



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 CODE: BFI 4453

**UNIT NAME: VALUATION AND ANALYSIS OF
DERIVATIVES**

END OF SEMESTER EXAMINATION

SUPPLEMENTARY PAPER

SERIES: APRIL 2025

TIME: 2 HOURS

DATE: JULY 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

MINI CASE

It is natural, for a gold mining company to consider hedging against changes in the price of gold. Typically, it takes several years to extract all the gold in a mine. Once a gold mining Company decides to go ahead with production at a particular mine, it has a

big exposure to the price of gold. Indeed a mine that looks profitable at the outset could become unprofitable if the price of gold plunges.

Gold mining companies are careful to explain their hedging strategies to potential shareholders, some gold mining companies do not hedge. They tend to attract shareholders who buy gold stocks because they want to benefit when the price of gold increases and are prepared to accept the risk of a loss from a decrease in the price of gold. Other companies choose to hedge. They estimate the number of ounces that will produce each month for the next few years and enter into short futures or forward contracts to lock in the price that will be received.

Required

- a) Suppose you are Goldman and have just entered into a forward contract with a hedger whereby you agree to buy a large amount of gold at a fixed price. How do you hedge your risk? **(10marks)**
- b) Give three reasons why the treasurer of a company might not hedge the company's exposure to a particular risk. **(10marks)**
- c) Does a perfect hedge always succeed in locking in the current spot price of an asset for future transactions? **(5marks)**
- d) Explain why a short hedger's position improves when the basis strengthens unexpectedly and worsens when the basis weakens unexpectedly. **(5marks)**

QUESTION Two

"In practice, data providers will typically provide the values of the Greeks.

Hence, for most practitioners, the ability to *calculate* the Greeks is not of primary importance. Instead, *interpreting and understanding* the Greeks are of primary importance."

Based on the statement you are required to answer the following:

- a) Which of the Greeks measure the sensitivity of value? **(3marks)**
- b) Which of the Greeks measure the sensitivity of Delta? **(3marks)**
- c) What is Theta's source of sensitivity? **(4marks)**

- d) Does Delta measure sensitivity to increase or decrease in its source of sensitivity?
(5marks)
- e) Does Gamma measure sensitivity to increase or decrease of its source of sensitivity?
(5marks)

QUESTION Three

A foreign company buys industrial machinery from a U.S Company at a price of \$ 10 million. The machinery will be delivered and paid for in six months. The foreign company seeks to establish its costs in FCs. It decides to use the forward market to accomplish its objective. The company contacts its bank. Which provides the following quotations:

	FC	\$
Six-month rates	8%	9%
Spot exchange rates	2.041FC/\$	\$0.49/FC

The bank states that it will charge a commission of .25% on any transaction.

Required

- a) Does the foreign company enter the forward market to go long or short forward dollars?
(5marks)
- b) Explain the difference between the over-the-counter market and the exchange-traded market. (5marks)
- c) Explain what a stop limit order to sell at 20.30 with a limit of 20.10 means.
(5marks)
- d) What are the bid and offer quotes of a market maker in the over-the-counter market?
(5marks)

QUESTION Four

Companies X and Y have been offered the following rates per annum on a \$5 million 10-year investment:

	Fixed-rate	Floating rate
Company X	8.0%	LIBOR
Company Y	8.8	LIBOR

Company X requires a fixed-rate investment; company Y requires a floating-rate investment.

- Design a swap that will net a bank, acting as an intermediary, 0.2% per annum, and will appear equally attractive to X and Y. **(10marks)**
- Discuss the Black-Scholes formula and its assumptions **(10 marks)**

QUESTION FIVE

Suppose you observe the following yields on T-bills and T -bills futures contracts on January 5, 2021:

	Yield (%)
March futures contract on a 90 day T-bill (futures contract matures in 77days on March 22)	12.5
167 day T-bill	10.0
77-day T-bill	6.0

- What arbitrage position should you undertake in order to make a certain profit with no risk and no net investment? **(10marks)**
- A company knows that it is due to receive a certain amount of a foreign currency in 4 months. What type of option contract is appropriate for hedging? **(10marks)**



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