Print Last Name: ➔	Print First Name: ➔	ID Number: ➔	
COURSE FINANCE	**NUMBER** COMM 308	**SECTIONS: (➔ Circle your section)** A AA B BB C D E F	
EXAMINATION Final Exam **VERSION BLUE**	**DATE** December 15, 2011	**TIME** 3 hours 19:00 to 22:00	**# OF PAGES 18** including cover
INSTRUCTOR: **(➔ Underline your instructor's name)** Rahul Ravi Raad Jassim Jennifer Yang Thomas Walker Wissam Newfal Ravi Mateti		**DIVISION** John Molson School of Business Concordia University	

READ THESE SPECIAL INSTRUCTIONS CAREFULLY

- You must submit a BLUE computer answer sheet.

- For Multiple Choice Questions,
All answers must be recorded IN PENCIL on the computer sheet.
- For Problems:
All answers must be recorded IN INK within this exam.
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

- Please ensure you have 18 pages (including the cover page) in this exam.

- Fill in your name and other required information IN PENCIL on the Computer Answer sheet as well as IN INK on this cover sheet.

- Blank questions or those with multiple answers will not receive credit.

SCORES (FOR INTERNAL USE ONLY)

Part I Multiple Choice Questions	Part II Long Answer Questions				
	Question 1	Question 2	Question 3	Question 4	
(Max: 70 Points)	(Max: 8 Points)	(Max: 9 Points)	(Max: 7 Points)	(Max: 6 Points)	**Total: 100**

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

- This part consists of 28 Multiple Choice Questions.
- Each question counts 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 loving aunt has loaned you a sum of $1000 at a 0% effective annual rate. Which of the following cashflow streams would you prefer in order to repay the loan? (Assume that the interest rate in the market is greater than zero.)

	Year 1	Year 2	Year 3	Year 4
I	$400	$300	$200	$100
II	$100	$200	$300	$400
III	$250	$250	$250	$250

A) I
B) II
C) III
D) Any of the above, since they each sum to $1000
E) Insufficient information. Need to know the discount rate k to answer the question

2. Which of the following statements is CORRECT?

A) One of the advantages of the corporate form of organization is that it avoids double taxation.
B) It is easier to transfer one's ownership interest in a partnership than in a corporation.
C) One of the disadvantages of a sole proprietorship is that the proprietor is exposed to unlimited liability.
D) One of the advantages of a partnership is that every partner has equal say in the decision making process of the firm.
E) Corporations are subject to the corporate income tax while partnerships are subject to partnership income tax.

3. The risk-free rate is 6 percent. Stock A has a beta of 1.0, while Stock B has a beta of 2.0. The market risk premium is positive. Which of the following statements is most correct?

A) Stock B's required rate of return is twice that of Stock A.
B) If Stock A's required return is 11 percent, the market risk premium is 5 percent.
C) If the risk-free rate increases (but the market risk premium stays unchanged), Stock B's required return will increase by more than Stock A's.
D) Statements b and c are correct.
E) Statements a, b and c are correct.

$$0.11 = 0.06 + (R_m - 0.06)$$
$$\Rightarrow MRP = 0.11 - 0.06 = 0.05 = 5\%$$

4. Jack Sparrow currently manages a $500,000 portfolio. He is expecting to receive an additional $250,000 from a new client. The existing portfolio has a required return of 10.75 percent. The risk-free rate is 4 percent and the return on the market is 9 percent. If Walter wants the required return on the new portfolio to be 11.5 percent, what should be the average beta for the new stocks added to the portfolio?

