of the annuity due, and, the future value of an ordinary annuity must be less than the future value of the annuity due.

   B. The present value of the annuity due exceeds the present value of the ordinary annuity, while the future value of the annuity due is less than the future value of the ordinary annuity.

   C. The present value of the annuity due exceeds the present value of the ordinary annuity, and the future value of the annuity due also exceeds the future value of the ordinary annuity.

   D. If interest rates increase, the difference between the present value of the ordinary annuity and the present value of the annuity due remains the same.

   E. Statements a and c are correct.

8. Which of the following are likely to reduce agency conflicts between stockholders and managers?

   A. Existence of the board of directors.

   B. Increasing the threat of corporate takeover.

   C. A manager receives a lower salary but receives additional shares of the company's stock.

   D. All of the statements above are correct.

   E. Statements b and c are correct.

9. A conflict arising when people entrusted to look after the interests of others use the authority or power for their own benefit instead is known as _____. And, when the average buyer of an insurance policy is likely to have higher risk than others in his class, this is known as_____.

   A. Adverse selection, Moral hazard

   B. Agency problem, Adverse selection

   C. Moral hazard, Egalitarianism

   D. Moral Hazard, Adverse selection

   E. None of the above

10. You just purchased a 10-year corporate bond that has an annual coupon of 10 percent. The bond is selling below par. Which of the following statements is most correct?

A. The bond's yield to maturity is greater than 10 percent.

B. The bond's current yield is greater than 10 percent.

C. If the bond's yield to maturity stays constant, the bond's price will be the same one year from now.

D. Statements a, and b are correct.

E. Statements a, b, and c are correct.

11. Under which of the following scenarios will increasing the payout ratio for a firm increase its equity value?

A. Never

B. Always

C. When the return on equity is equal to its cost of equity

D. When the return on equity is less than the cost of equity

E. When the return on equity is greater than the cost of equity

12. You just read the following from The Financial Post on Thursday, May 12, 2014: "Gannett Co. Inc. the largest U.S. newspaper publisher, reported a lower third-quarter profit yesterday because of weak advertising growth and lower-than-expected revenues, sending shares down 3.4%. Revenue rose 2.7% to US$1.91-billion, but fell short of analysts' views ranging from US$1.92-billion to US$1.99-billion, according to Reuters Estimates." Assume nothing happens before the event. This is consistent with: (pick the best answer)

A. Weak form EMH (Efficient market hypothesis)

B. Semi-strong form EMH

C. Strong form EMH

D. Markets are Inefficient

E. Both A and B

13. If D0 = $2.00, g (which is constant) = 6%, and P0 = $40, what is the stock's expected total return for the coming year?

Total return = Div yield + Capital gain yield

$= \frac{2 \times 1.06}{40} + 0.06 = 11.3\%$

A. 6.0%

B. 10.8%.

C. 11.0%.

D. None of the above.

E. Insufficient information.

14. If the dividend yield for year one is expected to be 5% based on the current price of $25, what will the year four dividend be if dividends grow at a constant 6%?

$\frac{D_1}{P_0} = 0.05 \Rightarrow D_1 = 0.05 \times 25 = \$1.25$

$D_4 = 1.25 \times 1.06^3 = \$1.49$

A. $1.33

B. $1.49

C. $1.58

D. $1.67

E. None of the above

15. Your personal opinion is that a security has an expected rate of return of 0.11. It has a beta of 1.5. The risk-free asset has a beta of zero and the market expected rate of return is 0.09. According to the Capital Asset Pricing Model, this security is

A. underpriced.

B. overpriced.

C. fairly priced.

D. cannot be determined from data provided.

E. none of the above.

16. Which statement is incorrect?

A. Current yield is the ratio of annual coupon payment divided by the price of the bond.

B. When the coupon rate is lower than the market rate, the bond is priced at discount.

C. If a bond is at discount, the coupon rate < current yield < YTM.

D. All other factors remaining same, callable bonds will be priced less than non-callable bonds.

E. When the face value of the bond is greater than or equal to the price of the bond, current yield of the bond must be less than or equal to the coupon rate of the bond.

17. When two risky securities with correlation less than one, are held in a portfolio,

A. the portfolio standard deviation will be greater than the weighted average of the individual security standard deviations.

B. the portfolio standard deviation will be less than the weighted average of the individual security standard deviations.

