HKUST **FINA3203 Fall 2018**
School of Business **Yan Ji**

Final Mock Exam

Thursday, 20 Dec, 2018

Instructions:

Carefully read these instructions! Failure to follow them may lead to deductions from your grade.

- Please write your name and student ID number on the front page.
- The exam lasts 120 minutes. It consists of four parts. Please answer all of them.
- You are allowed one "$8\frac{1}{2} \times 11$" sheets of formulas and one calculator.
- Answer these questions without consulting anyone.
- Use the space provided. If more space is needed, use the two extra pages provided at the end of the exam.
- Be neat and show your work. Answers without work receive no credit. Wrong answers with partially correct work may receive partial credit.
- All pages of your exam paper (including the last two empty pages) should be turned in. Your grade will be deducted by 2 points per page missing.
- **You also need to turn in your cheat sheet.**

Good luck!!

Name: _____

HKUST ID: _____ Section Num: _____

FINA 3203 Exam Grade Sheet

1.	_____	/	20
2.	_____	/	20
3.	_____	/	30
4.	_____	/	30
Total	_____	/	100

1 (20 points) Short Questions

(Please briefly explain your answers.)

(i) (5 points) How to use binary options to replicate a standard European call option with strike price K?

(ii) (5 points) The Delta of a call option will increase as the volatility of the stock increases.

(iii) (5 points) All else equal, when the default correlation rises, the value of the equity tranche of a CDO increases while the values of the senior tranches typically decrease.

(iv) (5 points) Compare the following two positions. There are three strike prices, $K1 = 10$, $K2 = 20$ and $K3 = 30$. Position 1 holds a butterfly position (using all three options) and borrows the present value of 10 dollars (borrow $10 \times B(t;T)$ dollars today, repay 10 dollars tomorrow). Position 2 holds a short straddle (sell the 20 call, sell the 20 put). Draw the payoff diagrams for the two positions. In each case, what are you betting on? Which position is cheaper today and why?

2 (20 points) Long Question 1

European puts and calls with one year until expiration are available on ABC common stock at the following prices:

Strike price	Call price	Put price
30	-	5
40	10	-
50	-	10

The dashes indicate that the corresponding options are not available. The stock pays no dividends, and its current price is \$38 per share. The current price of a zero coupon bond paying one dollar one year from now is \$0.90.

(i) (10 points) Calculate the three missing prices in the table.

(ii) (10 points) Explain how you could make an arbitrage profit trading at the quoted prices.

3 (30 points) Long Question 2

Alex, a manager at Fast Food, Inc.(FFI) received 1,000 shares of company stock as part of his compensation package. The stock currently sells at $40 at share. Alex would like to defer selling the stock until the next tax year. In January, however, he will need to sell all his holdings to provide for a down payment on his new house. Alex is worried about the price risk involved in keeping his shares. At current prices, he would receive $40,000 for the stock. If the value of his stock holdings falls below $35,000, his ability to come up with the necessary down payment would be jeopardized. On the other hand, if the stock value rises to $45,000, he would be able to maintain a small cash reserve even after making the down payment. Alex considers three investment strategies:

1. Strategy A is to write January call options on the FFI shares with strike price $45. These calls are currently selling for $3 each.

2. Strategy B is to buy January put options on FFI with strike price $35. These options also sell for $3 each.

3. Strategy C is to establish a zero-cost collar by writing the January calls with strike price $45 and buying the January puts with strike price $35.

Evaluate each of these strategies with respect to Alex's investment goals. What are the advantages and disadvantages of each? Which would you recommend?

4 (30 points) Long Question 3

A chooser option gives its owner the right to specify at the time of exercise whether the option is a put or a call. Your firm is considering a three-period American chooser option with a time-dependent strike price.

Each option covers 100 shares of ABC stock. The current price of the stock is \$80 per share. Over each period, the stock price will either increase by 25% or decrease by 20%. The strike price of the option grows at 5% per period. The initial strike price is \$8,000. The stock does not pay dividends, and the interest rate is 2.5% per period.

(i) (15 points) Given the information above, what is the proper value of the chooser option?

(ii) (5 points) Under what circumstances should the option be exercised before the expiration date?

(iii) (10 points) If the seller of the option wishes to hedge its position using stock shares, how many shares should it hold initially?