UNIVERSITÉ Concordia UNIVERSITY

Examination Cover Sheet

Print Name: ➔		**ID Number:** ➔	
COURSE FINANCE	**NUMBER** COMM 308	**SECTIONS: (➔ Circle your section)** CC, DD, G, H, I, J	
EXAMINATION Final Exam **VERSION BLUE**	**DATE** April 28, 2014	**TIME** 3 hours 19:00 to 22:00	**# OF PAGES 18** Including this cover
INSTRUCTOR: **(➔ Underline your instructor's name)** Saif Ullah David Newton Rahul Ravi June Riley Nada El Hassan Mahmood Mohebshahedin		**DIVISION** John Molson School of Business Concordia University	

INSTRUCTIONS: Please read these carefully

1. **Please ensure you have 18 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: 9 Points)	(Max: 4 Points)	(Max: 11 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. 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 second year will represent repayment of principal?

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

$PMT = \frac{500{,}000 * 0.07}{\left(1 - \frac{1}{1.07^5}\right)} = 121{,}945.35$

$OB_2 = \frac{121{,}945.35}{0.07} * \left(1 - \frac{1}{1.07^4}\right) = 413{,}054.65$

$Int_2 = 0.07 * 413{,}054.61 = 28{,}913.83 \Rightarrow 23.7\%$

2. You plan to buy a new HDTV. The dealer offers to sell the set to you on credit. You will have 3 months in which to pay, but the dealer says you will be charged a 15 percent interest rate; that is, the nominal rate is 15 percent, quarterly compounding. As an alternative to buying on credit, you can borrow the funds from your bank. At what nominal bank interest rate (APR compounded monthly) should you be indifferent between the two types of credit?

   A. 13.7643%
   B. 14.2107%
   C. 14.8163%
   D. 15.5397%
   E. 15.3984%

Convert 15% APR quarterly compounding to APR monthly compounding.

$EAR = \left(1 + \frac{0.15}{4}\right)^{4/12} - 1 = 1.2347\%$

APR compounded monthly $= 1.2347 * 12 = 14.8163\%$

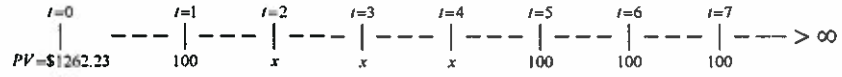
3. A friend promises to pay you $600 two years from now if you loan him $500 today. What annual interest rate is your friend offering?

   A. 7.5%
   B. 8.5%
   C. 9.5%
   D. 10.0%
   E. 11.5%

$500 * (1+k)^2 = 600$

$k = \sqrt{\frac{6}{5}} - 1 = 9.54\%$

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 $100 payment continues in perpetuity.



Let $y = x - 100$ or $x = y + 100$

$$1262.23 = \frac{100}{0.12} + \frac{y}{0.12} \times \left[1 - \frac{1}{1.12^3}\right] \times \frac{1}{1.12}$$

A. $100.00

B. $142.96

C. $200.00

D. $300.00

E. None of the above

$y = \$200$

$\therefore x = \$300$

5. You are offered an investment opportunity with the "guarantee" that your investment will double in 5 years. Assuming annual compounding, what annual rate of return would this investment provide?

$$x \times (1+r)^5 = 2x$$

A. 40.00%

B. 100.00%

C. 14.87%

D. 20.00%

E. 18.74%

$$r = 2^{1/5} - 1 = 14.869\%$$

6. Your banker quotes you two different loan payments on a $12,000 car loan, one calling for 36 monthly payments and the other calling for 24 monthly payments. Both loans have the same EAR. What would be a good reason for her to advise you to take the short loan?

A. The payment would be lower on the 24-month loan.

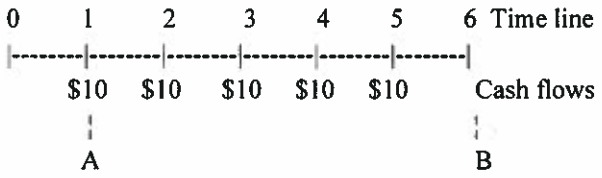
B. The shorter term loan will be less sensitive to changes in interest rates.

