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 9months.

Required

i. Find the present value of the dividends (3 marks)

ii. Find the forward price F0 (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?

i. In-the-money

ii. Out of –the-Money

iii. At- the- Money

iv. 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:

i. The futures Price F_0 (6 marks)

ii. 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)

i. Long position

ii. Short position

iii. Spot price.

iv. 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:

1. shs 130
2. shs 145
3. 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)