UNIVERSITÉ Concordia UNIVERSITY

Examination Cover Sheet

Print Name: ➔		**ID Number:** ➔	
COURSE FINANCE	**NUMBER** COMM 308	**SECTIONS: (➔ Circle your section)** AA, AB	
EXAMINATION Final Exam **VERSION ~~BLUE~~** Green	**DATE** June 27, 2014	**TIME** 3 hours 19:00 to 22:00	**# OF PAGES 17** Including this cover
INSTRUCTOR: **(➔ Underline your instructor's name)** Rahul Ravi Jay Mannadiar		**DIVISION** John Molson School of Business Concordia University	

INSTRUCTIONS: Please read these carefully

1. **Please ensure you have 17 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~~ Green 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: 10 Points)	(Max: 4 Points)	(Max: 10 Points)	(Max: 6 Points)	**Total**

Green

~~Blue~~ *Version*

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. Your company is planning to borrow $500,000 on a 5-year, 7 percent, annual payment, fully amortized term loan. What fraction of the payment made at the end of the fifth year will represent repayment of principal?

   what fraction of the last payment is principal?
   If x is the principal
   $x + 0.07x = PMT$
   $x = \frac{PMT}{1.07} \Rightarrow \frac{x}{PMT} = \frac{1}{1.07} = 93.46\%$

   A. 76.29%
   B. 42.82%
   C. 50.28%
   D. 49.72%
   E. None of the above

2. Addico Corp's 2005 earnings per share were $2. The EPS growth rate during the prior 5 years was 11.0% per year. If that growth rate were maintained, how long would it take for Addico's EPS to double?

   $2 \times (1.11)^n = 4^2$
   $\therefore n \ln(1.11) = \ln 2$
   $\therefore n = 6.64$ years.

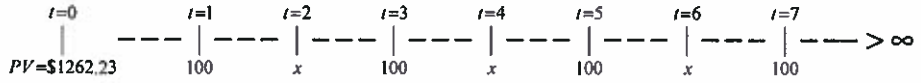
   A. 6.64 years
   B. 6.81 years
   C. 6.99 years
   D. 7.13 years
   E. None of the above

3. Which of the following is most correct?

If compounding period is more then effective period (5% APR compounded every two years) then effective rate will be less then nominal rate

   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 nominal rate of 10 percent, then the effective rate can never be less than 10 percent.
   C. If there is annual compounding, then the effective, periodic, and nominal rates of interest are all 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 alternating payment of $100 and $x continues in perpetuity.



A. $39.47

B. $190.94

C. $195.67

D. $209.11

E. $221.11

Effective 2 year rate: $k = 1.12^2 - 1$

$= 25.44\%$

$\frac{100}{0.2544} * (1.12) + \frac{x}{0.2544} = 1262.23$

$\therefore x = \$209.11$

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

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

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 more dollars of interest under the 5-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 higher if the interest rate were higher.

E. The last payment would have a higher proportion of interest than the first payment.

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 end 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 (or deferred) annuity, the other is an annuity due. Which of the following statements is most correct?

A. The present value of the ordinary annuity must exceed the present value of the annuity due, but the future value of an ordinary annuity may 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 d are correct.

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

A. Paying managers a large salary.

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. When people behave in ways that involve increased risk because they have insurance, this 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 sells at a premium above 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 less 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, b, and c are correct.

E. None of the statements above is correct.

11. Under which of the following scenarios will increasing the payout ratio for a firm will have no effect on 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. None of the above

13. If D1 = \$2.00, g (which is constant) = 6%, and P0 = \$40, what is the stock's expected total return for the coming year?

A. 6.0%

B. 10.8%.

C. **11.0%.**

D. None of the above.

E. Insufficient information.

total return = $g + \frac{2}{40} = 0.06 + 0.05$

$= 11\%$

14. TrueNorth's stock is currently selling for \$40 a share. The stock is expected to pay a \$2 dividend at the end of the year. The stock's dividend is expected to grow at a constant rate of 7 percent a year forever. The risk-free rate (rf) is 6 percent and the market risk premium ($r_m - r_f$) is also 6 percent. What is the stock's beta?

