

LAST NAME →		FIRST NAME →		ID NUMBER →
COURSE COMM	NUMBER 308			SECTIONS → (Circle your section) CA, CB
EXAMINATION FINAL VERSION BLUE	DATE August 15, 2015	TIME 14:00 – 17:00 (3 Hours)	# OF PAGES = 11 Including this cover	
INSTRUCTOR → (Circle your Instructor's name) Hamed Ghabari Hosein Maleki		DIVISION JOHN MOLSON SCHOOL OF BUSINESS		

INSTRUCTIONS:

- **PRINT YOUR NAME and I.D. #** in the space provided above. PRINT and MARK (FILL IN THE CIRCLES) your NAME and ID# on the computer answer sheet (scantron sheet).
- Students with a seven digit ID should add "2" in front to make it an eight digit ID. (eg. 1234567 becomes 21234567).
- **PART I:** Your responses to **PART I (multiple choice questions)** MUST be marked in **PENCIL** on the computer answer sheet. **ONLY THE RESPONSES MARKED ON THIS SHEET WILL BE GRADED. IF YOU DO NOT FILL IN THE ANSWERS ON THE SCANTRON SHEET, A SCORE OF ZERO IS AWARDED.** There are no part marks. Questions with no answer or multiple answers will not receive credit. You can use the examination itself for any rough work.
- **PART II:** Qualitative questions – point form is acceptable.
- **PART II:** Quantitative questions – **SHOW ALL YOUR CALCULATIONS** to ensure that you receive full/proper credit. If you use a financial calculator, be sure to show the formula and the inputs used.
- **PART II:** All answers must be recorded in **INK** on the exam paper itself. Please do not use red ink. If you are using the back of the exam for your answers, please label it clearly.
- **ONLY non-programmable, non-text, no-tape, noiseless calculators are permitted.** Financial calculators are permitted. ENCS sticker not required. Handheld devices capable of storing text and having calculator functionality (eg. Palm) are **not permitted**. Programmable and graphical calculators are **not permitted**.
- Your calculator cover and calculator user guide are **NOT** permitted.
- **YOUR CELL PHONE MUST BE TURNED OFF AND MUST NOT BE WITH YOU AT YOUR EXAM SEAT.**
- **NO DICTIONARIES** of any kind are permitted.
- **NO SCRAP PAPER** is permitted.
- This exam consists of **35 MC** questions in part I and 3 questions in part II. There are **11 pages**, a separate **2 page Formula Sheet**, and a **BLUE scantron sheet**. Please ensure that you have a complete exam before starting.
- The time allotted for this exam is 3 hours. **YOU WILL NOT GET ANY EXTRA TIME TO FILL IN YOUR SCANTRON SHEET AT THE END OF THE EXAM**
- Put your scantron sheet and formula sheet inside your exam when submitting the exam to the invigilator. Verify that your name and ID are on the cover page and the computer answer sheet (with the circles filled in).
- **THE EXAMINATION PAPER, FORMULA SHEET, AND SCANTRON SHEET MUST BE RETURNED and NOT TAKEN FROM EXAMINATION ROOM NOR MUTILATED IN ANY MANNER.**

GOOD LUCK!

SCORES (FOR INTERNAL USE ONLY)

PART I MC	PART II Numerical and Short Answer Questions			TOTAL
	Question 1	Question 2	Question 3	
(Max = 70 Marks)	(Max = 10 Marks)	(Max = 10 Marks)	(Max = 10 Marks)	(Max = 100 Marks)

PART I – MC QUESTIONS (70 MARKS)

Part I consists of 35 multiple choice questions. Put your responses on the computer answer sheet using pencil – ONLY these answers will be graded. Each correct response is worth 2 marks.

1. Ross Manufacturing has recently purchased class 10 equipment for \$100,000 with a CCA rate of 30%. Calculate the amount of CCA that Ross can claim as a tax deductible expense in the first year.

- a. \$15,000
b. \$25,500
c. \$30,000
d. \$40,500
e. Good luck on your exam! ☺

$$CCA_1 = 100,000 \left(\frac{0.30}{2} \right) = \underline{\underline{\$15,000}}$$

2. You purchased a stock one year ago for \$91.20. Today you sold the stock and realized a total return of -63.7% on your investment. During the year you received a total of \$2.28 in dividends. At what price did you sell the stock?