C. You could earn interest by investing the difference between the two loan payments.

D. All of the above.

E. None of the above.

7. 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 0; ordinary annuity starting at 1.

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

C. annuity due starting at 0; annuity due starting at 1.

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

E. None of the above.

8. A new project with a life of 10 years, costs $210,000 and is expected to generates annual net cash inflows of $x each year. The project has a discounted payback period of 10 years. Which of the following statement/s is/are most correct: (*Note: RRR stands for the required rate of return for the project*)

A. $NPV_A>0$, and $PI_A>1$

B. $IRR_A>RRR_A$, and Payback period will be less than 10 years

C. $NPV_A=0$, and $PI_A=1$

D. Both A and B

E. The answer will depend on the magnitude of "x".

9. Which of the following is the best example of a conflict of interest between management and shareholders?

A. Management borrows heavily to fund risky projects.

B. Management moves production overseas to take advantage of low-cost labor.

C. Management fights against a takeover bid despite the market consensus that it is the most reasonable bid.

D. Management voluntarily recalls defective products.

E. All of the above.

10. A _____ can lose, at most, what she has already invested in a firm.

I. common stockholder
II. limited partner
III. general partner
IV. sole proprietor

A. I only
B. I and II only
C. I, II, and IV only
D. II, III, and IV only
E. II and III only

11. A particular asset has a beta of 1.2 and an expected return of 10%. The expected return on the market portfolio is 13% and the risk-free is 5%. Which of the following statement is correct?

A. This asset is correctly priced according to the CAPM because its returns lie on the SML.
B. This asset is underpriced according to the CAPM because its returns lie above the SML.
C. This asset is overpriced according to the CAPM because its returns lie above the SML.
D. This asset is overpriced according to the CAPM because its returns lie below the SML
E. This asset is underpriced according to the CAPM because its returns lie below the SML.

SML $E(R) = 0.05 + 1.2 * (0.13 - 0.05) = 14.6\% > 10\%$

12. Which of the following statements is most correct?

A. Assume that the required rate of return on a given stock is 13%. If the stock's dividend is expected to grow (in perpetuity) at a constant rate of 5%, its expected capital gain is 5% as well.
B. The dividend yield on a stock is equal to the expected return less the expected capital gain.
C. A stock's dividend yield can never exceed the expected growth rate.
D. Answers A and B are correct.
E. Answers A, B, and C are correct.

13. Given no change in required returns, the price of a stock whose dividend is constant will: (Assume the required rate of return for the stock is k% EAR)

A. Increase over time at a rate of k%.

B. Decrease over time at a rate of k%.

C. Increase over time at a rate equal to the dividend growth rate.

D. Decrease over time at a rate equal to the dividend growth rate.

E. Remain unchanged.

14. A company paid a dividend last year of $1.75. The expected ROE for next year is 14.5%. An appropriate required return on the stock is 10%. If the firm has a retention ratio (plowback) of 75%, the dividend in the coming year should be

$g = b \times ROE = 0.145 * 0.75 = 10.875\%$

$D_1 = 1.75 * (1.10875)$

$= \$1.94$

A. $1.80

B. $2.12

C. $1.77

D. $1.94

E. Insufficient information

15. What is the coupon rate for a bond with three years until maturity, a price of $1,053.46, and a yield to maturity of 6%? Assume the bond pays annual coupons and it has a face value of $1000.

$1053.46 = \frac{C}{0.06} * \left[1 - \frac{1}{1.06^3}\right] + \frac{1000}{1.06^3}$

$C = \$80 = 8\%$

A. 4%

B. 8%

C. 10%

D. 16%

E. None of the above

16. The discount rate that makes the present value of a bond's payments equal to its price is termed the:

A. rate of return

B. yield to maturity.

C. required rate of return

D. current yield.

E. coupon rate.

17. In a weak form efficient market the correlation coefficient between stock returns for two non-overlapping time periods is expected to be

A. positive and large.

B. positive and small.

C. zero.

D. negative and small.

E. negative and large.

18. What is the yield to maturity for a $1000 face value bond, paying $100 annually that has six years until maturity and sells for $1,000?