A. 1.06

B. 1.08

C. 2.00

D. 0.83

E. **None of the above**

$E(r) = 0.07 + \frac{2}{40} = 12\%$ (Assuming stock correctly priced)

$0.12 = 0.06 + \beta \times 0.06$

$\therefore \beta = \frac{0.06}{0.06} = 1$

15. A stock that pays no dividends is currently priced at \$40 and is expected to increase in price to \$45 by year-end. The expected risk premium on the market portfolio is 6% and the risk-free is 5%. The stock has a beta of 0.6. According to the capital asset pricing model, the stock is:

A. Overpriced because its returns lie below the SML.

B. **Underpriced because its returns lie above the SML.**

C. Overpriced because its returns lie above the SML.

D. Correctly priced.

E. Cannot tell from the given information.

Market - Expects a return of: $\frac{45-40}{40} = 12.5\%$

According to CAPM: $E(r) = 0.05 + 0.6 \times 0.06 = 8.6\%$

$\therefore$ Asset is Underpriced.

16. When two risky securities that are perfectly positively correlated 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.

17. 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. Zero coupon bonds can sometimes be priced at premium.

E. When the market rate is the same as the coupon rate, the bond will always trade at par.

18. The objective of a money manager charged with creating the overall portfolio for a client is to:

A. Minimise variance, or risk

B. Maximise expected returns

C. Maximise the Sharpe ratio

D. Minimise the market risk

E. Minimize correlations.

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

A. have positive betas

B. have negative betas

C. have non-zero betas

D. have zero alphas

E. Both C and D

20. Which of the following statements about the security market line (SML) is not true?

A. The SML provides a benchmark for evaluating expected investment performance

B. The SML can have a negative slope assuming the CAPM is valid

C. The SML is a graphic representation of the relationship between expected return and beta.

D. Properly valued assets plot exactly on the SML assuming the CAPM is valid.

E. Assuming CAPM is valid, mispriced assets can lie either above or below the SML.

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 6%. The tax rate is 30%. Therefore, the weighted average cost of capital is:

$K_E = 0.12$ $K_D = \left(1 + \frac{0.06}{2}\right)^2 - 1 = 6.09\%$

$P = \frac{6}{0.12} = \$50 \Rightarrow E = \$50{,}000{,}000$

$D = 20{,}000 \times 1100 = \$22{,}000{,}000$

$\therefore WACC = \frac{50}{72} \times 0.12 + \frac{22}{72} \times 0.0609 \times 0.7 = 9.6359\%$

A. 8.975%

B. 10.194%

C. 9.636%

D. 9.617%

E. None of the above

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

A. WACC cannot be used to evaluate projects in which the capital structure is significantly different from the firm's overall structure.

B. WACC determines the cash flows that can be distributed to shareholders after paying operating costs, financing costs, and debt repayments.

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

D. WACC adjusts for the tax deductibility of interest costs.

E. All of the above.

23. WidgetsRus will produce 55,000 widgets next year. Variable costs will equal 40 percent of sales, while fixed costs will total $110,000. At what price must each widget be sold for the company to achieve an EBIT (Earnings before interest and taxes) of $95,000?

A. $2.00
B. $4.45
C. $5.00
D. $5.37
E. $6.21

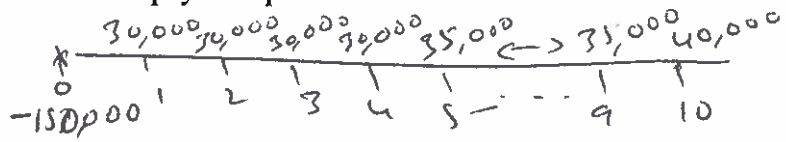
$EBIT = (S - C) = 55{,}000 * P - 0.4 * 55000 * P - 110{,}000 = 95{,}000$

$\therefore 0.6 * 55{,}000P = 95{,}000 + 110{,}000$

$P = \$6.21$

24. 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 payback period for this investment?

A. 5.23 years
B. 4.86 years
C. 4.00 years
D. 6.12 years
E. 4.35 years



In 4 years: 120,000
need to recover 30,000 in year 4

$\frac{30}{35} = 0.857 \Rightarrow 4.857$ years

25. 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 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 greater than one.
C. If the PI of a project is greater than one, then the IRR will always be less than the project's cost of capital
D. If the NPV of a project is zero, then the IRR of the project will be equal to the discount rate for the project.
E. Both A and D.

26. A firm's pre-tax cost of debt is Kd = 8%, its cost of equity is Ke=12%, 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 WACC?

$\frac{D}{E} = \frac{2}{3} \Rightarrow \frac{D}{V} = \frac{2}{5}$, $\frac{E}{V} = \frac{3}{5}$

A. 7.2%

B. 7.68%

C. 9.12%

D. 10.00%

E. 10.40%.

$\therefore WACC = \frac{3}{5} * 0.12 + \frac{2}{5} * 0.08 * 0.6$

$= 9.12\%$

27. 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 $853.61. What is the bond's annual coupon interest rate?

