



University of Waterloo

Final Examination

Term: Fall 2006

Student Name
UW Student ID Number

Course Abbreviation and Number	AFM 372
Course Title	Math Managerial Finance 2
Instructor	Alan Huang

Date of Exam	December 13, 2006	
Time Period	Start time: 7:30	End time: 10:00
Number of Exam Pages (including this cover sheet)	14	
Exam Type	Closed Book	
Additional Materials Allowed	Formula Sheet/Table provided by instructor Calculator (any form of calculator may be used)	

MARKING SCHEME:

Question	Score	Question	Score
I. (30 points)		IV.3 (14 points)	
II.(8 points)		IV.4 (9 points)	
III. (8 points)		IV.5 (16 points)	
IV.1 (5 points)			
IV.2 (10 points)			
		Total 100	
		Bonus (5 points)	

Instructions for Part IV (Calculations):

1. Show process to get partial credit;
2. If the correct number has more than four decimal points, please specify dollar amount to 2-decimal points (e.g., \$1.23), percentage to 2-decimal points (e.g., 11.15%), and all other numbers to 4 decimal points (e.g., 0.8333).

I. Multiple choice questions: Circle one answer that is the best. (Questions 1 to 10 are worth 1 point each, and questions 11 to 20 are worth 2 points each.)

1. A new public equity issue from a company with equity previously outstanding is called a/an:

- A) initial public offering.
- B) seasoned equity issue.
- C) unseasoned equity issue.
- D) private placement.

2. Bonds that have Standard and Poor's credit rating BBB and above are called:

- A) income bonds.
- B) deep-discount bonds.
- C) junk bonds.
- D) investment grade bonds.

3. You own a call option with the time to expiration of 6 months. The common stock is selling for \$15 and your exercise price is \$12. This option is:

- A) at-the-money
- B) in-the-money.
- C) out-of-the-money.

4. Warrants are similar to traded options except warrants, if exercised,:

- A) decrease the number of shares outstanding of the firm.
- B) increase the number of shares outstanding of the firm.
- C) do not change of the number of shares outstanding of the firm.

5. In merger and acquisition activities, tender offers are frequently used where one party makes a public offer to the other party's shareholders. Tender offers are typically used in

- A) Friendly mergers.
- B) Hostile mergers.
- C) Acquisitions.
- D) Shareholder meetings.

6. A forward contract is described by:

- A) agreeing today to buy a product at a later date at a price to be set in the future.
- B) agreeing today to buy a product today at its current price.
- C) agreeing today to buy a product at a later date at a price set today.
- D) agreeing today to buy a product if and only if its price rises above its current price.

7. The duration of a zero-coupon bond is _____ its maturity.

- A) smaller than
- B) greater than
- C) equal to

8. A chocolate company which needs to buy cocoa in the future and uses the futures market to lock in the price of cocoa is an example of:

- A) a long hedge.
- B) a short hedge.
- C) an even hedge.

9. If the lessor borrows much of the purchase price of a leased asset, the lease is called:

- A) a leveraged lease.
- B) a nonrecourse lease.
- C) a sale-and-leaseback.
- D) a capital lease.

10. Interest rate swaps allow one party to exchange a:

- A) floating interest for a fixed rate over the contract term.
- B) fixed interest rate for a lower fixed rate over the contract term.
- C) floating interest rate for a lower floating rate over the contract term.

11. Assume the stocks on which these options are written pay no dividends. Assume the risk free interest rate is 6%.

Call	Stock Price	Exercise price	Volatility (standard deviation)	Price of option
A	50	50	0.20	\$12
B	55	50	0.20	\$10

Which call option must have shorter time to maturity?

- A) A
- B) B
- C) A and B have same time to maturity
- D) not enough information

12. On March 1, you contract to take delivery of 1 ounce of gold for \$415. The agreement is good for any day up to April 1. Throughout March, the price of gold hit a low of \$385 and a high of \$435. The price settled on March 31 at \$420, and on April 1 you settle your futures agreement at that price. Your net cash flow is:

- A) -\$20.00.
- B) \$20.00.
- C) \$ 5.00.
- D) -\$5.00.
- E) -\$15.00.

13. In a rights offering, if the subscription price for a new equity issue is \$15, the ex-rights price of the stock is \$20.5, and the old stock price is \$22.5, then the number of rights needed to purchase a new share is:

- A) 2.0.
- B) 2.5.
- C) 2.75.
- D) 5.5.
- E) 7.5.