A. 6%

B. 8.5%

C. 10.0%

D. 12.5%

E. None of the above

Trading at par.
Coupon = YTM = 10%.

19. Suppose Sarah can borrow and lend at the risk free-rate of 3%. Assume Sarah is risk averse. Which of the following four risky portfolios should she hold in combination with a position in the risk-free asset?

A. portfolio with a standard deviation of 15% and an expected return of 12% $SR_1 = \frac{0.12-0.03}{0.15} = 0.6$

B. portfolio with a standard deviation of 19% and an expected return of 15% $SR_2 = 0.6316$

C. portfolio with a standard deviation of 25% and an expected return of 18% $SR_3 = 0.52$

D. portfolio with a standard deviation of 12% and an expected return of 9% $SR_4 = 0.5$

E. Insufficient information.

20. According to the CAPM (capital asset pricing model), the security market line is a straight line. The intercept of this line should be equal to

A. zero

B. the expected risk premium on the market portfolio

C. the risk-free rate

D. the expected return on the market portfolio

E. The average level of mispricing in the market

21. FarNorth Airlines is expected to pay a dividend of $8 in the coming year. Dividends are expected to decline at the rate of 2% per year. The risk-free rate of return is 6% and the expected return on the market portfolio is 14%. The stock of Far North Airlines Company has a beta of -0.25. The price of the stock is _____.

A. $80.00

B. 133.33

C. $200.00

D. $400.00

E. none of the above

$E(K) = 0.06 + (-0.25) * (0.14 - 0.06)$

$= 4\%$.

$P_0 = \frac{8}{0.04 + 0.02} = \$133.33$

22. When two risky securities that are positively correlated but not perfectly 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.

23. FarNorth Airlines is considering two equally risky, mutually exclusive projects, both of which have normal cash flows (initial negative cash flow followed by a set of net positive cash flows). Project A has an IRR of 11%, while Project B's IRR is 14%. When the WACC is 8%, the projects have the same NPV. Given this information, which of the following statements is correct?

A. If the WACC is 13%, Project A's NPV will be higher than Project B's.

B. If the WACC is 9%, Project A's NPV will be higher than Project B's.

C. If the WACC is 6%, Project B's NPV will be higher than Project A's.

D. If the WACC is greater than 14%, Project A's NPV will exceed Project B's.

E. If the WACC is greater than 8%, Project B's NPV will be higher than Project A's.

24. Other things equal, the price of a stock call option is positively correlated with the following factors:

A. the stock price.

B. the time to expiration.

C. the stock volatility.

D. the risk free rate.

E. all of the above.

25. What happens to the NPV of a one-year project if fixed costs are increased from \$400 to \$600, the firm is profitable, has a 15% tax rate and employs a 12% cost of capital? Assume all costs are incurred at the end of the year.

A. NPV decreases by \$200.00.

B. NPV decreases by \$170.00.

C. NPV decreases by \$151.79.

D. NPV decreases by \$113.04.

E. Insufficient information.

Year 1 Cash flow declines by $0.85 * 200$
$= \$170$

$PV_0 = \frac{170}{1.12} = \$151.79$

NPV declines by \$151.79

26. A firm bought a new sewing machine for \$40,000 that will be depreciated in asset class 39, which has a capital cost allowance (CCA) rate of 30%. The firm pays 35% corporate tax. What is the undepreciated capital cost (UCC) amount in the beginning of year 4?

A. \$14,660

B. \$15,600

C. \$16,660

D. \$17,660

E. None of the above.

Year 4 (Beginning) undepreciated cost

$= 40{,}000 * \left(1 - \frac{0.3}{2}\right) * (1-0.3) * (1-0.$

$= \$16{,}660$

27. What proportion of a firm is equity financed if the weighted average cost of capital (WACC) is 14%, the after-tax cost of debt is 7%, the tax rate is 35% and the required return on equity is 18%?