- a. \$58.09
b. \$55.81
c. \$33.11
d. \$30.83
e. \$28.55

$$-0.6370 = \frac{2.28}{91.20} + \frac{P - 91.20}{91.20}$$

$$P = \underline{\underline{\$30.8256}}$$

3. You deposit \$1,000 in an account today. You will deposit \$600 at the end of each month for the next 12 months and \$800 each month for the following 12 months. How much interest will you have earned in two years if the account pays 5.5% compounded monthly?

- a. \$979.00
b. \$962.57
c. \$849.42
d. \$827.65
e. \$795.42

$$\begin{aligned} FV &= 1,000 \left(1 + \frac{0.055}{12} \right)^{24} + 600 \left\{ \frac{\left(1 + \frac{0.055}{12} \right)^{12} - 1}{\frac{0.055}{12}} \right\} \left(1 + \frac{0.055}{12} \right)^{12} + 800 \left\{ \frac{\left(1 + \frac{0.055}{12} \right)^{12} - 1}{\frac{0.055}{12}} \right\} \\ &= 1,115.9976 + 7,800.8344 + 9,845.7356 \\ FV &= 18,762.5676 \\ Cap &= 17,800.0000 = 1,000 + 600(12) + 800(12) \\ Int &= \underline{\underline{\$962.5676}} \end{aligned}$$

4. The semi-annual, ten-year bonds of Adep, Inc. are selling at par and have an effective annual yield of 4.295%. What is the amount of coupon interest paid over a year on a \$1,000 Adep bond?

- a. \$21.25
b. \$21.48
c. \$21.50
d. \$42.50
e. \$42.95

$$0.04295 = \left(1 + \frac{APR}{2} \right)^2 - 1$$

$$\frac{APR}{2} = 0.0212 \dots \Rightarrow \$C = \$21.2492 \text{ per 6 months}$$

$$\$C \text{ per yr} = (21.2492)(2) = \underline{\underline{\$42.50}}$$

5. You want your portfolio beta to be 1.20. Currently, your portfolio consists of \$100 invested in stock A with a beta of 1.4 and \$300 in stock B with a beta of 0.6. You have another \$400 to invest and want to divide it between stock C with a beta of 1.6 and a risk-free asset. How much should you invest in stock C?

- a. \$0
b. \$140
c. \$200
d. \$320
e. \$400

$$1.20 = \frac{100}{800} (1.40) + \frac{300}{800} (0.60) + w_C (1.60) + (1 - w_C)(0)$$

$$w_C = 0.50 \quad \$w_C = 0.50(\$800) = \underline{\underline{\$400}}$$

PART I – MC QUESTIONS continued

6. The Friendly Bank wants to earn an effective rate of 8% on its auto loans. If interest is compounded monthly, what APR must they charge?

- a. 7.72%
b. 8.58%
c. 8.65%
d. 9.17%
e. 9.38%

$$0.08 = \left(1 + \frac{r}{12}\right)^{12} - 1$$

$$\underline{\underline{r = 0.0772 (7.72\%)}}$$

7. 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 percent per year for the foreseeable future. How long will it take for Addico's EPS to halve?

- a. 4.64 years
b. 4.95 years
c. 5.42 years
d. 5.64 years
e. 5.95 years

$$2(1 - 0.11)^N = 1$$

$$N = \frac{\log 0.50}{\log 0.89}$$

$$\underline{\underline{N = 5.95 \text{ yr}}}$$

8. Given the information below, what is the expected return on a portfolio that is 60% invested in A and 40% invested in B?

State	Probability	Return on A	Return on B	$R_p = 0.60R_A + 0.40R_B$	$P_i R_i$
Boom	0.60	15%	8%	$9 + 3.2 = 12.20\%$	$0.60(12.20\%) = 7.32\%$
Bust	0.40	5%	20%	$3 + 8 = 11.00\%$	$0.40(11.00\%) = 4.40\%$
				Σ	$\underline{\underline{E(R_p) = 11.72\%}}$

9. You purchase a bond with an invoice price of \$988. The bond has a coupon rate of 7.4%, and there is one month to the next semiannual coupon date. What is the clean price of the bond?