C. the portfolio standard deviation will be equal to the weighted average of the individual security standard deviations.

D. the portfolio standard deviation will always be equal to the securities' covariance.

E. none of the above are true.

18. If stock A and B have the same variance, which of the following does not appropriately complete the following sentence: If stock A has a higher _____ than stock B, then stock A must have a higher _____ than stock B.

A. beta; risk premium

B. beta; unsystematic risk

C. risk premium; Sharpe ratio

D. covariance with the market; correlation with the market

E. None of the above

19. According to the Capital Asset Pricing Model, fairly priced securities could _____.

A. have positive betas

B. have negative betas

C. have zero betas

D. have non zero alphas

E. have positive, negative or zero beta

20. The tangency portfolio is the portfolio with

A. The highest expected return

B. The lowest standard deviation

C. The highest correlation

D. The highest Sharpe ratio

E. The highest beta

21. A firm is expected to pay a constant annual dividend of $6 every year with the first dividend payment coming up immediately. Its cost of equity is 12% and it has 1,000,000 shares outstanding. The book value of its equity is $60 million. It also has 20,000 bonds outstanding. Each bond pays semi-annual coupon, has a par value of $1,000, is trading at a price of $1,100 and has an annualized YTM of 2.978%. The tax rate is 30%. Therefore, the weighted average cost of capital is:

A. 8.970%

B. 8.975%

C. 10.194%

D. 9.636%

E. None of the above

$P_0 = \frac{6}{0.12} = \$50$

$E = 50 \times 1{,}000{,}000 = 50{,}000{,}000$

$D = 20{,}000 \times 1{,}100 = 22{,}000{,}000$

$k_E = 12\%$ $k_D = \left(1 + \frac{0.02978}{2}\right)^2 - 1 = 3\%$

$WACC = 8.975\%$

22. Which of the following statements is true about the weighted average cost of capital (WACC) method?:

A. WACC can be used to evaluate projects in which the capital structure is significantly different from the firm's overall structure.

B. WACC does not explicitly calculate interest tax shields that are generated by debt securities for the financing of a project.

C. WACC does not adjust for the tax deductibility of interest costs.

D. All of the above.

E. Only B and C

23. The FarNorth Corp. has been presented with an investment opportunity that will yield cash flows of $30,000 per year in Years 1 through 4, $35,000 per year in Years 5 through 9, and $40,000 in Year 10. This investment will cost the firm $150,000 today, and the firm's cost of capital is 10 percent. Assume cash flows occur evenly during the year, 1/365th each day. What is the discounted payback period for this investment?

A. 5.23 years

B. 4.86 years

C. 4.00 years

D. 6.75 years

E. 4.35 years

t		PV	Bal
0	-150,000	-150,000	-150,000
1	30,000	27,272.73	-122,727.27
2	30,000	24,793.39	-97,933.88
3	30,000	22,539.44	-75,394.44
4	30,000	20,490.40	-54,904.04
5	35,000	21,732.25	-33,171.79
6	35,000	19,756.59	-13,415.20
7	35,000	17,960.53	→

24. Which of the following statements is most correct concerning a project with normal cash flows (i.e., a cash outflow in Year 0 followed by cash inflows in all subsequent years)?

A. If the NPV of a project is positive then the discounted payback period rule will always accept the project

B. If the NPV of a project is negative, then the profitability index of the project will always be less than one.

C. If the PI of a project is equal to one, then the IRR will always be equal to the project's cost of capital

D. If the NPV of a project is zero, then the IRR of the project will be greater than the discount rate for the project.

E. Both B and C.

25. A firm's WACC is estimated to be 10.56%, its cost of equity is Ke=14%, and it is subject to a 40% corporate income tax rate. The firm's debt-to-equity ratio is $D/E = 2/3$. What is the firm's after tax cost of debt?

A. 5.4%

B. 7.68%

C. 9.0%

D. 9.33%

E. 10.56%.

$$\frac{2}{5} k_D(1-T_c) + \frac{3}{5} 0.14 = 0.1056$$

$$k_D(1-T_c) = \left[0.1056 - \frac{3}{5} \times 0.14\right] \times \frac{5}{2}$$

$$= 5.4\%$$

26. You are considering two perpetuities which are identical in every way except for the when the perpetuity payments will begin. Perpetuity A will begin making annual payments of a fixed amount, with the first payment being made two years from today. Perpetuity B pays the same fixed annual payment, but will make the first payment one year from today. Which of the following statements is most correct?