A) 1.50
B) 2.00
C) 1.67
D) 1.35
E) 1.80

$$\beta_{old} = \frac{0.1075 - 0.04}{0.05} = 1.35, \quad \beta_{new} = \frac{0.115 - 0.04}{0.05} = 1.5$$
$$w_{old} = \frac{500,000}{750,000} = \frac{2}{3} \Rightarrow 1.5 = \frac{2}{3} \times 1.35 + \frac{1}{3} \times \beta_i \Rightarrow \beta_i = 1.8$$

5. You are holding a stock that has a beta of 2.0 and is currently in equilibrium. The required return on the stock is 15 percent, and the market return is 10 percent. What would be the return on the stock, if the market return increased to 13 percent while the risk-free rate remained unchanged?

A) 18.0%
B) 19.5%
C) 21.0%
D) 22.5%
E) 24.0%

$$0.15 = R_f + 2 \times (0.1 - R_f) \Rightarrow R_f = 0.05 = 5\%$$
$$E(R_i) = 0.05 + 2 \times (0.13 - 0.05) = 0.21 = 21\%$$

6. Which of the following statements is most correct?

A) If annual compounding is used, the effective annual rate equals the quoted rate.
B) If semiannual compounding is used, the effective semiannual rate equals half the quoted rate.
C) If a loan has a 12% quoted rate with semiannual compounding, its effective annual rate is equal to 11.66 percent.
D) Statements a and b are correct.
E) Statements a and c are correct.

7. A bank recently loaned you $15,000 to buy a car. The loan is for five years (60 months) and is fully amortized. The quoted interest rate on the loan is 12 percent APR compounded monthly, and payments are made at the end of each month. What will be the remaining balance on the loan after you make the 30th payment?

A) $ 8,611.17
B) $ 8,363.62
C) $14,515.50
D) $ 8,637.38
E) $ 7,599.03

$$EMR = \frac{0.12}{12} = 0.01 = 1\%$$
$$15,000 = \frac{PMT}{0.01} \times \left(1 - \frac{1}{1.01^{60}}\right) \Rightarrow PMT = \$333.67$$
$$After\ 30th\ payment: OB = \frac{333.67}{0.01} \times \left(1 - \frac{1}{1.01^{30}}\right) = \$8611.17$$

8. Assume that you wish to purchase a 20-year bond that has a maturity value of $1,000 and makes semiannual interest payments of $40. If you require a YTM of 10 percent (5% semiannually) on this investment, what is the maximum price you would be willing to pay for the bond?

A) $619
B) $674
C) $761
D) $828
E) $902

$$\text{Price} = \frac{40}{0.05} \times \left(1 - \frac{1}{1.05^{40}}\right) + \frac{1000}{1.05^{40}} = \$828.41$$

9. Suppose you are planning to invest in a portfolio of two stocks, stock A and stock B. Use the following two statements to answer this question:

I. There will be benefits from diversification as long as $\rho_{AB} < +1$.

II. As long as $\rho_{AB} = -1$, an equally weighted portfolio would always be risk free.

III A risk free portfolio can be created by picking two perfectly negatively correlated stocks.

A) I and III are correct, II is incorrect.
B) I is correct, II and III are incorrect.
C) I and II are correct, III is incorrect
D) I, II and III are correct.
E) I, II and III are incorrect

10. Which of the following statements is most correct?

A) The weighted average cost of capital for a firm is a weighted average of the marginal cost of each relevant capital component that makes up the firm's capital structure.
B) The weighted average cost of capital is calculated on a before-tax basis.
C) An increase in the risk-free rate is likely to increase the marginal costs of both debt and equity financing.
D) Statements a and c are correct.
E) All of the statements above are correct.

11. You have found your dream house. The selling price is $120,000; you will put $20,000 down and obtain a 25-year fixed-rate mortgage at 8.25% (APR compounded semiannually) for the rest. You plan to prepay the loan by making an additional payment each month along with your regular payment. How much extra must you pay each month if you wish to pay off the loan in 20 years? Assume there is no early payment penalty.

