



# **MAASAI MARA UNIVERSITY**

**REGULAR UNIVERSITY EXAMINATIONS  
2020/2021 ACADEMIC YEAR  
FOURTH YEAR SECOND SEMESTER**

**SCHOOL OF BUSINESS AND ECONOMICS  
BACHELOR OF SCIENCE IN FINANCIAL  
ECONOMICS**

**COURSE CODE: ECF 4205**

**COURSE TITLE: FINANCIAL DERIVATIVES**

DATE: 7<sup>TH</sup> OCTOBER, 2021

TIME: 0830 – 1030HRS

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**INSTRUCTIONS TO CANDIDATES**

**Answer Question ONE and any other three questions**

### **QUESTION ONE [25 MARKS]**

- a) Define the following terms in relation to financial derivatives
- i. Marking to market [1 Mark]
  - ii. Spot price [1 Mark]
  - iii. Moneyness [1 Mark]
  - iv. Arbitrage [1 Mark]
- b) Define a derivative and outline three types of derivatives [4 Marks]
- c) Explain the difference between a futures contract and an option contract [2 Marks]
- d) What is the difference between taking a long position in a call option with a strike price of sh.950 and entering into a forward contract when the forward price is sh.950 [4 Marks]
- e) You are a senior financial analyst at KYE Capital. You are asked by a client to determine the maximum price she should pay to purchase Crown call options having an exercise price of £ 45 and expiring in 156 days. The current price of Crown stock is £ 44.375, the riskless interest rate is 7%, and the estimated rate of return variance of the stock is  $\sigma^2 = 0.0961$ . No dividends are expected to be declared over the next six months. What is the estimated price? [6 Marks]
- f) The price of coffee is currently sh.500 per kg. The forward price for delivery in one year is sh.700 per kg. One can also borrow money at 10% per annum. Assume that the cost of storing coffee is zero. How can Baraka take advantage of this and make a risk free profit? [5 Marks]

### **QUESTION TWO [15 MARKS]**

- a) The dividend yield of a portfolio of shares with current price of 673,000 is 2.8% per annum payable continuously. Calculate the forward price of a one year forward contract based on the portfolio if we assume dividends are received continuously and the risk free rate of interest is 4.6028% per annum effective [5 Marks]
- b) Distinguish between credit risk of over-the counter(OTC) and exchange traded derivative contracts [5 Marks]
- c) Suppose you write a put contract with a strike price of shs.400 and an expiration date in three months. The current stock price is shs.410 and the contract is on 100 shares. What have you committed yourself to? How much do you stand to gain or lose? [3 Marks]
- d) Explain clearly the difference between a long call position and a short put position [2 Marks]

### **QUESTION THREE [15 MARKS]**

- a) You are interested in Mabati Company. Its stock is currently priced at sh.9,000. The stock price is expected to either go up by 25% or down by 20% each six months. The annual risk free interest rate is 20%.

Your broker calls you with an interesting offer; You pay  $C_0$  now for the following opportunity: In 6 months you can choose whether or not to buy a call option on Mabati Company with 6 months maturity (i.e. expiry is 12 months from now). This option has an exercise price of sh.9,000 and costs sh.1,500. (Hint: You have an option on an option)

- i. If  $C_0$  is the fair price for this “compound option,” find  $C_0$  [7 Marks]
  - ii. If you do not have any choice after 6 months, you have to buy the option, what is then the value of the contract? [5 Marks]
- b) Clearly explain the difference between speculation, hedging and insurance [3 Marks]

### **QUESTION FOUR[15 MARKS]**

- a) State the main assumptions underlying the Black-Scholes model for a security price and comment on how realistic these assumptions are in practice [5 marks]
- b) Calculate the price of a three month European put option on
  - i. A non-dividend paying stock with a strike price of £50 when the current stock price is £50. The risk free rate of interest is given as 10% per annum and the volatility is 30% per annum. [5 Marks]
  - ii. A dividend paying stock with a dividend of £1.50 that is expected in two months to come with a strike price of £50 when the current stock price is £50. The risk free rate of interest is given as 10% per annum and the volatility is 30% per annum. [5 Marks]

### **QUESTION FIVE [15 MARKS]**

- a) Explain using an example how a firm can hedge against losses arising as a result of commodity price fluctuations using derivatives [5 Marks]
- b) Outline the differences between a futures contract and a forward contract [4 Marks]
- c) Derive the put-call parity relationship for European options [6 Marks]

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