TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF MATHEMATICS AND PHYSICS

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN MATHEMATICS AND FINANCE

UNIT NAME: VALUATION AND ANALYSIS OF DERIVATIVES

UNIT CODE: BFI 4453

END OF SEMESTER EXAMINATION

SERIES: APRIL 2025

TIME: 2 HOURS

DATE: APRIL 2025

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION One

a) The following appears in the 2000 10-K of International Business Machines:

The company employs a number of strategies to manage these risks, including the use of derivative financial instruments. Derivatives involve the risk of non-performance by the counterparty.

Explain what is meant in the last sentence of this quotation. **(5marks)**

b) A manufacturer of furniture is concerned that the price of lumber will increase over the next three months. Explain how the manufacturer can protect against a rise in the price of lumber using lumber futures contracts. **(10Marks)**

c) The chief financial officer of the corporation you work for recently told you that he had a strong preference to use forward contracts rather than futures contracts to hedge: "You can get contracts tailor-made to suit your needs."

a. Comment on the CFO's statement. **(5Marks)**

b. What other factors influence the decision to use futures or forward contracts? **(10Marks)**

QUESTION Two

The treasurer of the KSiR Corporation is attempting to manage risks using options.

a) . What option strategy can the treasurer take to protect against a rise in the cost of one of the company's inputs in the production process, assuming that there is an option available? (10Marks)

b). What option strategy can the treasurer take to protect against a decline in the selling price of one of the company's products assuming that there is an option available? (10Marks)

QUESTION Three

Orono Bank and the Portland Manufacturing Corp. enter into the following seven-year swap with a notional amount of $75 million and the following terms: Every year for the next seven years, Orono Bank agrees to pay Portland Manufacturing 7% per year and receive LIBOR from Portland Manufacturing.

a). What type of swap is this? **(5Marks)**

b). In the first year payments are to be exchanged, suppose that LIBOR is 4%. What is the amount of the payment that the two parties must make to each other? (**10Marks)**

QUESTION Four

A trader enters into a short cotton futures contract when the futures price is 50 cents per pound. The contract is for delivery of 50,000 pounds. How much does the trader gain or lose if the cotton price at the end of the contract is: -

- **a)** 48.20 cents per pound **(10Marks)**
- **b)** 51.30 cents per pound**.** **(10Marks)**

QUESTION Five

Use the Black-Scholes option pricing formula, assume the following values:

Stock price = S = \$47

Strike price = X = \$45

Risk-free rate of interest = r = 10%

Time remaining to expiration = t = 183 days ÷ 365 days = 0.5

Expected price volatility = s = 25%

b) Suppose you borrow \$1,000 at 8% per year so that you can use this money to buy Asset W. You also sell a futures contract on Asset W, with delivery in one year.

1. What type of transaction is this? **(3Marks)**

2. Is this a profitable transaction if the futures price is \$1,010? **(2Marks**)

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