A) $24.56
B) $54.88
C) $64.17
D) $93.28
E) $106.86

$$EMR = \left(1 + \frac{0.0825}{2}\right)^{\left(\frac{1}{6}\right)} = 0.0067597$$

$$PMT_{25} = \frac{100{,}000}{\frac{1}{0.006759} \times \left(1 - \frac{1}{1.0067597^{300}}\right)} = \$729.2287$$

$$PMT_{20} = \frac{100{,}000}{\frac{1}{0.006759} \times \left(1 - \frac{1}{1.0067597^{240}}\right)} = \$843.40$$

$$Diff = \$64.17$$

12. Diversifiable risk is defined as the risk that:

A) Affects almost every financial asset that is sold in the marketplace.
B) Relates to the overall economy, such as inflation and GDP growth.
C) Serves as the basis for determining the amount of the risk premium.
D) Is related to an event that affects a single firm or a limited number of assets.
E) Is generated by expected news.

13. Given the following forecasts, what is the covariance of the returns on securities A and B?

State of the Economy	Probability of Occurrence	Stock A Expected Return	Stock B Expected Return
Boom	15%	24%	30%
Normal	55%	12%	18%
Recession	30%	-8%	-20%

A) 0.0209
B) 0.1447
C) 0.2348
D) 0.9871
E) 1

$$E(R_A) = 0.15 \times 0.24 + 0.55 \times 0.12 - 0.3 \times 0.08 = 0.078$$
$$E(R_B) = 0.15 \times 0.30 + 0.55 \times 0.18 - 0.3 \times 0.2 = 0.084$$
$$Cov(A,B) = \sum_{i=1}^{3} \left[p_i \times \left(R_A - E(R_A)\right)\left(R_B - E(R_B)\right) \right] = 0.02092$$

14. Conner Corporation has a stock price of $32.35 per share. The last dividend was $3.42 (D0 = $3.42). The long-run growth rate for the company is a constant 7 percent. What is the company's capital gains yield and dividend yield?

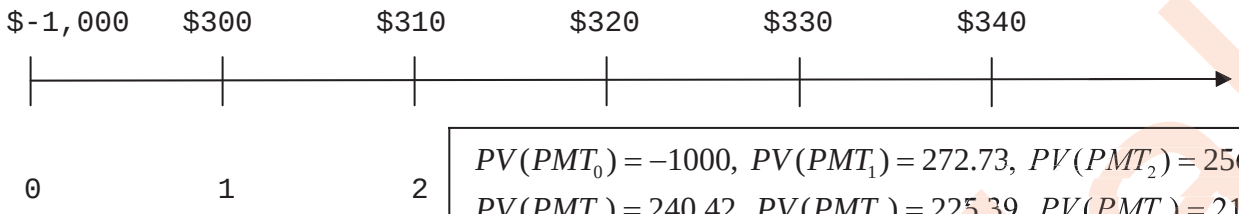
A) Capital gains yield = 7.00%; Dividend yield = 10.57%
B) Capital gains yield = 10.57%; Dividend yield = 7.00%
C) Capital gains yield = 7.00%; Dividend yield = 4.31%
D) Capital gains yield = 11.31%; Dividend yield = 7.00%
E) Capital gains yield = 7.00%; Dividend yield = 11.31%

$$DivYield = \frac{3.42 \times 1.07}{32.35} = 0.11311$$
$$Capital\ Gain = g = 7\%$$

15. If a stock's dividend is expected to grow at a constant rate of 5% a year, which of the following statement is CORRECT? The stock is in equilibrium.

A) The expected return on the stock is 5% a year.
B) The stock's dividend yield is 5%.
C) The stock's required return must be equal to or less than 5%.
D) The stock's price one year from now is expected to be 5% above the current price.
E) The price of the stock is expected to decline in the future.