A. The PV of perpetuity A is greater than the PV of perpetuity B by the amount of the fixed payment.

B. The PV of perpetuity B is greater than the PV of perpetuity A by the amount of the fixed payment.

C. The PV of perpetuity A is equal to the PV of perpetuity B.

D. The PV of perpetuity A is greater than the PV of perpetuity B by the present value of the amount of the fixed payment.

E. The PV of perpetuity B is greater than the PV of perpetuity A by the present value of the first payment of perpetuity B.

27. A machine costs $3 million and has zero salvage value. The machine qualifies under a special depreciation category whereby the firm is allowed to use straight-line depreciation over 4 years (the machine is depreciated 25% of its original value of $3 million value in each year leading to full depreciation at the end of year 4). Assume a discount rate of 10% and a 40% tax rate. What is the present value of depreciation tax savings associated with this machine? (Ignore half year rule)

A. $1,800,000
B. $1,426,439.45
C. $1,200,000
D. $950,959.63
E. None of the above

UCC | ~~Dep~~ | D×Tc | PV
1. 3,000,000 | 750000 | 300,000 | 272727.27
2. 2,250,000 | 750,000 | 300,000 | 247933.88
3. 1,500,000 | 750000 | 300,000 | 225394.40
4. 75,000 | ~~750~~,000 | 300,000 | 204904.00
950,959.63

28. TrueNorth Inc's outstanding bonds have a $1,000 par value, and they mature in 5 years. Their yield to maturity is 9%, based on semiannual compounding, and the current market price is $845.70. What is the bond's annual coupon interest rate?

A. 5.10%
B. 5.20%
C. 5.30%
D. 5.40%
E. None of the above

$$\frac{C}{0.045} * \left(1 - \frac{1}{1.045^{10}}\right) + \frac{1000}{1.045^{10}} = 845.70$$

$$\therefore C = 25.50$$

Annualised Coupon rate

$$= 2 * \frac{25.50}{1000} = 5.10\%$$

Part II: Problèmes (30 Points Total)

- Answer on this document, in the space provided. Use the back of the sheet if you need additional space. Label it clearly. Any work on the back of the sheet, which is not labeled clearly, will not be graded.
- Show all your work. Unsupported statements or numbers will not receive any credit.

Q1. (6 Points) Risk and Return:

Quebecare Inc. has a beta of 1.20. The risk free rate is 6% and the expected return on the market portfolio is 14.5%. The company presently pays an annual dividend of $5 per share. However, investors expect all future dividends to experience a decline of 1% per annum for many years to come.

a. (3 Points) What is the stock's present market price per share, assuming the required rate of return is determined by the CAPM?

$$E(R) = 0.06 + 1.2 \times (0.145 - 0.06) = 0.162$$

$$P_0 = \frac{D_1}{E(R) - g} = \frac{5 \times 0.99}{0.162 + 0.01} = \frac{4.95}{0.163} = \$29.77$$

b. (3 Points) Consider an alternative investment in the stock of Cancare Inc. Cancare has an expected return of 15% and a beta of 1.5. Should you purchase this stock? (why or why not?)

$E(R) = 0.15$

$\beta = 1.5$

CAPM $(E(R) = 0.06 + 1.5 \times (0.145 - 0.06)$

$= 18.75\% > 0.15$

$\Rightarrow$ The asset is overpriced

$\Rightarrow$ Do not buy (Assuming CAPM is correct)

Q2. **(8 Points) Cost of Capital:**

Sparrow Corp. has $100 million face value of outstanding debt with a coupon of 10% and a yield to maturity of 8% (annualized). The bonds make semi-annual payments, and have 10 years to maturity. The company also has 1 million shares of common stock with book value per share of $35. The company presently pays an annual dividend of $5 per share, and investors expect it to experience a growth in dividends of 1% per annum for many years to come. The current beta of the stock is 1.5. The Treasury bill rate is 5%, and the market risk premium is 8.5%. Sparrow Corp. has 50,000 preferred shares outstanding, with a face value of $100 and a 6% preferred dividend rate. The preferred stock is trading at $105. The company is in the 40% tax bracket. What is the company's current weighted average cost of capital? (Assume that the common stock price lies on the SML)

Debt: $F = \$100$ mill

$C = 5\%$ Semi-annual. $k_D = 8.16\% \Leftarrow (1.04)^2 - 1$

$y = 4\%$ Eff. semi ann.