Let Equity portion be x

$x * 0.18 + (1-x)\,0.07 = 0.14$

$x = 63.64\%$

A. 54.00%

B. 63.64%

C. 70.26%

D. 77.78%

E. None of the above.

28. When comparing two projects with different lives, why do you compute an annuity with an equivalent present value to the NPV of the project?

A. So that we can see which project has the greatest net present value.

B. So that the projects can be compared on their cost or value created per year.

C. Because it is easier to calculate equivalent annual NPV than to calculate the IRR.

D. Because it is the recommended way of comparing two projects with different lives.

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. (9 Points) Risk and Return:

Suppose the economy can be in one of the following two states: (i) Boom or "good" state and (ii) Recession or "bad" state. Each state can occur with an equal opportunity (50%). The annual return on the market and a certain security X in the two states of the economy are as follows:

- *Market*: at the end of the year, the market is expected to yield a return of 30% in the good state and a return of (-10%) in the bad state;
- *Security X*: at the end of the year, the security is expected to yield a return of 40% in the good state and a return of (-35%) in the bad state;

Furthermore, assume that annual risk-free rate of return is 6% in all states of the market.

Assuming CAPM is the correct model:

i. (7 points) Calculate the beta of security X relative to the market.

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

(i) β of security X is:

Market: $E(r_m) = 0.5 * 0.3 + 0.5 \times (-0.1) = 0.1 = 10\%$.

$\sigma^2_{r_m} = 0.5 \times (0.3 - 0.1)^2 + 0.5 \times (-0.1 - 0.1)^2 = 0.04$

Security X: $E(r_x) = 0.5 \times 0.4 + 0.5 \times (-0.35) = 0.025 = 2.5\%$.

$Cov(r_m, r_x) = 0.5 \times (0.3 - 0.1)(0.4 - 0.025) + 0.5 \times (-0.1 - 0.1)(-0.35 - 0.025)$

$= 0.0750$

$$\beta_x = \frac{Cov(r_m, r_x)}{\sigma_m^2} = \frac{0.0750}{0.04} = 1.875$$

(3)(ii) Security α is:

$$\alpha = E(r_x) - \left[r_f - \beta_x * (r_m - r_f) \right]$$

$$= 0.025 - \left[0.06 - 1.875 \times (0.1 - 0.06) \right]$$

$$= -11\%$$

Q2. (4 Points) Time Value mechanics:

John and Jane are twins. Jane invests $5,000 at age 20 and earns 5% EAR. John invests $10,000 at age 40 and earns 5% EAR. Assuming that John and Jane do not have any other savings, no matter how long they live, John will never have as much money as Jane. Explain why.

At 40, $FV(\text{Jane's Investment}) = \$5{,}000 \times 1.05^{20}$

$= \$13{,}266.49$

~~This amount~~

$\therefore FV_{40}(\text{Jane's Investment}) > \$10{,}000$

$\therefore$ John will never have as much money as Jane.

(10)

Q3. **(11 Points)** This question has two unrelated parts. Part (a) is Cost of Capital. Part (b) is Capital Budgeting. Information from part (a) should not be used in part (b)

Question 3, Part a) (5 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 and a market value per share of $50. The current beta of the stock is 1.5. The Treasury bill rate is 5%, and the market risk premium is 8.5%. The company is in the 40% tax bracket. What is the company's current weighted average cost of capital?

$$\text{Market value of debt} = \frac{5{,}000{,}000}{0.04} * \left[1 - \frac{1}{1.04^{20}}\right] + \frac{100{,}000{,}000}{1.04^{20}}$$

$$= \$113{,}590{,}326.34$$

$$\text{Market value of Equity} = \$50{,}000{,}000$$

$$k_d = \left(1 + \frac{0.08}{2}\right)^2 - 1 = 8.16\%$$

$$k_E = 0.05 + 1.5 \times 0.085 = 17.75\%$$

$$WACC = \frac{50{,}000{,}000}{163{,}590{,}326.34} * 0.1775 + \frac{113{,}590{,}326.3}{163{,}590{,}326.34} * 0.0816 * (1 - 0.4)$$

$$= 8.825\%$$

Question 3, Part b) (6 Points): Capital Budgeting

Consider the following cash flows of two mutually exclusive projects for Tropical Rubber Company. Assume the discount rate for Tropical Rubber is 10 percent.