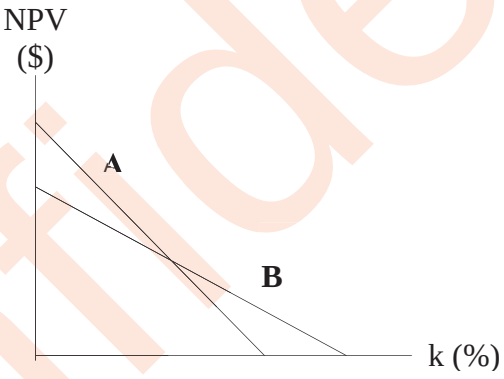
16. John Doe Associates is considering a project that has the following cash flow data. What is the project's discounted payback period? John Doe estimates its cost of capital to be 10%



A) 3.21 years
B) 4 years
C) 4.02 years
D) 4.5 years
E) 5 years

$PV(PMT_0) = -1000,\ PV(PMT_1) = 272.73,\ PV(PMT_2) = 256.198,$
$PV(PMT_3) = 240.42,\ PV(PMT_4) = 225.39,\ PV(PMT_5) = 211.11$
In 4 years discounted payback remaining =
-1000+272.73+256.198+240.42+225.39 = 5.259
Fraction of year 5 required $= \frac{5.259}{211.11} = 0.0249$
$\therefore$ *Discounted Payback time* $= 4 + 0.0249 = 4.0249$ *year*

17. Projects A and B have the same expected lives and initial cash outflows. However, one project's cash flows are larger in the early years, while the other project has larger cash flows in the later years. The two NPV profiles are given below:



Which of the following statements is most correct?

A) Project A has the smaller cash flows in the later years.
B) Project B has the smaller cash flows in the later years.
C) We require information on the cost of capital in order to determine which project has larger early cash flows.
D) The NPV profile graph is inconsistent with the statement made in the problem.
E) None of the statements above is correct.

18. Which of the following would most likely be related to an increase in the risk of a bond?

A) Adding a call provision.
B) Adding additional restrictive covenants that limit management's actions.
C) Adding a sinking fund.
D) The rating agencies change the bond's rating from Baa to Aaa.
E) An increase in the expected return on the S&P 500.

19. After analyzing data for 1,000 stocks, you discover that you can make greater than normal returns by buying shares of stock in firms whenever the price of a share exceeds the maximum price that the stock reached in the most recent three-month period by more than 5%. Which of the following best describes this strategy?

A) This is not a violation of market efficiency
B) This is a violation of weak-form efficiency
C) This is a violation of semi-strong form efficiency
D) This is a violation of strong-form efficiency
E) This is a violation of all forms of market efficiency

20. You just put $1,000 in a bank account which pays an interest of 6 percent APR compounded monthly. How much will you have in your account after 3 years?

A) $1,006.00
B) $1,056.45
C) $1,180.32
D) $1,191.00
E) $1,196.68

$$EMR = \frac{0.06}{12} = 0.05$$

$$FV = 1000 \times (1.005)^{36} = \$1{,}196.68$$

21. Which of the following statements is (are) correct?

I. All else equal, the value of a perpetual bond will remain unchanged from one year to the next, unless market interest rates change.

II. All else equal, bond prices and coupon rates are inversely related.

III. All else equal, the market price of a lower coupon bond will change more (in percentage terms) than that of a higher coupon bond for a given change in market interest rates.

A) I only
B) I and II only
C) I and III only
D) II and III only
E) I, II, and III

The correct choice is (C)
A is highlighted in error.

22. Suppose two portfolios have the same average return, the same standard deviation of returns, but portfolio A has a higher beta than portfolio B. According to the Sharpe measure, the performance of portfolio A _____.

A) Is better than the performance of portfolio B;
B) Is the same as the performance of portfolio B;
C) Is poorer than the performance of portfolio B;
D) Cannot be measured as there is no data on the alpha of the portfolio;
E) None of the above is true.

23. You have $1,500 to invest. You have 2 choices: savings account A, which earns 8.75 percent compounded annually, or savings account B, which earns 8.50 percent compounded monthly. Which account should you choose and why?