$n = 10 \times 2 = 20$

$$P_0^{debt} = \frac{5{,}000{,}000}{0.04} \times \left(1 - \frac{1}{1.04^{20}}\right) + \frac{100{,}000{,}000}{1.04^{20}}$$

$= \$113,590,326.34$

Equity: $D_0 = \$5$ $\beta = 1.5$ $E(r_m - r_f) = 0.085$

$g = 1\%$ $r_f = 0.05$

$k_E = E(r) = 0.05 + 1.5 * 0.085 = 0.1775$

$$P_0^{Equity} = \frac{5 * 1.01}{0.1775 - 0.01} = \$30.15$$

$E = 30.15 * 1{,}000{,}000 = \$30{,}150{,}000$

Pref: $P_0^{Pref} = 105 \Rightarrow P = 105 * 50{,}000 = \$5{,}250{,}000.00$

$$k_P = \frac{6}{105} = 0.057143$$

Q2 Cont....

$\therefore V = 113,590,326.34 + 30,150,000 + 5,250,000$

$= 148,990,326.34$

$$WACC = \frac{148,990,326.34}{147,290,326.34} \times 0.0816 \times 0.6$$

$$+ \frac{27,450,000}{147,290,326.34} \times 0.1775$$

$$+ \frac{5,250,000}{147,290,326.34} \times 0.057143$$

$= 0.0753 = 7.53\%$

Q3. (10 Points): Capital Budgeting

Service Inc. is investigating four different opportunities. Information on the four projects under study is as follows: (Assume all projects have standard cash-flows: initial cash outflow followed by a series of cash inflows)

	Project 1	Project 2	Project 3	Project 4
Investment required	$480,000	$360,000	$270,000	$450,000
Net present value	$87,270	$73,400	$66,140	$72,970
Life of project	6 years	12 years	6 years	3 years

Service Inc. has a WACC of 10%. The expected market return is 6% and the prevailing risk free rate is 2%.

a) (6 Points) Compute the project profitability index for each investment project.

b) (2 Points) Rank the four projects according to preference, in terms of:
- Net present value
- Project profitability index

c) (2 Points) assuming that the firm faces capital constraints and it needs to achieve maximum return on its investments, which project should it accept?

(a) $PI_1 = \frac{480,000 + 87,270}{480,000} = 1.1818$ ← 1 ← 0.5 ← 1.1

$PI_2 = \frac{360,000 + 73400}{360,000} = 1.2039$ ← 1.1

$PI_3 = \frac{270,000 + 66140}{270,000} = 1.24496$ ← 1.5

$PI_4 = \frac{450,000 + 72970}{450,000} = 1.1622$ ← 1.1

(b) NPV: P1, P2, P4, P3 ← 1 pt

PI: P3, P2, P1, P4 ← 1 pt

(c) Accept Project 3 = highest PI

Q4. **(6 Points) Option portfolio payoff:** Suppose that the price of a share of stock in XYZ Corporation is currently trading at \$20 per share. Consider buying a put option with strike price \$60 and simultaneously selling another put option with strike price \$40. Both options have the same underlying asset and same maturity date.