Year	Forklift	Conveyor
0	-$500,000	-$1,000,000
1	500,000	600,000
2	500,000	400,000
3	100,000	1,000,000

i. (2 points) Based on the NPV which project should be taken?

ii. (2 Points) Based on the Profitability Index, which project should be taken?

iii. (2 points) Assuming that (i) and (ii) provided contradicting recommendations. As the CEO of Tropical Rubber, when should you follow PI recommendation? When do you follow the NPV recommendation?

(i) $NPV_{Forklift} = -500{,}000 + \frac{500{,}000}{1.1} + \frac{500{,}000}{1.1^2} + \frac{100{,}000}{1.1^3}$

$= \$442{,}900.075$

$NPV_{Con} = -1{,}000{,}000 + \frac{600{,}000}{1.1} + \frac{400{,}000}{1.1^2} + \frac{1{,}000{,}000}{1.1^3}$

$= \$627347.86$

=> Accept Conveyor project.

(ii) $PI_{Forklift} =$ 942900.0751/500000 = 1.8858 ,and:

$PI_{Con} = \frac{1627347.86}{1000{,}000} = 1.627$

=> Accept Forklift project.

(iii) - When facing Capital ~~constraints~~ rationing P.I. would be better because it measures the percentage return per dollar invested.

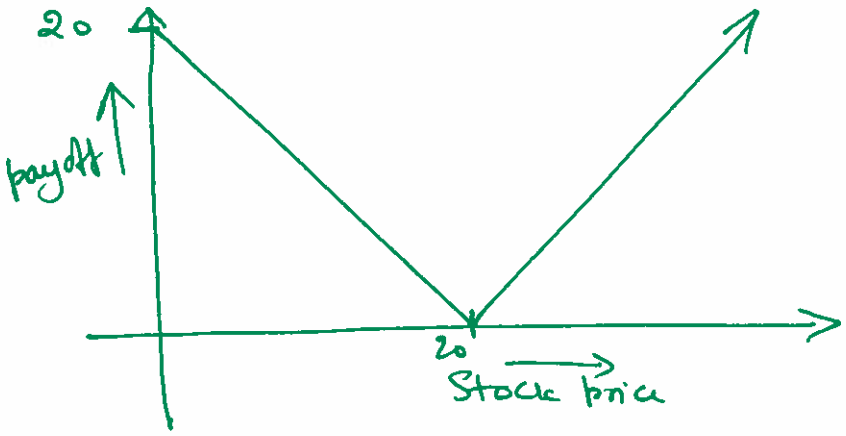
- All other situation - NPV would be prefered because it measures the total wealth change for the firm.

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 the following two options on one share of XYZ:

a. A Call option with strike price $20
b. A Put option with strike price $20

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.).*



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

High stock price volatility around $20

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:* $NPV = PV(Annual\ CFs) + PV(ECF_n) - CF_0$
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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: $NP = \frac{I(1-T)}{K_i}\left[1 - \frac{1}{(1+K_i)^n}\right] + F\left(\frac{1}{(1+K_i)^n}\right)$
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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: $K_{ne} = K_e \times \frac{P_0}{NP}$

UNIVERSITÉ Concordia UNIVERSITY

Examination Cover Sheet

Print Name: ➔		**ID Number:** ➔	
COURSE FINANCE	**NUMBER** COMM 308	**SECTIONS: (➔ Circle your section)** CC, DD, G, H, I, J	
EXAMINATION Final Exam **VERSION GREEN**	**DATE** April 28, 2014	**TIME** 3 hours 19:00 to 22:00	**# OF PAGES 18** Including this cover
INSTRUCTOR: **(➔ Underline your instructor's name)** Saif Ullah Rahul Ravi Nada El Hassan Mahmood Mohebshahedin David Newton June Riley		**DIVISION** John Molson School of Business Concordia University	

INSTRUCTIONS: Please read these carefully

1. **Please ensure you have 18 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 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: 9 Points)	(Max: 4 Points)	(Max: 11 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. 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 second year will represent the interest payment?