A) B; because it has a higher effective annual rate
B) A; because it has the higher stated rate
C) A; because it has a higher effective annual rate
D) B; because the quoted rate is higher
E) A; because it has the higher quoted rate

$$EAR_1 = 8.75\%$$
$$EAR_2 = \left(1+\frac{0.085}{12}\right)^{12} - 1 = 8.839\%$$

24. A quoted rate of 6% APR compounded monthly would provide investors with the same effective value of return as _____ APR compounded quarterly.

A) 1.5%
B) 6.17%
C) 6.03%
D) 6%
E) 18%

$$EQR = \left(1+\frac{0.06}{12}\right)^{\frac{12}{4}} - 1 = 0.015075$$
$$\therefore APR\left(Compounded\ \ Quarterly\right) = 0.015075 \times 4 = 0.0603$$

25. You are planning to save your annual bonuses from work and are comparing savings accounts: Account A compounds semiannually, while Account B compounds monthly. If both accounts have the same effective annual rate of interest and you place only the bonuses in the account, you should:

A) choose account A because it has a higher APR.
B) choose account B because it has a higher APR.
C) choose account B because it is compounded more often.
D) choose account A because you will pay less in taxes.
E) choose either since you would be indifferent between the two.

26. Though they are classified as equity, why are preferred shares also similar to debt?

A) Both carry the same interest rate.
B) Dividends on preferred shares must be paid out before any common share dividends.
C) Preferred shareholders can force bankruptcy if the firm defaults on dividend payment.
D) Preferred shares have similar maturity structures to debt.
E) Preferred shareholders and debt holders have equal rights on the firm's cashflow.

27. A credit card company charges you an effective interest rate of 1.25% monthly. The annual percentage rate (compounded monthly) is ____ and the effective annual rate is _____.

A) 15.00%; 15.00%
B) 15.00%; 14.55%
C) 14.55%; 15.00%
D) 15.00%; 16.08%
E) 16.08%; 15.00%

$$APR(CompoundedMonthly) = 12 \times 0.0125 = 15\%$$
$$EAR = (1.0125)^{12} - 1 = 16.075\%$$

28. Jane Doe Inc has been paying out all of its earnings as dividends, and hence has no retained earnings. This same situation is expected to persist in the future. The company uses the CAPM to calculate its cost of equity. Its capital structure consists of common stock, preferred stock, and debt. Which of the following events would **reduce** the WACC?

A) The flotation costs associated with issuing new common stock increase.
B) The market risk premium declines.
C) The company's beta increases.
D) Expected inflation increases.
E) The flotation costs associated with issuing preferred stock increase.

Part II: Problems (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.

Q1(a): (4 Points) Jiang Min has obtained the following information on the Velocity Bicycle Company:

- book values: assets = $250,000; common equity = $25,000; preferred stock = $150,000 and debt = $75,000. Coupons on debt are paid once a year.
- number of shares outstanding: 10,000 common and 25,000 preferred
- market prices per share: common stock $25, preferred $10
- preferred dividend $1.00 per share; coupon rate on debt is 8%; Velocity does not pay dividends on its common stock
- beta of the stock is 1.25
- yield to maturity of debt is equal to the coupon rate
- tax rate is 35%, risk free rate is 2%, expected return on the market is 15%.

Calculate the weighted average cost of capital (WACC) or the Velocity Bicycle Company. Show your work clearly. If the answer cannot be determined using the available information, explain what information is missing and how you would use it.