$853.61 = \frac{C}{0.045} * \left(1 - \frac{1}{1.045^{10}}\right) + \frac{1000}{1.045^{10}}$

A. 5.10%

B. 5.20%

C. 5.30%

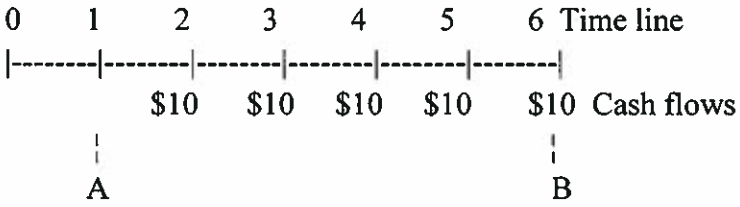
D. 5.40%

E. None of the above

$C = \$26.499 =$ Annual Coupon payment $= 2 * 26.499$

As a % of face value $= \frac{2 * 26.499}{1000}$

28. Study the time line and accompanying 5-period cash-flow pattern below.



The present value of the cashflows at Point A is the present value of a 5-period _____, whereas the future value at Point B is the future value of a 5-period _____.

A. Ordinary annuity starting at 1; ordinary annuity starting at 1.

B. Ordinary annuity starting at 1; annuity due starting at 1.

C. Annuity due starting at 1; annuity due starting at 1.

D. Annuity due starting at 1; ordinary annuity starting at 1.

E. None of the above.

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. (10 Points) Risk and Return:

Suppose the economy can be in one of the following three states:

State	Probability	Return (stock X)	Return (Market)	Rf
Boom	0.3	10%	7%	2%
Normal	0.4	3%	3%	2%
Recession	0.3	-9%	-5%	2%

Assuming that CAPM is the correct model for pricing security X:

i. (6 points) Calculate the beta of security X relative to the market.

ii. (2 points) Calculate the alpha of security X.

iii. (2 point) Based on your answers to part (i) and (ii), Is security X Underpriced/Overpriced/accurately priced? Why?

$E(R_x)$ - 1 point-
$E(R_m)$ - 1 point-
σ_m^2 - 1 point-
$\sigma_{m,x}$ - 2 point-
β_x - 1 point-

(i)

$E(R_x) = 0.3\times0.1 + 0.4\times0.03 + 0.3\times(-0.09) = 1.5\%$

$E(R_m) = 0.3\times0.07 + 0.4\times0.03 + 0.3\times(-0.05) = 1.8\%$

$\sigma_m^2 = 0.3\times(0.07-0.018)^2 + 0.4\times(0.03-0.018)^2 + 0.3\times(-0.05-0.01$

$= 0.002256$

$\sigma_{m,x} = 0.3\times(0.1-0.015)\times(0.07-0.018) + 0.4\times(0.03-0.015)\times(0.03-0.018)$

$+ 0.3\times(-0.09-0.015)\times(-0.05-0.018) = 0.00354$

$\therefore \beta_x = \frac{\sigma_{m,x}}{\sigma_m^2} = \frac{0.00354}{0.002256} = 1.569$

(ii) $E(R_{x,CAPM}) = 0.02 + 1.569 \times (0.018 - 0.02)$

$= 1.6862\%$

$\therefore \alpha = E(R_x) - E(R_{x,CAPM}) = 1.5\% - 1.6862\%$

$= -0.1862\%$

(iii) The security is overpriced

It should earn a return of 1.6862%

However, it is earning 1.5% < SML return

For (ii) & (iii) If they get Correct Answer award 2 point, zero otherwise.

Q2. (4 Points) Cost of Capital:

What is typically higher – cost of debt or the cost of equity? Why (give two reasons)?

Typically Cost of Equity is higher. ← 2 points

1 point for each reason.

→ – ~~Cost of~~ Interest on debt is paid pre-tax

↘ – debt holders have superior rights over the cash-flow Equity holders receive residual cash flows.

Q3. (10 Points): Capital Budgeting

You are a recycler of spent plutonium rods from nuclear reactors, and a new government mandate requires you to purchase a filtration system for your wastewater. You can choose between two machines:

Machine 1 has a four-year life and costs 1,200,000. It has an annual pre-tax operating cost of $100,000 in the first year. Operating costs are expected to increase at a rate of 5% per year over the life of machine.

Machine 2 has a six-year life costs $720,000. It has an annual pre-tax operating cost of $80,000 in the first year. The operating costs for the second machine are expected to increase at the rate of 8% per year over the life of the machine.