- a. \$926.33
b. \$957.17
c. \$975.67
d. \$981.83
e. \$993.83

$$\text{Clean } P = 988 - \frac{5}{6} \left(\frac{7.4}{2}\right) = \underline{\underline{\$957.1667}}$$

10. Beaksley, Inc. is a very cyclical type of business which is reflected in its dividend policy. The firm pays a \$2.00 a share dividend every other year. The most recent dividend was just paid today. Five years from now, the company is repurchasing all of the outstanding shares at a price of \$50 a share. At an 8% rate of return, what is this stock worth today?

- a. \$53.18
b. \$48.09
c. \$43.78
d. \$37.21
e. \$34.03

$$P_0 = \frac{2}{(1.08)^2} + \frac{2}{(1.08)^4} + \frac{50}{(1.08)^5}$$

$$= 1.7147 + 1.4701 + 34.0292$$

$$\underline{\underline{P_0 = \$37.2140}}$$

PART I - MC QUESTIONS continued

11. Curtis bought an 8.5% annual coupon bond at par. One year later, he sold the bond at a quoted price of 98. During the year, market interest rates rose and inflation was 2.5%. What real rate of return did Curtis earn on this investment?

a. 6.70%
b. 6.50%
c. 6.40%
d. 3.90%
e. 3.40%

$$\text{Nom } R = 0.085 + \frac{980 - 1,000}{980} = 0.0650$$

$$1.0650 = (1+r)(1.025)$$

$$r = 0.0390 \text{ (3.90\%)}$$

12. NanTech Corporation's next dividend is expected to be \$1.75. Dividend growth has been a consistent 7% per year. If investors want a 12% return, determine the stock price 4 years ago.

a. \$24.95
b. \$25.55
c. \$26.05
d. \$26.70
e. \$27.55

$$P_{-4} = \frac{D_{-3}}{r-g} = \frac{1.75 / (1.07)^4}{0.12 - 0.07} = \$26.7013$$

13. You own two risky assets, both of which plot on the security market line. Asset A has an expected return of 12% and a beta of 0.8. Asset B has an expected return of 18% and a beta of 1.4. If your portfolio beta is the same as the market portfolio, what proportion of your funds are invested in asset B?

a. 0.33
b. 0.50
c. 0.67
d. 1.33
e. 1.67

$$(1-W_B)(0.80) + (W_B)(1.40) = 1$$

$$W_B = 0.33$$

14. Investment A makes annual payments of \$813.73 for each of the next 10 years, while investment B makes annual payments of \$500 per year forever. At what interest rate would you be indifferent between the two investments?

a. 13%
b. 12%
c. 11%
d. 10%
e. 9%

$$813.73 \left\{ \frac{1 - \frac{1}{(1+r)^{10}}}{r} \right\} = \frac{500}{r}$$

$$10\sqrt{(1+r)^{10}} = 10\sqrt{2.593727...}$$

$$r = 0.10 \text{ (10\%)}$$

15. What are the geometric and arithmetic average returns for a stock with annual returns of 21%, 8%, -32%, 41%, and 5%?

a. 5.6%; 8.6%
b. 5.6%; 6.3%
c. 8.6%; 5.6%
d. 8.6%; 8.6%
e. 8.6%; 6.3%

$$\bar{R}_{\text{geom}} = [(1.21)(1.08)(0.68)(1.41)(1.05)]^{1/5} - 1 = 0.0564 \text{ (5.64\%)}$$

$$\bar{R}_{\text{arith}} = (21 + 8 - 32 + 41 + 5) / 5 = 8.60\%$$

PART I - MC QUESTIONS continued

16. What is the portfolio variance (measured in decimals) if 55% is invested in stock S and 45% is invested in stock T?

State	Probability	Return on S	Return on T	$R_p = 0.55 R_S + 0.45 R_T$	$P_i R_p$	$P_i (R_p - \bar{R}_p)^2$
Boom	35%	16%	18%	0.1690	0.05915	0.000854126
Normal	65%	12%	6%	0.0930	0.06045	0.000459914
				Σ	$E(R_p) = 0.11960$	$0.00131404 = \text{Var}(R_p)$

- a. 0.001314
b. 0.003148
c. 0.009128
d. 0.036250
e. 0.056106

17. Daryl wishes to save money to provide for his retirement. Beginning one month from now, he will begin depositing a fixed amount into a retirement savings account that will earn 12% compounded monthly. He will make 360 such deposits. Then, one year after making his final deposit, he will withdraw \$100,000 annually for 25 years. The fund will continue to earn 12% compounded monthly. How much should the monthly deposits be for his retirement plan?