   A. 76.29%

   B. 42.82%

   C. 50.28%

   D. 23.71%

   E. None of the above

2. You plan to buy a new HDTV. The dealer offers to sell the set to you on credit. You will have 3 months in which to pay, but the dealer says you will be charged a 15 percent interest rate; that is, the nominal rate is 15 percent, quarterly compounding. As an alternative to buying on credit, you can borrow the funds from your bank. At what nominal bank interest rate (APR compounded monthly) should you be indifferent between the two types of credit?

   A. 13.7643%

   B. 14.8163%

   C. 14.2107%

   D. 15.5397%

   E. 15.3984%

3. A friend promises to pay you $605 two years from now if you loan him $500 today. What annual interest rate is your friend offering?

   A. 7.5%

   B. 8.5%

   C. 9.5%

   D. 10.0%

   E. 11.5%

4. Other things equal, the price of a stock call option is positively correlated with the following factors:

   A. the stock price.

   B. the time to expiration.

   C. the stock volatility.

   D. the risk free rate.

   E. all of the above.

5. What happens to the NPV of a one-year project if fixed costs are increased from $400 to $600, the firm is profitable, has a 15% tax rate and employs a 12% cost of capital? Assume all costs are incurred at the end of the year.

   A. NPV decreases by $200.00.

   B. NPV decreases by $170.00.

   C. NPV decreases by $151.79.

   D. NPV decreases by $113.04.

   E. Insufficient information.

6. A firm bought a new sewing machine for $40,000 that will be depreciated in asset class 39, which has a capital cost allowance (CCA) rate of 30%. The firm pays 35% corporate tax. What is the undepreciated capital cost (UCC) amount in the beginning of year 4?

   A. $14,660

   B. $15,600

   C. $16,660

   D. $17,660

   E. None of the above.

7. When comparing two projects with different lives, why do you compute an annuity with an equivalent present value to the NPV of the project?

A. So that we can see which project has the greatest net present value.

B. So that the projects can be compared on their cost or value created per year.

C. Because it is easier to calculate equivalent annual NPV than to calculate the IRR.

D. Because it is the recommended way of comparing two projects with different lives.

E. None of the above.

8. You are offered an investment opportunity with the "guarantee" that your investment will double in 5 years. Assuming annual compounding, what annual rate of return would this investment provide?

A. 40.00%

B. 100.00%

C. 14.87%

D. 20.00%

E. 18.74%

9. Your banker quotes you two different loan payments on a $12,000 car loan, one calling for 36 monthly payments and the other calling for 24 monthly payments. Both loans have the same EAR. What would be a good reason for her to advise you to take the short loan?

A. The payment would be lower on the 24-month loan.

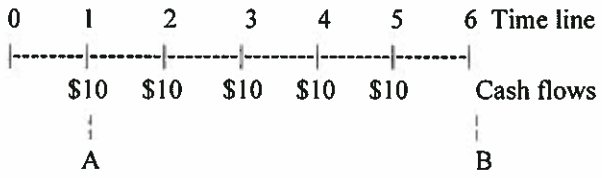
B. The shorter term loan will be less sensitive to changes in interest rates.

C. You could earn interest by investing the difference between the two loan payments.

D. All of the above.

E. None of the above.

10. 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 0; ordinary annuity starting at 1.