Common Stock: Value = 10,000*25=$250,000 ----------> 0.5 points

Cost of Equity: k_e=2% + 1.25*(15% - 2%) = 18.25% ----------> 0.5 points

Preferred Stock: Value = 25,000*10 = $250,000 ----------> 0.5 points

Cost of preferred: k_p= 1/10 = 10% ----------> 0.5 points

Debt: Value = $75,000 (Coupon = yield ➔ Price = Face value.) ----------> 0.5 points

Yield before tax = 8% ----------> 0.5 points

$$WACC = \frac{1}{575} \times \left[250 \times 0.1825 + 250 \times 0.1 + 75 \times 0.08 \times (1 - 0.35) \right] = 0.1296 = 12.96\%$$ -> 1 point

Q1(b): (4 Points) The following cash flows are estimated for two mutually exclusive projects:

Year	Project A Cash Flow	Project B Cash Flow
0	-$100,000	-$100,000
1	60,000	30,000
2	40,000	40,000
3	20,000	20,000
4	10,000	50,000

You have also estimated that the IRR of project A is 15.86% and the IRR of project B is 14.1%. The payback period of Project A is 2 years, while the payback period of project B is 3.2 years.

When is Project B more lucrative than Project A? That is, over what range of discount rate (k) does Project B have a higher NPV than Project A?

Calculate the Crossover rate:

Year	$\Pr oject(A-B)$
0	0
1	30,000
2	0
3	0
4	–40,000

$$PV_{A-B} = \frac{30,000}{(1+k)} - \frac{40,000}{(1+k)^4} = 0$$

$$\therefore k = \left(\frac{4}{3}\right)^{\frac{1}{3}} - 1 = 0.10064 = 10.064\%$$ ----------> 2 points

Part marks left at instructors discretion

Accept the project A if the cost of capital k is : $10.064\% \le k \le 15.86\%$ -------> 1 point

Accept the project B if the cost of capital k is : $0\% \le k \le 10.064\%$ -------> 1 point

Q2: (9 Points)

Patterson, Inc. is considering the replacement of an old machine
The old machine, which was purchased 5 years ago, has book value of $63,000 today and an expected remaining useful life of four years. The firm could sell it for $60,000 today or $10,000 in four years. The new machine costs $280,000. It has a useful life of four years and a salvage value of $18,000. Both machines fall into asset class 39, which has a CCA rate of 25%.
The new machine will increase sales by $85,000, $90,000, $80,000, and $70,000 in years 1, 2, 3, and 4 respectively. The firm must invest $5,000 in NWC today, and then NWC must be maintained at 10% of sales revenue. The discount rate is 8% and the tax rate is 40%.

a) (3 Points) You will find below a partially completed cash flow estimation table corresponding to the above replacement problem. Complete the table by filing in the missing numbers **(find the values of alphabets a through l**):

Year	0	1	2	3	4
Operating income (Revenue –Expenses)		$85,000.00	$90,000.00	$80,000.00	$70,000.00
After tax operating income		**a**	**b**	**c**	**d**
NWC	$5,000	$8,500	$9,000	$8,000	$7,000
ΔNWC	**e**	**f**	**g**	**h**	**i**
NWC recapture (NWC released upon termination of project)					**j**
Investment	**k**				
Salvage Value					**l**

$a = 51,000$ $b = 54,000$ $c = 48,000$ $d = 42,000$

$e = -5,000$ $f = -3,500$ $g = -500$ $h = 1,000$ $i = 1,000$

$j = 7,000$

$k = -220,000$

$l = 8,000$

-------> a through d Total 1 point
-------> e through i Total 1 point
-------> j and k 0.5 points each
-------> l (Salvage value) 1 point

b) (1 Points) What is the PV of the CCA tax shields?

$$PVCCATS = \frac{(Net\ New\ Asset)\times(CCA\ Rate)\times T}{k+(CCA\ Rate)}\times\frac{1+0.5\times k}{1+k} - \frac{(Net\ Salvage)\times(CCA\ Rate)\times T}{k+(CCA\ Rate)}\times\frac{1}{(1+k)}$$

$$= \frac{220,000\times 0.25\times 0.4}{0.08+0.25}\times\frac{1+0.5\times 0.08}{1+0.08} - \frac{8,000\times 0.25\times 0.4}{0.08+0.25}\times\frac{1}{(1+0.08)^4} = \$62,415.64$$

c) (3 Points) What is the NPV of the above project excluding CCA tax shields?