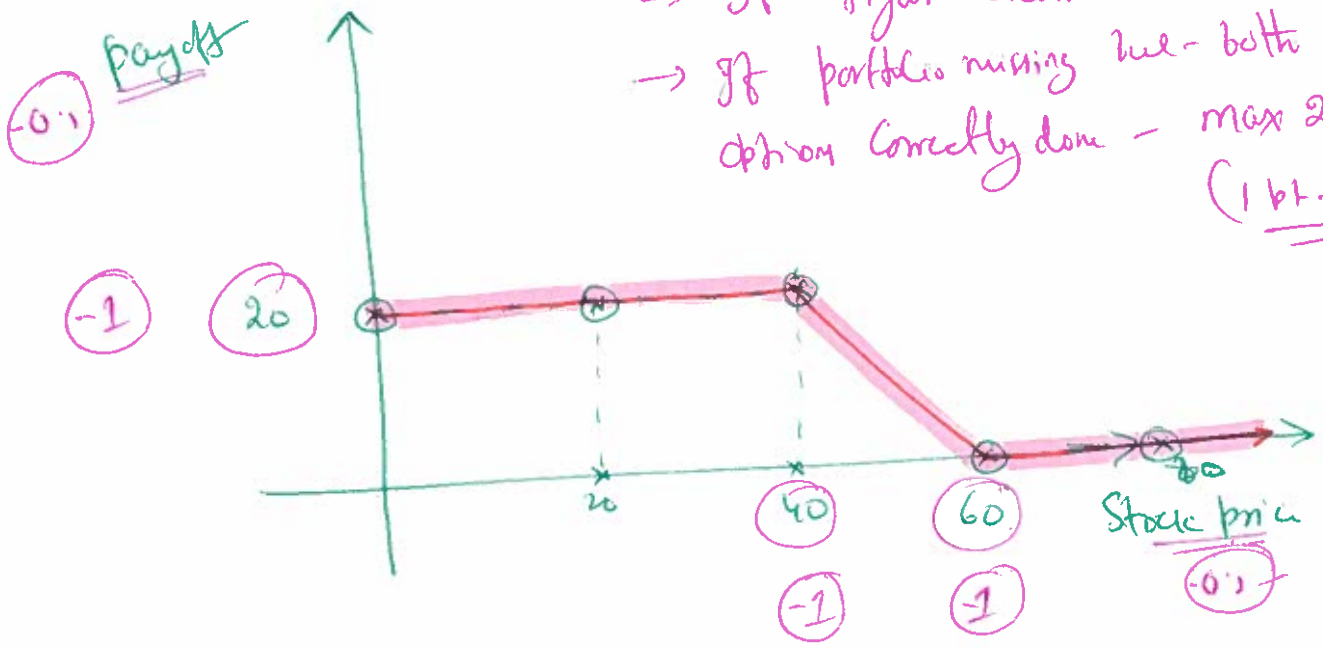
i. (5 Points) Draw a payoff diagram of this portfolio

Note: *Clearly label both axes and the location of each important point on the diagram (Points of intersections, points where the graph changes direction, etc.).*

	Ø	20	40	60	80
Long P_{60}	60	40	20	Ø	Ø
Short P_{40}	-40	-20	Ø	Ø	Ø
Portfolio	20	20	20	Ø	Ø

→ If figure incorrect – Then Zero

→ If portfolio missing but both Put options correctly done – max 2 pts (1 pt. each)



ii. (1 Point) What is the holder of this portfolio betting on?

Holder is betting on the stock price remaining below \$60 and most likely around \$40

Equation List - Comm 308 - Booth-Cleary Text

5.3	Present value (compound interest): $PV_0 = \frac{FV_n}{(1+k)^n}$
5.4	Future value (ordinary annuity): $FV_n = \frac{PMT}{k}\left[(1+k)^n - 1\right]$
5.5	Present Value of an annuity: $PV_n = \frac{PMT}{k}\left[1 - \frac{1}{(1+k)^n}\right]$
5.8	Present value of perpetuity: $PV_0 = \frac{PMT}{k}$
5.10	Effective rate with continuous compounding: $k = e^{QR} - 1$
5.11	Effective period rate (for any period f): $k = \left(1 + \frac{QR}{m}\right)^{\frac{m}{f}} - 1$
5A-2	Present value of growing perpetuity: $PV_0 = \frac{PMT_0(1+g)}{k-g} = \frac{PMT_1}{k-g}$
5A-4	Present value of growing annuity: $PV_0 = \frac{PMT_1}{k-g}\left[1 - \left(\frac{1+g}{1+k}\right)^n\right]$
6.3	Current Yield: $CY = \frac{Annual\ Interest}{B}$
6.5	Fisher Relationship: $RF = \left[(1 + \text{Real rate}) \times (1 + \text{Expected inflation})\right] - 1$
6.7	Price of T-Bill given BEY: $P = \frac{F}{\left(1 + k_{BEY} \times \frac{n}{365}\right)}$
7.10	Share price with growth opportunities: $P_0 = \frac{EPS_1}{k_c} + PVGO$
7.11	Growth rate: $g = b \times ROE$
8.3	Total return = Income yield + Capital gain (loss) yield = $\frac{CF_1}{P_0} + \frac{P_1 - P_0}{P_0}$
8.5	Geometric average (GM) $= \left[(1+r_1)(1+r_2)(1+r_3)\ldots(1+r_n)\right]^{1/n} - 1 = \left(\prod_{i=1}^{n}(1+r_i)\right)^{\frac{1}{n}} - 1$
8.6	Expected return: $ER = \sum_{i=1}^{n}(r_i \times \text{Prob}_i)$
8.7	Standard Deviation for individual returns: Ex-post $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(r_i - \bar{r})^2}{n-1}}$
8.8	Standard Deviation for individual returns: Ex-ante $\sigma = \sqrt{\sum_{i=1}^{n}(\text{Prob}_i)(r_i - ER)^2}$
8.9	Expected portfolio return: $ER_p = \sum_{i=1}^{n}(w_i * ER_i)$
8.11	Portfolio standard deviation: $\sigma_p = \sqrt{(w_A)^2(\sigma_A)^2 + (w_B)^2(\sigma_B)^2 + 2(w_A)(w_B)(COV_{A,B})}$
8.12	Covariance of returns: $COV_{AB} = \sum_{i=1}^{n}\text{Prob}_i(r_{A,i} - \bar{r}_a)(r_{B,i} - \bar{r}_b)$
8.14	Covariance of returns: $COV_{AB} = \rho_{AB}\sigma_A\sigma_B$