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

C. annuity due starting at 0; annuity due starting at 1.

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

E. None of the above.

11. A new project with a life of 10 years, costs $210,000 and is expected to generates annual net cash inflows of $x each year. The project has a discounted payback period of 10 years. Which of the following statement/s is/are most correct: (*Note: RRR stands for the required rate of return for the project*)

A. $NPV_A>0$, and $PI_A>1$

B. $IRR_A>RRR_A$, and Payback period will be less than 10 years

C. $NPV_A=0$, and $PI_A=1$

D. Both A and B

E. The answer will depend on the magnitude of "x".

12. Which of the following is the best example of a conflict of interest between management and shareholders?

A. Management borrows heavily to fund risky projects.

B. Management moves production overseas to take advantage of low-cost labor.

C. Management fights against a takeover bid despite the market consensus that it is the most reasonable bid.

D. Management voluntarily recalls defective products.

E. All of the above.

13. A _____ can lose, at most, what she has already invested in a firm.

I. common stockholder
II. limited partner
III. general partner
IV. sole proprietor

A. I only
B. I and II only
C. I, II, and IV only
D. II, III, and IV only
E. II and III only

14. A particular asset has a beta of 1.2 and an expected return of 10%. The expected return on the market portfolio is 13% and the risk-free is 5%. Which of the following statement is correct?

A. This asset is correctly priced according to the CAPM because its returns lie on the SML.
B. This asset is underpriced according to the CAPM because its returns lie above the SML.
C. This asset is overpriced according to the CAPM because its returns lie above the SML.
D. This asset is overpriced according to the CAPM because its returns lie below the SML
E. This asset is underpriced according to the CAPM because its returns lie below the SML.

15. Which of the following statements is most correct?

A. Assume that the required rate of return on a given stock is 13%. If the stock's dividend is expected to grow (in perpetuity) at a constant rate of 5%, its expected capital gain is 5% as well.
B. The dividend yield on a stock is equal to the expected return less the expected capital gain.
C. A stock's dividend yield can never exceed the expected growth rate.
D. Answers A and B are correct.
E. Answers A, B, and C are correct.

16. Given no change in required returns, the price of a stock whose dividend is constant will: (Assume the required rate of return for the stock is k% EAR)

A. Increase over time at a rate of k%.

B. Decrease over time at a rate of k%.

C. Increase over time at a rate equal to the dividend growth rate.

D. Decrease over time at a rate equal to the dividend growth rate.

E. Remain unchanged.

17. A company paid a dividend last year of $1.75. The expected ROE for next year is 14.5%. An appropriate required return on the stock is 10%. If the firm has a retention ratio (plowback) of 75%, the dividend in the coming year should be

A. $1.80

B. $2.12

C. $1.77

D. $1.94

E. Insufficient information

18. What is the coupon rate for a bond with three years until maturity, a price of $1,053.46, and a yield to maturity of 6%? Assume the bond pays annual coupons and it has a face value of $1000.

A. 4%

B. 8%

C. 10%

D. 16%

E. None of the above

19. The discount rate that makes the present value of a bond's payments equal to its price is termed the:

A. rate of return

B. yield to maturity.

C. required rate of return

D. current yield.

E. coupon rate.

20. In a weak form efficient market the correlation coefficient between stock returns for two non-overlapping time periods is expected to be

A. positive and large.

B. positive and small.

C. zero.

D. negative and small.

E. negative and large.

21. What is the yield to maturity for a $1000 face value bond, paying $100 annually that has six years until maturity and sells for $1,000?

A. 6%

B. 8.5%

C. 10.0%

D. 12.5%

E. None of the above

22. Suppose Sarah can borrow and lend at the risk free-rate of 3%. Assume Sarah is risk averse. Which of the following four risky portfolios should she hold in combination with a position in the risk-free asset?

A. portfolio with a standard deviation of 15% and an expected return of 12%

B. portfolio with a standard deviation of 19% and an expected return of 15%

C. portfolio with a standard deviation of 25% and an expected return of 18%

D. portfolio with a standard deviation of 12% and an expected return of 9%

E. Insufficient information.

23. According to the CAPM (capital asset pricing model), the security market line is a straight line. The intercept of this line should be equal to

A. zero

B. the expected risk premium on the market portfolio

C. the risk-free rate

D. the expected return on the market portfolio

E. The average level of mispricing in the market

24. FarNorth Airlines is expected to pay a dividend of $8 in the coming year. Dividends are expected to decline at the rate of 2% per year. The risk-free rate of return is 6% and the expected return on the market portfolio is 14%. The stock of Far North Airlines Company has a beta of -0.25. The price of the stock is _____.