Cash Flow Excluding CCA tax shields: = (After Tax operating income)+(Change in NWC)+(NWC recapture)+investment + (Salvage Value)

From the Above Table:

Year	0	1	2	3	4
TotalCF	–225,000	47,500	53,500	49,000	58,000
PV(*TCF*)	–225,000	43,981.48	45,867.63	38897.78	42631.73
$\sum PV(TCF)$	–53,621.38				

Present value of the above project (excluding CCA tax shields) = - $53,621.38

-------> Part marks left at instructors discretion.

d) (2 Points) What is the NPV of the above project? Should Patterson Inc. implement the above project?

NPV of the project = Present value of the above project (excluding CCA tax shields) + PVCCATS

= - $53,621.38 + $62,415.64 = $8,794.26 --> 1 point for correct NPV

Accept the project. -------> 1 point for clearly stating the decision

Q3: (7 Points)

Important: when drawing payoff or profit diagrams, you need to show the location of each important point on the diagram by writing down the relevant numbers next to each point (i.e. indicate intersections with the horizontal and vertical axes and any points where the payoff/profit function changes abruptly).

Consider a portfolio composed of two options written on the same stock:

- Long a European put option with a strike price of $60.00
- Short a European Put option with a strike price of $50.00

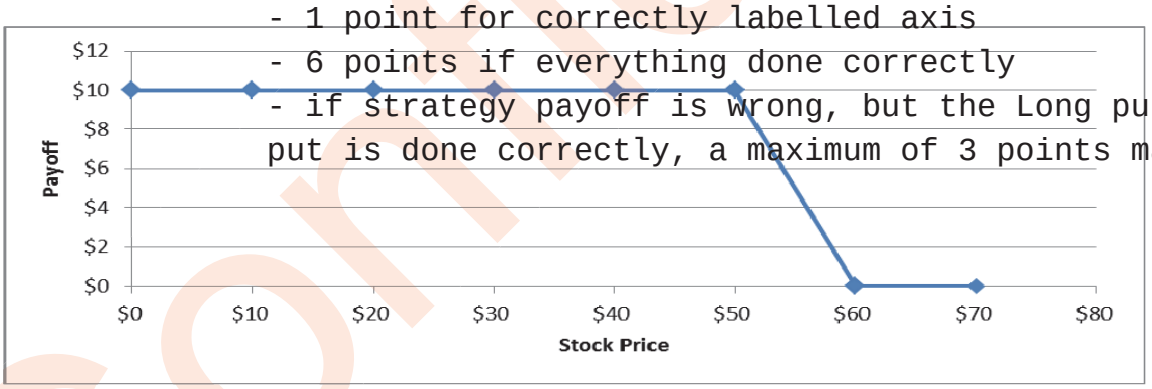
This trading strategy is known as a Bear Spread.

a) (6 Points) Draw the payoff diagram for the above bear spread.

Payoff Matrix:

Stock	0	50	60	70
Long Put	60	10	0	0
Short Put	-50	0	0	0
Payoff	10	10	0	0

- 1 point for $10 on y-axis
- 1 point for $50 on x-axis
- 1 Point for $60 on X-axis
- 1 point for correctly labelled axis
- 6 points if everything done correctly
- if strategy payoff is wrong, but the Long put and the short put is done correctly, a maximum of 3 points may be awarded.



b) (1 Point) What is the investor betting on?

The investor is betting on the price remaining below $60

--> 1 Point for correctly answering True/False/Uncertain

Q4: (6 Points) Short Answers: --> 1 point for clear explanation

a) (2 Points) True/False/Uncertain? (Justify your answer with a one-sentence explanation)
If you are interested in minimizing the variance of the returns on a portfolio of risky assets, you should only add an asset to your portfolio if it has a lower return variance than your portfolio.

False.