You do not foresee any further changes in environmental laws or changes in water filtration technology. Both machines have zero salvage values. Both machines belong to CCA class 22 with a depreciation rate of 50%. The corporate tax rate is 34% and the appropriate discount rate is 12%

Which machine should you buy?

$$NPV_1 = -1{,}200{,}000 - \frac{100{,}000\times(1-0.34)}{0.12-0.05}\left(1-\frac{1.05^4}{1.12^4}\right)+ \frac{1{,}200{,}000\times 0.5\times 0.34}{0.12+0.5}\times\frac{1+0.5\times 0.12}{1.12} = -1{,}103{,}116.91$$ ← 2 points

$$NPV_2 = -720{,}000 - \frac{80{,}000\times(1-0.34)}{0.12-0.08}\left(1-\frac{1.08^6}{1.12^6}\right)+ \frac{720{,}000\times 0.5\times 0.34}{0.12+0.5}\times\frac{1+0.5\times 0.12}{1.12} = -791{,}929.59$$ ← 2 points

Machines have unequal life. Therefore we need to estimate the EANPV:

$$-1{,}103{,}116.91 = \frac{EANPV_1}{0.12}\left(1-\frac{1}{1.12^4}\right)$$

$$\Rightarrow EANPV_1 = -363{,}184.08$$ ← 2 points

$$-791{,}929.59 = \frac{EANPV_2}{0.12}\left(1-\frac{1}{1.12^6}\right)$$ ← 2 points

$$\Rightarrow EANPV_2 = -192{,}617.64$$

Choose Machine 2 ← 2 points

Here it is not necessary to estimate EANPV because longer life machine has lower net cost. Therefore, the decision can be made by simply comparing the NPV.

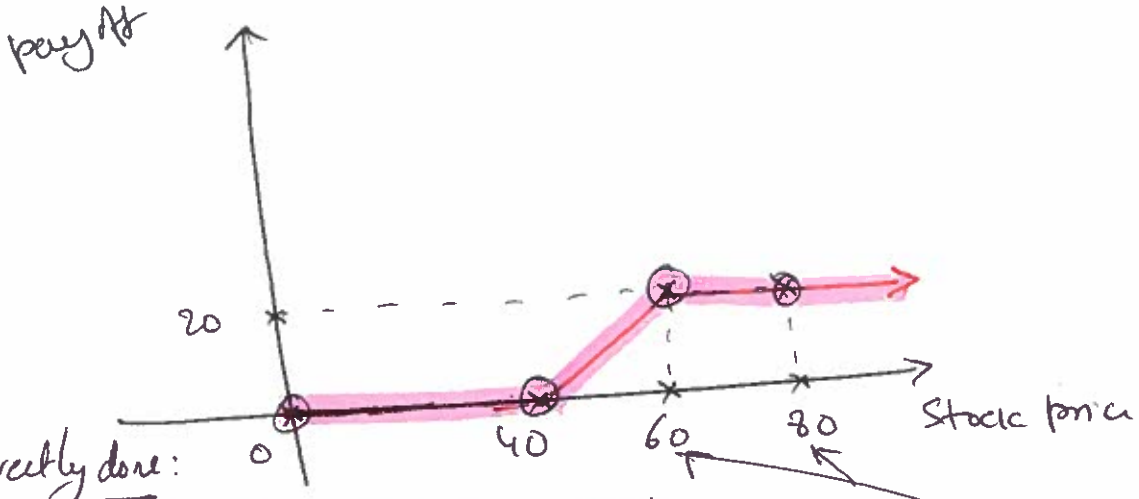
If NPV is correct and student has provided reason for not computing EANPV ← award 4 points

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 call option with strike price \$40 and simultaneously selling another call option with strike price \$60. Both options are 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.).*

	∅	40	60	80
C_{40}	∅	∅	20	40
$-C_{60}$	∅	∅	∅	−20
portfolio	∅	∅	20	20



If Correctly done:
- 1 point for Each axes labels.
- 1 point for Correctly labeling 40 on the x-axis
- 1 point for Correctly labeling 60 on the x-axis
- 1 point for overall Correct.

If portfolio payoff is missing, but provided Correct payoff for Each call → 2 points total.

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

Stock price increasing from \$40 to \$60

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: $ER = \sum_{i=1}^{n}\left(r_i \times \text{Prob}_i\right)$
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: $ER_p = \sum_{i=1}^{n}\left(w_i * ER_i\right)$
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	$WACC = K_e\frac{S}{V} + K_p\frac{P}{V} + K_i\frac{D}{V}$, 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: $K_{ne} = K_e \times \frac{P_0}{NP}$