8.16	If $\rho_{AB} = -1$, then: $\sigma_P = w\sigma_A - (1-w)\sigma_B$
9.3	Expected return for a portfolio of one risky and one riskfree asset: $E(R_P) = RF + \left(\frac{E(R_A) - RF}{\sigma_A}\right)\sigma_P$
9.4	Slope of CML $= \frac{ER_M - RF}{\sigma_M}$
9.6	Sharpe Ratio $= \frac{ER_P - RF}{\sigma_P}$
9.7	$\beta_i = \frac{Cov_{i,M}}{\sigma_M^2} = \frac{\rho_{i,M}\sigma_i}{\sigma_M}$
9.8	Portfolio beta: $\beta_P = w_A\beta_A + w_B\beta_B + \ldots + w_n\beta_n$
9.9	Security market line (SML): $k_i = RF + (ER_M - RF)\beta_i$
12.3	TV = Option premium - IV
12.5	Put Call Parity: $P + S = C + PV(X)$
13.1	$NPV = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \ldots + \frac{CF_n}{(1+k)^n} - CF_0 = \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} - CF_0$
13.3	$PI = \frac{PV(Cash\ \text{inflows})}{PV(Cash\ \text{outflows})}$
14.1	*Initial cash outlay:* $CF_0 = C_0 + \Delta NWC_0 + OC$
14.2	*Annual After-Tax Cash flows:* $CF_t = CFBT_t(1-T) + CCA_t(T)$
14.4	*Ending Cash flows (ignoring tax implications):* $ECF_n = SV_n + \Delta NWC_n$
14.5	*Net present value:* $NPV = PV(Annual\ CFs) + PV(ECF_n) - CF_0$
14.6	$PV(Operating\ Cash\ Flows) = \frac{CFBT(1-T)}{k}\left[1 - \frac{1}{(1+k)^n}\right]$
14.7	*Present value of CCA Tax shield (ignoring CCA recapture and Terminal loss)* $PV(CCA\ Tax\ Shield) = \frac{(C_0)(d)(T)}{d+k} * \frac{(1+0.5k)}{(1+k)} - \frac{(SV_n)(d)(T)}{d+k} * \frac{1}{(1+k)^n}$
20.8	Weighted average Cost of Capital (WACC): $K_a = \frac{ROI \times IC}{V} = \frac{K_e S + K_d(1-T)D}{V} = K_e\frac{S}{V} + K_d(1-T)\frac{D}{V}$
20.9	$WACC = K_c\frac{S}{V} + K_p\frac{P}{V} + K_i\frac{D}{V}$, Where: $K_i = K_d(1-T)$
20.10	Market value: $S = P_0 \times n$
20.13	Net proceeds: $NP = \frac{I(1-T)}{K_i}\left[1 - \frac{1}{(1+K_i)^n}\right] + F\left(\frac{1}{(1+K_i)^n}\right)$
20.14	$K_p = D_p / NP$
20.17	$K_{ne} = \frac{D_1}{NP} + g$
20.21	$K_e = \frac{D_1}{P_0} + g = \frac{X_1(1-b)}{P_0} + b \times ROE$
20.27	Cost of new equity: $K_{ne} = K_e \times \frac{P_0}{NP}$