



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING BANKING AND FINANCE

THIRD YEAR SPECIAL/ SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF COMMERCE

BAC 309: FINANCIAL DERIVATIVES

DATE:22/3/2021

TIME: 2.00-4.00 PM

INSTRUCTIONS:

Answer question ONE and Any other TWO questions.

QUESTION ONE (30 MARKS)

- a) Highlight and explain the importance of Futures Contracts (4 marks)
- b) Explain the following types of Commodity derivatives:
- i. Investment Commodities
 - ii. Consumption Commodities (6 marks)
- c) You have entered into a 10 month forward contract on stock with a price of sh50. The risk free rate of interest (compounded continuously) is 6% P.a. for all maturities. Dividends of shs 1.80 per share are expected after 3 months, 6 months and 9 months.

Required

- i. Find the present value of the dividends (3 marks)
 - ii. Find the forward price F_0 (3 marks)
- d) The exercise price of a non-dividend paying stock is Shs.21 and its current price is Shs.25 with an implied volatility of 23%.
- i. Calculate the price of a call option written on this stock with a maturity of three months given a short-term risk-free interest rate of 5%. (8 marks)
 - ii. Calculate the price of a put option on the same stock given the same risk-free interest rate. (6 marks)

QUESTION TWO (20 MARKS)

- a) What do the following terms mean with respect to a call option?
- In-the-money
 - Out of –the-Money
 - At- the- Money
 - Near-the Money (8 marks)
- b) Wisdom Investments Ltd. Purchased a futures contract of a coupon bearing bond whose price is Shs. 9,000. The futures contract will mature in 9 months. If a coupon payment of Shs.400 is expected after 4 months, and the 4-month and 9-month risk free interest rates are 3% p.a and 4% p.a compounded continuously, calculate:
- The futures Price F_0 (6 marks)
 - The amount of arbitrage profits that Wisdom Investments Ltd. locks in if any. (6 marks)

QUESTION THREE (20 MARKS)

- a) Explain the following terms as used in Financial Derivatives Market. (8 marks)
- Long position
 - Short position
 - Spot price.
 - Exercise price
- b) i Explain the term ‘Intrinsic Value’. (2 marks)
- ii A call option of XYZ Co. has an exercise price of shs 145. Find the intrinsic value of the call if the current price is:
- shs 130
 - shs 145
 - shs 165 (6 marks)
- iii What do you understand by the term” closing out positions”? (4 marks)

QUESTION FOUR (20 MARKS)

- a) Differentiate between a European option and a American option (4 marks)
- b) Ideal Tech Ltd has entered into a forward Rate Agreement that specified it will receive a fixed rate of 4% on a principal of shs, 1000,000 for a 3-month period starting in three years. If the 3-month floating rate is 4.5 % for the 3-month period, find the cash flow to the lender. (8 marks)

- c) A Company bought a 2 year futures contract on an investment asset that provides no income. It costs Shs.20 per unit to store the asset with the payment being made at the end of the 2 years. If the spot price of the asset is Shs.4,500 per unit and the risk free rate is 7% per unit for all maturities, calculate the Futures price F_0 (8 marks)

QUESTION FIVE (20 MARKS)

The current price of the stock on which a call option is written is Kshs.320 and the exercise price is Kshs.300. The maturity term of the option is 0.25 years and the annualized variance is 16%. The risk free rate of interest is 4% p.a.

Required:

- a) Represent the above information graphically (6 marks)
- b) Calculate the value of the call option using the Black – Scholes Option Pricing Model. (7 marks)
- c) Assuming the facts of the stock above hold, use the Put-Call Parity theorem to calculate the value of a put written on the same stock. (7 marks)