14. Tele-Tech Com announces a major expansion into internet services. This announcement not only causes the price of Tele-Tech Com stock to increase, but also causes an increase in price volatility of the stock. Which of the following correctly identifies the impact of these changes on the put option of Tele-Tech Com?

- A) Both changes cause the price of the put option to decrease.
- B) Both changes cause the price of the put option to increase.
- C) The greater uncertainty will cause the price of the put option to decrease. The higher price of the stock will cause the price of the put option to increase.
- D) The greater uncertainty will cause the price of the put option to increase. The higher price of the stock will cause the price of the put option to decrease.
- E) The greater uncertainty has no direct effect on the price of the put option. The higher price of the stock will cause the price of the put option to decrease.

15. As the CFO of your firm, you are buying an interest rate futures contract to hedge against the interest rate risk of your loan liabilities. The futures contract specifies 6-month delivery of \$1,000,000 par value of five-year zero coupon government bond. The term structure is flat at 5% per annum. What is the current price for this futures contract?

- A) \$783,526.
- B) \$746,215.
- C) \$764,640.
- D) \$952,381.
- E) The price of futures depends on the amount of your liabilities.

16. Verma Violin Manufacturing Corporation has issued debt with \$10 million of principal and interest due next year. In terms of viewing the equity of the firm as a call option, what happens to the equity of the firm if the cashflow of the firm is less than \$10 million next year?

- A) The option is in-the-money and the stockholders earn the difference between the cash flow and the bondholder's promised payment.
- B) The option is in-the-money and the bondholders earn the entire cash flow.
- C) The option is out-of-the-money, the stockholders walk away, and the bondholders receive the entire cash flow.
- D) The option is out-of-the-money, and the stockholders make up the difference so that the bondholders receive full payment.

17. An analyst has recently informed you that at the issuance of Firm A's convertible bonds, one of the two following sets of relationships existed:

	Scenario 1	Scenario 2
Face value of each convertible bond	\$1,000	\$1,000
Straight value of each convertible bond	950	850
Market value of each convertible bond	900	900

Assume the bonds are available for immediate conversion. Which of the two scenarios do you believe is more likely?

- A) Scenario 1.
- B) Scenario 2.
- C) Neither scenario is feasible.
- D) Both scenarios are equally likely.

18. A firm plans to pay dividends of \$10 at time 0 and \$15 at time 1 to an investor. Ignoring transaction costs and taxes, and assuming that the investor can earn 10% on investments for one period and that stocks are perfectly divisible, which of the following statement is true?

- A) The investor can spend up to \$25 at time 0 purely financed by dividends and selling the firm's stocks.
- B) The investor can spend up to \$23.64 at time 0 purely financed by dividends and selling the firm's stocks.
- C) The investor can spend up to \$25 at time 0 purely financed by dividends.
- D) The investor can spend up to \$23.64 at time 0 purely financed by dividends.
- E) None of the above.

19. Diamond Drill Inc. has 100 shares of stock and 40 warrants outstanding. The warrants are about to expire, and all of them will be exercised. The firm's current stock price is \$20 per share. Each warrant gives the owner the right to buy 2 shares at \$15 per share. What is the price per share of the stock after the warrants are exercised?

- A) \$15.00. B) \$17.78. C) \$11.11. D) \$20.00. E) None of the above.

20. Companies A and B have been offered the following rates per year on a \$200 million 10-year loan:

	Fixed Rate	Floating Rate
A	8%	LIBOR+0.2%
B	8.5%	LIBOR+1.5%

Which of the following set best fills in the blanks in sequence for the following statement: If Company A receives _____ loans and B receives _____ loans, they can engage in an interest-rate swap and save a maximum of _____ basis points in interest rate in total.

- A) fixed-rate; floating-rate; 80.
 B) floating-rate; fixed-rate; 80.
 C) fixed-rate; floating-rate; 130.
 B) floating-rate; fixed-rate; 130.

II. Short answer questions.

1. Briefly explain the difference between valuing a capital leasing and valuing an operating leasing from the standpoint of lessee. (4 points)

2. Briefly answer the following two questions.

a. Why warrants are less valuable than an otherwise identical call? (2 points)

b. An extendable bond gives the issuer the choice to extend the bond's maturity. Is there an option embedded in the extendable bond? If yes, what's the nature of the option (e.g., type, strike, underlying, etc.)? (2 points)

III. True or false. Assess whether each of the following statements is true, false, or uncertain. Justify your answer. All marks are based on the quality of your arguments supporting your answer. (4 points each)

1. Assuming that the underlying stock does not pay any dividends, an at-the-money European call option is worth more than an at-the-money European put option with the same expiry date.