- a. \$199.58
b. \$214.21
c. \$234.89
d. \$249.38
e. \$256.36

$$EAR = (1.01)^{12} - 1 = 0.12682503013...$$

$$C \left\{ \frac{(1.01)^{360} - 1}{0.01} \right\} = 100,000 \left\{ \frac{1 - \frac{1}{(1.12682503013)^{25}}}{0.12682503013} \right\}$$

$$C = \$214.2059$$

Use the information below to answer questions # 18 & 19.

	Year 0	Year 1	Year 2	Year 3	
Project A	-\$200	\$100	\$100	\$100	Payback A = 2 yr
Project B	-\$300	\$175	\$125	\$125	Payback B = 2 yr

18. If the discount rate is 14% and the firm has limited funds, which of the following is true?

- a. The PI of project A is less than 1.0.
b. The PI of project B is less than 1.0.
c. Based on the PI rule, project B is preferable.
d. Both projects would be accepted based on the PI rule.
e. The project with the smaller initial investment always has the higher PI.

$$PI(A) = 100 \left\{ \frac{1 - \frac{1}{1.14^3}}{0.14} \right\} \div 200 = 1.1680$$

$$PI(B) = \left[\frac{175}{1.14^1} + \frac{125}{1.14^2} + \frac{125}{1.14^3} \right] \div 300 = 1.1135$$

19. Based on the payback rule, which of the following is false?

- a. You would be indifferent between the two projects.
b. Since both projects pay back, the NPV of both must be positive.
c. With a payback cutoff of one year, neither project is acceptable.
d. With a payback cutoff of three years, both projects are acceptable.
e. With a payback cutoff of 1.5 years, both projects are unacceptable.

PART I – MC QUESTIONS continued

20. A General Co. bond has an 8% coupon and pays interest annually. The face value is \$1,000 and the current market price is \$1,020.50. The bond matures in 20 years. What is the yield to maturity?
- a. 7.79% Premium $\Rightarrow C_b > YTM \Rightarrow \underline{YTM < 8\%}$ (Ans = A)
 b. 8.00%
 c. 8.79%
 d. 9.00%
 e. 9.79% or using Fin Calc $\underline{YTM = 7.7944\%}$
21. Which of the following is NOT a cost of issuing securities?
- a. Abnormal returns on seasoned offerings.
 b. Losses on share value one year after the issue.
 c. The spread.
 d. Losses related to underpricing.
 e. Legal fees, filing fees, taxes.
22. If a market is efficient, then the difference between the market value of an investment and its cost is:
- a. Equal to the risk-free rate of return.
 b. Equal to the net present value of the cash inflows.
 c. Equal to the risk premium.
 d. Negative.
 e. Zero.
23. If portfolio weights are positive: 1) Can the variance of a portfolio ever be less than the smallest variance of an individual security in the portfolio? 2) Can the return on a portfolio ever be less than the smallest return on an individual security in the portfolio?
- a. 1) no; 2) no
 b. 1) no; 2) yes
 c. 1) yes; 2) yes
 d. 1) yes; 2) no
 e. 1) maybe; 2) no
24. Which bond would most likely possess the lowest degree of interest rate risk?
- a. 8% coupon rate, 10 years to maturity
 b. 8% coupon rate, 20 years to maturity
 c. 10% coupon rate, 10 years to maturity
 d. 12% coupon rate, 10 years to maturity
 e. 12% coupon rate, 20 years to maturity
25. Which of the following describes a portfolio that plots above the security market line?
- a. The security is undervalued.
 b. The security is providing a return that is less than expected.
 c. The security's beta is too low.
 d. The security's reward to risk ratio is too low.
 e. The security provides a return that exceeds the average return on the market.
26. Which of the following is true about the differences between debt and common stock?
- a. Bondholders can also own equity, but not vice versa.
 b. Interest payments are promised while dividend payments are not.
 c. Periodic payments made to either class of security are tax deductible for the issuer.
 d. Creditors have voting power while stockholders do not.
 e. Debt is ownership in a firm but equity is not.
27. A project whose NPV equals zero:
- a. Should be rejected.
 b. Is expected to earn a return equal to the firm's required return.
 c. Should be accepted even if the firm has alternative investments with positive NPVs.
 d. Has a profitability index that is greater than one.
 e. Has a discounted payback period that is shorter than the life of the project.