A. $80.00

B. 133.33

C. $200.00

D. $400.00

E. none of the above

25. When two risky securities that are positively correlated but not perfectly 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.

26. FarNorth Airlines is considering two equally risky, mutually exclusive projects, both of which have normal cash flows (initial negative cash flow followed by a set of net positive cash flows). Project A has an IRR of 11%, while Project B's IRR is 14%. When the WACC is 8%, the projects have the same NPV. Given this information, which of the following statements is correct?

A. If the WACC is 13%, Project A's NPV will be higher than Project B's.

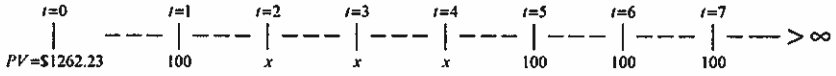
B. If the WACC is 9%, Project A's NPV will be higher than Project B's.

C. If the WACC is 6%, Project B's NPV will be higher than Project A's.

D. If the WACC is greater than 14%, Project A's NPV will exceed Project B's.

E. If the WACC is greater than 8%, Project B's NPV will be higher than Project A's.

27. 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 $100 payment continues in perpetuity.



A. $100.00

B. $142.96

C. $200.00

D. $300.00

E. None of the above

28. What proportion of a firm is equity financed if the weighted average cost of capital (WACC) is 14%, the after-tax cost of debt is 7%, the tax rate is 35% and the required return on equity is 18%?

A. 54.00%

B. 63.64%

C. 70.26%

D. 77.78%

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. (9 Points) Risk and Return:

Suppose the economy can be in one of the following two states: (i) Boom or "good" state and (ii) Recession or "bad" state. Each state can occur with an equal opportunity (50%). The annual return on the market and a certain security X in the two states of the economy are as follows:

- *Market*: at the end of the year, the market is expected to yield a return of 30% in the good state and a return of (-10%) in the bad state;
- *Security X*: at the end of the year, the security is expected to yield a return of 40% in the good state and a return of (-35%) in the bad state;

Furthermore, assume that annual risk-free rate of return is 6% in all states of the market.

Assuming CAPM is the correct model:

i. (7 points) Calculate the beta of security X relative to the market.

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

Q2. (4 Points) Time Value mechanics:

John and Jane are twins. Jane invests $5,000 at age 20 and earns 5% EAR. John invests $10,000 at age 40 and earns 5% EAR. Assuming that John and Jane do not have any other savings, no matter how long they live, John will never have as much money as Jane. Explain why.

Q3. **(11 Points)** This question has two unrelated parts. Part (a) is Cost of Capital. Part (b) is Capital Budgeting. Information from part (a) should not be used in part (b)

Question 3, Part a) (5 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 and a market value per share of $50. The current beta of the stock is 1.5. The Treasury bill rate is 5%, and the market risk premium is 8.5%. The company is in the 40% tax bracket. What is the company's current weighted average cost of capital?

Question 3, Part b) (6 Points): Capital Budgeting

Consider the following cash flows of two mutually exclusive projects for Tropical Rubber Company. Assume the discount rate for Tropical Rubber is 10 percent.

Year	Forklift	Conveyor
0	-$500,000	-$1,000,000
1	500,000	600,000
2	500,000	400,000
3	100,000	1,000,000

i. (2 points) Based on the NPV which project should be taken?

ii. (2 Points) Based on the Profitability Index, which project should be taken?

iii. (2 points) Assuming that (i) and (ii) provided contradicting recommendations. As the CEO of Tropical Rubber, when should you follow PI recommendation? When do you follow the NPV recommendation?

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 the following two options on one share of XYZ:

a. A Call option with strike price $20
b. A Put option with strike price $20

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.).*

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

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:* $NPV = PV(Annual\ CFs) + PV(ECF_n) - CF_0$
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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: $K_{ne} = K_e \times \frac{P_0}{NP}$