2. If a firm's cashflows become more volatile, then I am worried that its stock price may fall a lot. Therefore, I would prefer to hold the firm's straight bond than convertible bond, because in the case of large price falls, it is hard for me to get a chance to convert my convertible bonds into stocks.

III. Calculations

1. Tim Hortons issued IPO on March 24, 2006. The offer price was \$23.16 per share, and the first day closing price was \$28.17. The current stock price (Nov. 10th) is \$29.59. The lead-underwriters were Goldman Sachs and RBC Capital Markets. The number of shares offered was 29 million.

a. How much was the IPO underpricing? (2 points)

b. What are possible reasons for Tim Hortons' IPO underpricing? Give no less than two reasons and briefly elaborate. (3 points)

2. A stock has been recently trading at a price close to \$47. You believe that the stock price is highly volatile and may go either up or down. You decide to purchase a strangle, i.e. a put and a call option with the same expiration date but different exercise prices. The call option that you buy has an exercise price of \$50 and costs \$2. The put option that you buy has an exercise price of \$45 and costs \$3. Both options have the same maturity date of six months from now.

a. (4 points) Construct a table showing both the payoffs and the profits from this strategy for stock prices at maturity of \$30, \$35, \$45, \$50, and \$60.

b. (4 points) Draw the payoff diagram (please show appropriate legends). For what range of stock prices will this strategy show a profit when the options mature?

c. (2 points) When would an investor prefer to buy a strangle rather than a straddle?

3. Mr. Nash is considering an investment using a put option on Delta Triangle, a non-dividend-paying stock. The strike price of the put is \$50, and Delta Triangle's stock is currently selling for \$45 per share. The option will expire 6 months from now. Use this information to answer questions (a) and (b), which are independent of each other.

(a). Suppose this is an American option. The current market price of the put is \$4.50. Is this option correctly priced? If not, design an investment strategy for Mr. Nash to take advantage of the mispricing. (5 points.)

(b). Suppose this is a European option instead. The current market price of the option is \$6.50. Six months from now the stock price can take two possible outcomes; it can either go up by 15% or go down by 15%. Mr. Nash borrows and lends at the riskfree interest rate of 5% per annum. Is the put correctly priced? If not, design an investment strategy for Mr. Nash to take advantage of the mispricing. (9 points. Assume that stocks are perfectly divisible.)

5. Andina Minerals, Inc. is a small mineral firm listed in TSX's Venture Exchange. Its current stock is selling at \$2.50 a share. It has 50 million common shares and 2 million warrants outstanding. Each warrant gives its owner the right to purchase 5 common shares at the price of \$4.00 per share two years from now. You estimate that the expected annual stock return for Andina is 20%, and the annual volatility (standard deviation) of Andina's stock return is 25%. The two-year government bond yields a continuous return of 10% per annum.

(a) What's the value of one warrant for Andina? (11 points. You must use the attached table to calculate cumulative normal probability.)

(b) In an attempt to acquire Andina, Inco Inc. is proposing a tender offer of \$3.00 per share to Andina's common shareholders. As a much larger and more stable firm, Inco's stand-alone expected annual stock return is 15%, and its annual volatility (standard deviation) is 20%. The current stock price of Inco is also \$3.00. As part of the acquisition offer, Inco is proposing that Andina's warrant holders exchange one Andina warrant to one warrant to buy five post-merger Inco shares at \$4.00 per share two years from now. Without any calculation, should the warrant holders accept the offer? Briefly explain your answer. (5 points. Your answer can be yes, no, or uncertain.)

Bonus question (5 points)

A small, risky, venture-capital-backed firm has the following mixture of securities offered: common equity and convertible bond. It has 50 million common shares outstanding, each valued at \$1.80. Its convertible debt has a face value of 5 million, a maturity of three years, and an annual coupon rate of 4% with annual coupon payment. Every \$1,000 face value of convertible debt can be converted into 500 common shares one year from now. The firm is not expected to pay any cash dividend in five years. Its cost of straight debt is 500 basis points above the riskfree rate. The term structure for the riskfree rate can remain constant at 5% with 50% of chance or can be upward sloping with the rest 50% of chance. If the term structure is upward sloping, then the one-year rate is 5%, two-year rate is 6.5%, and three-year rate is 8%. The firm's stock beta is 2. The annual up factor for the firm's stock price is 1.25, and the annual down factor is 0.80. What is the firm value today?

Additional page (no content on this page)