You might reduce the variance of your portfolio's return by adding assets whose returns have a high variance, but a negative covariance with your portfolio's return.

b) (2 Points) True/False/Uncertain? (Justify your answer with a one-sentence explanation)
If news comes out that inflation is higher than expected, bond prices usually rise to compensate for the unexpectedly high inflation.

False.

Bond prices usually fall due to the increase in discount rate

c) (2 Points) True/False/Uncertain? Substantiate your answer with a brief explanation.
According to CAPM, the risk free asset has a β of zero. Therefore, all assets with β=0 must be risk free.

False.

β is a measure of systematic risk. All assets with zero systematic risk will have $\beta = 0$.
However, if the idiosyncratic risk of these assets is non-zero, they cannot be risk free

Equation List - Comm 308 - Booth-Cleary Text

5.3	Present Value of FV_n : $PV_0 = \frac{FV_n}{(1+k)^n}$
5.4	Future value of an 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 rate: $k = \left(1 + \frac{QR}{m}\right)^{\frac{m}{f}} - 1$
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: $CY = \frac{Annual\ Interest}{B}$
6.6	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: $g = b * ROE$
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) $= \left[(1+r_1)(1+r_2)(1+r_3)\times(1+r_n)\right]^{1/n} - 1 = \left(\prod_{i=1}^{n}(1+r_i)\right)^{\frac{1}{n}} - 1$
8.6	Expected return: $ER = \sum_{i=1}^{n}(r_i * \text{Prob}_i)$
8.7	Ex-post $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(r_i - \bar{r})^2}{n-1}}$
8.8	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	$COV_{A,B} = \sum_{i=1}^{n}\text{Prob}_i(r_{A,i} - \bar{r_a})(r_{B,i} - \bar{r_b})$

8.14	$COV_{AB} = \rho_{AB}\sigma_A\sigma_B$
8.16	If $\rho_{AB} = -1$, then: $\sigma_P = w\sigma_A - (1-w)\sigma_B$
9.3	$E(R_P) = RF + \left(\frac{E(R_A) - RF}{\sigma_A}\right)\sigma_P$
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	$\beta_P = w_A\beta_A + w_B\beta_B + \ldots + w_n\beta_n$
9.9	$k_i = RF + (ER_M - RF)\beta_i$
12.2	*Option* Premium $= IV + TV$
12.5	Put Call Parity: $P + S = C + PV(X)$
13.1	$NPV = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \mathrm{K} + \frac{CF_n}{(1+k)^n} - CF_0 = \sum_{t=1}^{n}\frac{CF_t}{(1+k)^t} - CF_0$
13.3	$PI = \frac{PV(Cash\ \text{inflows})}{PV(Cash\ \text{outflows})}$
14.1	$CF_0 = C_0 + \Delta NWC_0 + OC$
14.2	$CF_t = CFBT_t(1-T) + CCA_t(T)$
14.4	$ECF_n = SV_n + \Delta NWC_n$
14.5	$NPV = PV(CF_t) + PV(ECF_n) - CF_0$
14.6	$PV(Operating\ Cash\ Flows) = \frac{CFBT(1-T)}{k}\left[1 - \frac{1}{(1+k)^n}\right]$
14.7	$PV(CCA\ Tax\ Shield) = \frac{(C_0)(d)(T)}{d+k} * \frac{(1+0.5k)}{(1+k)} - \frac{(SV_n)(d)(T)}{d+k} * \frac{1}{(1+k)^n}$
20.8	Cost of Capital: $K_a = \frac{ROI \times IC}{V} = \frac{K_e S + K_d(1-T)D}{V} = K_e\frac{S}{V} + K_d(1-T)\frac{D}{V}$
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	Cost of preferred shares: $K_p = D_p / NP$
20.17	$K_{ne} = \frac{D_1}{NP} + g$
20.21	$K_e = \frac{D_1}{P_0} + g = \frac{X_1(1-b)}{P_0} + b * ROE$
20.27	Cost of new equity: $K_{ne} = K_e * \frac{P_0}{NP}$