

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF COMMERCE
DEPARTMENT OF BANKING
BACHELOR OF COMMERCE HONOURS DEGREE IN
BANKING**

**DERIVATIVE SECURITIES
[CBA 4204]**

FINAL EXAMINATION

JUNE 2010

TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATES

- Answer any **FOUR (4)** questions.
- Start the answer to each full question on a fresh page of the answer sheet.
- Indicate on your answer booklet whether you are in the conventional or parallel programme.
- Show all workings.
- Questions may be written in any order, but must be legibly numbered.

INFORMATION FOR CANDIDATES

The paper contains six (6) questions.

All questions carry equal marks [25 marks].

The businesses in this question paper are intended to be fictitious.

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Turn Over

QUESTION ONE

The common stock of NUST Ltd serves as the underlying asset for the following derivative securities: (1) forward contracts, (2) European call options, and (3) European put options.

- a) Assuming that all NUST derivatives expire at the same date in the future, complete a table similar to that shown below for each of the following contract positions:
- i) a long position in a forward with a contract price of \$50;
 - ii) a long position in a call option with a strike price of \$50 and a premium of \$5.20;
 - iii) a short position in a call option with a strike price of \$50 and a premium of \$5.20.

| Expiration Date Stock Price (\$) | Expiration Date Derivative Payoff | Derivative Premium | Net Profit |
|---|--|-------------------------------|-------------------|
| 25 | | | |
| 35 | | | |
| 50 | | | |
| 60 | | | |
| 75 | | | |

[11 marks]

- b) Graph the net profit for each of the three derivative positions, showing all important labels in each graph. **[8 marks]**
- c) Briefly describe the belief about the expiration date price of NUST stock that an investor using each of the three positions implicitly holds. **[6 marks]**

TOTAL

[25 MARKS]

QUESTION TWO

- a) Explain the difference in cashflow between short-selling an asset and entering a short futures position. **[5 marks]**
- b) Nomqhele believes she has identified an arbitrage opportunity for a stock index. The index is standing at \$400 and the futures price for a contract deliverable in 4 months is \$405. Nomqhele remembers that in 2001, the stock index paid a dividend of \$12. By then, the index was going for \$300. The risk-free rate of interest is 10% per annum with continuous compounding. Describe the transactions necessary to take advantage of this specific opportunity, indicating the total profit from the strategy. **[10 marks]**

- c) Hwamanda Ltd is going to publish their financial results in the next two months and an investor expects the share price to rise by 10%. The share price is currently ZAR50 and the two-month futures contract is trading at ZAR52.50. The investor has ZAR50 000 to invest and knows very well he could buy the physical shares or buy 10 futures contracts. Each futures contract has 100 shares. The initial margin required is ZAR500 per contract. Prepare calculations showing the return on investment from the two alternative investment avenues if the share price at expiry has risen as expected. **[10 marks]**

TOTAL

[25 MARKS]

QUESTION THREE

a) How might a portfolio manager use forward contracts to hedge risk in each of the following circumstances:

- i) You own a large position in a relatively illiquid bond that you want to sell. **[6 marks]**
- ii) One of your Japanese customers has promised to pay you U\$5000 on 30 September 2010. **[6 marks]**
- iii) You have a large gain on one of your investments and you want to sell it, but you would like to defer the gain until the next tax year. **[6 marks]**

b) A 42 months long forward contract on a non-dividend paying stock is entered into when the stock price is \$40 and the risk-free rate of interest is 10% per annum with continuous compounding.

- i) What is the initial value of the forward contract? **[2 marks]**
- ii) 21 months later, the price of the stock goes up to \$45 and the risk-free interest rate is still 10% per annum. Calculate the value of the forward contract. **[5 marks]**

TOTAL

[25 MARKS]

QUESTION FOUR

There have been calls for the re-introduction of derivatives trading in Zimbabwe. Evaluate the preparedness of Zimbabwean financial markets to trade in derivative securities. **[25 marks]**

TOTAL

[25 MARKS]

QUESTION FIVE

a) Consider a European call option on Inhlanyelo Ltd's share. Today, the share is trading at \$20 on the Johannesburg Stock Exchange and the risk-free rate of interest is 10% per annum with continuous compounding. The exercise price on the option is \$18 and time to maturity is one year.

- i) Estimate the theoretical minimum value of this option and interpret it. **[3 marks]**
- ii) Suppose the call option is selling at \$3. How would you make riskless profit in the two scenarios where Inhlanyelo's share price at the end of the year is \$19 and \$17? **[10 marks]**

b) State and explain 6 factors that affect the time value of an option. In each case, show how a change in the factor, other things remaining constant, would impact on the value of the option. **[12 marks]**

TOTAL [25 MARKS]

QUESTION SIX

- a) State and explain two major benefits of swaps. **[5 marks]**
- b) Describe each of the following option trading strategies. In each case, comment on the trader's view about the market and explain the pay-off at option expiration.
 - i) Protective put **[5 marks]**
 - ii) Covered call **[5 marks]**
 - iii) Bull spread **[5 marks]**
 - iv) Straddle. **[5 marks]**

TOTAL [25 MARKS]