PART I – MC QUESTIONS continued

28. If capital markets are efficient, then:
- Historical price trends will give you a good idea of where prices are headed in the future.
 - It is not possible to make money by playing the stock market.
 - Prices will adjust slowly when reacting to new information.
 - It is possible to profit regularly from publicly available information.
 - ☒ There is no reason to believe that prices are too high or too low.
29. You own a bond that has a 7.5% coupon and matures in 12 years. You purchased this bond at par value when it was originally issued. If the current market rate for this type and quality of bond is 7.0%, then you would expect:
- The bond issuer to decrease the amount of each interest payment on these bonds.
 - To realize a capital loss if you sold the bond at the market price today.
 - The yield to maturity to remain constant due to the fixed coupon rate.
 - ☒ Today's market price to exceed the face value of the bond.
 - The current yield today to be greater than 7.5%.
30. A stock or bond issue that is sold to the general public on a first come, first served basis is called:
- ☒ A general cash offering.
 - A private issue.
 - A seasoned issue.
 - A rights offering.
 - An initial public offering.
31. The principle of diversification states that spreading an investment over a number of assets will eliminate:
- ☒ Most of the unsystematic risk.
 - Most of the systematic risk.
 - All of the unsystematic risk and part of the systematic risk.
 - All of the systematic risk and part of the unsystematic risk.
 - All of the risk.
32. The profitability index will be:
- ☒ Greater than 1.0 when the IRR is greater than the discount rate.
 - Equal to 1 any time the IRR is less than the discount rate.
 - Less than 1.0 any time the discount rate is less than the IRR.
 - Negative any time the net present value is negative.
 - Greater than 1.0 whenever the net present value is negative.
33. The Koster Co. currently pays an annual dividend of \$1.00 and plans on increasing that amount by 5% each year. The Keyser Co. currently pays an annual dividend of \$1.00 and plans on increasing its dividend by 3% annually. Given this, it can be stated with certainty that the _____ of the Koster Co. stock is greater than the _____ of the Keyser Co. stock.
- Capital gains; Dividend yield
 - ☒ Rate of capital gain; Rate of capital gain
 - Total return; Total return
 - Dividend yield; Dividend yield
 - Market price; Market price
34. You are considering a project with the following data: IRR is 8.7%, PI ratio is 0.98, NPV is -\$393, payback period is 2.44 years, and required return is 9.5%. Which one of the following is correct given this information?
- ☒ This project should be rejected based on the internal rate of return.
 - This project should be accepted based on the profitability ratio.
 - The discount rate used to compute the profitability ratio was equal to the internal rate of return.
 - The discounted payback period will have to be less than 2.44 years.
 - The discount rate used in computing the net present value must have been less than 8.7 percent.
35. Suppose you purchase a stock expecting the price to rise in the coming year. After one year, your stock has actually decreased in value, due primarily to adverse information released during the year. Which of the following describes this result?
- This is a violation of all forms of market efficiency.
 - This is a violation of strong form efficiency.
 - This is a violation of semi-strong form efficiency.
 - This is a violation of weak form efficiency.
 - ☒ This is not a violation of market efficiency.

PART II – NUMERICAL AND SHORT ANSWER QUESTIONS

QUESTION 1 (10 MARKS)

Please show all your calculations. If you use a formula, show the formula used and also the formula with the numerical values. If you use a financial calculator, show the formula used, the formula with the numerical values, and the inputs.

Magma Inc. is considering a new 4 year project. Magma paid \$2,000 for a research study analyzing the effects on revenue and costs of the new project. Revenue is expected to be \$100,000 in year one and will grow at 5% per year. The expected operating costs (not including CCA) are 40% of revenue. The project will require the purchase of new equipment costing \$200,000, which can be salvaged for \$73,828 at the end of project, and has a CCA rate of 25%. Net working capital (NWC) is as follows: \$6,000, \$6,300, \$6,615, and \$6,000 in years 1, 2, 3, and 4 respectively. Assume NWC is recovered at the end of the project. Magma has a 20% cost of capital and a 30% tax rate. Assume cash flows occur at the end of the year. Calculate the NPV of this project. Based on your NPV, should Magma invest in this project?

$$\begin{aligned}
 N &= 4 \text{ yr} & \text{Rev}_1 &= \$100,000 & k &= 0.20 \\
 C_0 &= -200,000 & g &= 0.05 & T_c &= 0.30 \\
 S_4 &= \$73,828 & \text{Op Cost (Net CCA)} &= 0.40 \text{ Rev} \\
 d &= 0.25 & \text{NWC} &= 6,000, 6,300, 6,615, 6,000 \\
 \$2,000 & \text{ sunk cost} & \text{NWC recovery at end} & & &
 \end{aligned}$$

$$\text{PV}[(S-E)(1-T_c)] = \left[\frac{(100,000 - 40,000)(1 - 0.30)}{0.20 - 0.05} \right] \left[1 - \left(\frac{1.05}{1.20} \right)^4 \right] = \$115,869.1406$$

$$\begin{aligned}
 \text{PV}(\Delta \text{NWC, Recovery}) &= \frac{6,000}{(1.2)^1} + \frac{300}{(1.2)^2} + \frac{315}{(1.2)^3} + \frac{615}{(1.2)^4} + \frac{6,000}{(1.2)^4} \\
 &= -5,000 - 208.33 - 182.2917 + 296.5856 + 2,893.5185 = -\$2,200.5208
 \end{aligned}$$

$$\text{PV}(\text{Cost, Salvage}) = -200,000 + \frac{73,828}{(1.2)^4} = -200,000 + 35,603.7809 = -\$164,396.2191$$

$$\begin{aligned}
 \text{PV}(\text{CCATS}) &= \left[\frac{200,000(0.25)(0.30)}{0.20 + 0.25} \right] \left[\frac{1.10}{1.20} \right] - \left[\frac{73,828(0.25)(0.30)}{0.20 + 0.25} \right] \left[\frac{1}{(1.20)^4} \right] \\
 &= 30,555.5556 - 5,933.9635 = 24,621.5921
 \end{aligned}$$

IGNORING \$2,000 SUNK COST

NOTE: Other methods can be used

$$\text{NPV} = -\$26,106.0072$$

$$\text{NPV} < 0 \Rightarrow \text{Reject}$$

Q1 - VERSION BLUE - ALT SOL.

	YR 0	1	2	3	4
REV		\$100,000	\$105,000	\$110,250	\$115,762.50
COST		(40,000)	(42,000)	(44,100)	(46,305.00)
CCA		(25,000)	(43,750)	(32,812.50)	(24,609.38)
EBIT		35,000	19,250	33,337.50	44,848.12
TAX(30%)					
NI		\$24,500	\$13,475	\$23,336.25	\$31,393.68
(1) OCF = NI + CCA		49,500	57,225	56,148.75	56,003.06
(2) Δ NWC Recovery		(6,000)	(300)	(315)	615
					6,000
(3) Δ Cap Invest	(200,000)				73,828
* Tot CF (1) + (2) + (3)	(200,000)	43,500	56,925	55,833.75	136,446.06
* PV(CF)	(200,000)	36,250	39,531.25	32,311.20	65,801.53

$$NPV = \sum PV(CF) = -\$26,106.02$$

IGNORE \$2,000 SINK COST

$$NPV < 0 \Rightarrow \text{Reject}$$

YR	UCC open	CCA(25%)	UCC end
1	\$100,000	\$25,000	\$75,000
2	175,000	43,750	131,250
3	131,250	32,812.50	98,437.50
4	98,437.50	24,609.38	73,828.12

= Salvage at end = UCC end

QUESTION 2 (10 MARKS)

Please show all your calculations. If you use a formula, show the formula used and also the formula with the numerical values. If you use a financial calculator, show the formula used, the formula with the numerical values, and the inputs.

Robin Corp. has 10 million shares of common stock with a book value of \$25 per share. Robin just paid an annual dividend of \$4 per share, and shareholders expect it to grow by one percent per year forever. The current beta of the common stock is 0.75. The Treasury bill rate is 2% and the return on the market proxy is 12%. The firm also has one million 7% preferred shares outstanding with a face (par) value of \$100. The preferred stock is trading at 110% of par value. The firm also has \$200 million face value of outstanding debt with a coupon of 4% and an annualized yield to maturity of 3%. The bonds make semi-annual payments and have 8 years to maturity. In addition, the firm has Robin has a 30% tax rate. Calculate Robin's weighted average cost of capital.

Debt

$$F = \$200 \text{ M}$$

$$C = 4\% \text{ semi} \Rightarrow C = 0.02 (2\%) \text{ per 6 mos.}$$

$$YTM = 3\% \text{ annualized} = APR \Rightarrow r = 0.015 (1.5\%) \text{ per 6 mos.}$$

$$N = 8 \times 2 = 16 \text{ 6 mos. periods}$$

$$PV(\text{Debt}) = 4M \left\{ \frac{1 - \frac{1}{(1.015)^{16}}}{0.015} \right\} + \frac{200M}{(1.015)^{16}}$$

$$= 56,925,056.1804 + 157,606,207.865$$

$$= \$214,531,264.045$$

$$T_c = 0.30$$

$$C = 0.02 (\$200M) = \$4M$$

$$K_d = (1.015)^2 - 1 = 0.030225 (3.0225\%)$$

$$K_d(AT) = 0.030225(1 - 0.30) = 0.02115575 (2.115575\%) \text{ (see below)}$$

PREF

$$\# = 1 \text{ M}$$

$$P_{\text{par}} = \$100$$

$$D_{\text{div}} = 0.07(100) = \$7$$

$$P_0 = 1.10(100) = \$110$$

$$PV(\text{Pref}) = \$110(1 \text{ M}) = \$110 \text{ M}$$

$$K_p = \frac{7}{110} = 0.0636 (6.36\%)$$

EQ (15)

$$\# = 10 \text{ M}$$

$$BV = \$25$$

$$D_1 = \$4$$

$$g = 0.01 (1\%)$$

$$B = 0.75$$

$$R_f = 0.02$$

$$E(R_M) = 0.12$$

$$PV(EQ) = \left[\frac{4(1.01)}{0.0950 - 0.01} \right] [10M] = \$475,294,117.647 \quad \square$$

$$K_e = 0.02 + 0.75(0.12 - 0.02) = 0.0950 (9.50\%)$$

$$\text{TOT MKT VAL} = D + P + E = \$799,425,381.692$$

$$\begin{aligned} WACC &= \frac{214,531,264.045}{799,425,381.692} (0.02115575(1 - 0.30)) + \frac{110,000,000}{799,425,381.692} (0.0636) + \frac{475,294,117.647}{799,425,381.692} (0.0950) \\ &= 0.00566717... + 0.008756289... + 0.0564917457... \\ &= \underline{\underline{0.0709 (7.09\%)}} \end{aligned}$$

QUESTION 3 (10 MARKS)

This question has two unrelated parts. Information from part (A) should not be used in part (B).

PART A

The cash inflows of an investment project are a 25 year annuity paying \$C at the end of each year starting one year from today. The project requires an initial investment of \$7C. The required rate of return is 15%. Should you invest in this project? Show supporting calculations and explanations. (4 MARKS)

$$NPV = -7C + C \left\{ \frac{1 - \frac{1}{(1.15)^{25}}}{0.15} \right\}$$

$$= -7C + 6.4641C$$

$$= \underline{-0.5359C} < 0 \Rightarrow \underline{NPV < 0, \text{ Do not invest}}$$

PART B

A share of ABC Corp. is currently trading at \$60. Suppose you buy an ABC call option with an \$80 exercise price and sell (write) another ABC call option with a \$100 exercise price. Both options have the same maturity date.

- I. Draw a payoff diagram for the purchase of the ABC \$80 call. (2 marks)
- II. Draw a payoff diagram for the sale (writing) of the ABC \$100 call. (2 marks)
- III. Draw a payoff diagram for the portfolio. (2 marks)

Clearly label both axes and all important points on the diagrams (Points of intersection, points where graph changes direction etc.).

	$S = \$0 \dots \80	$\$100$	$\$120$	$\$140$
+ C 80	0	0	\$20	\$40
- C 100	0	0	0	-\$20
Σ	0	0	\$20	\$20

