kasneb

CIFA ADVANCED LEVEL

PILOT PAPER

DERIVATIVES ANALYSIS

DECEMBER 2021 **Time Allowed: 3 hours**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) With respect to the requirement for posting margin accounts by option holders and writers, explain the distinction of options from forwards and futures. (5 marks)

(b) Explain some of the reasons why investors may find options useful. (5 marks)

(c) Consider a stock index option that expires in 75 days. The stock index is currently at 1240.89 and makes no cash payments during the life of the option. Assuming that the stock index has a multiplier of 1 and the risk free rate is 3%, Calculate the lowest and highest possible prices for European style put options on the above stock index with exercise prices of:

(i) 1225 (3 marks)

(ii) 1255 (3 marks)

(d) A stock currently trades at a price of Sh.100. The stock price can go up to 10% or down 15%. The risk free rate is 6.5%. Use a one period binomial model to calculate the price of a call option with an exercise price of Sh. 90. (4 marks)

(Total: 20 marks)

QUESTION TWO

(a) With respect to option trading strategies, discuss the notion that strangles and straddles are strategies for those who feel the asset is going to be more volatile without a clear upwards or downwards tendency. (5 marks)

(b) Distinguish between a "long strangle" strategy from a "short strangle" strategy while trading options. (5 marks)

(c) A 45-day T-bill has a discount rate of 5.50 percent. A 135-day T-bill has a discount rate of 5.95 percent.

(i) What should be the price of a futures contract that expires in 45 days? Assume Sh. 1 par value. (5 marks)

(ii) Show that the purchase of a 135-day T-bill, with its price in 45 days hedged by the sale of a 45-day futures contract that calls for the delivery of a 90-day T-bill, is equivalent to purchasing a 45-day T-bill and holding it to maturity. (5 marks)

(Total: 20 marks)

QUESTION THREE

(a) Each futures exchange has its own clearing house. Describe the role that is played by the clearing house. (5 marks)

(b) Describe how the futures exchange clearing houses limit their own counter party risk as they guarantee the financial integrity of the futures exchanges. (5 marks)

(c) Consider an asset priced at Sh. 90. A futures contract on the asset expires in 75 days. The risk free interest rate is 7%.

(i) Find the appropriate futures price if the underlying asset has no storage costs, cash flows or convenience yield. (5 marks)

(ii) Find the appropriate futures price if the underlying assets storage costs at the futures expiration equal Sh.3. (5 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Explain two reasons why use of a market maker is advantageous to counter parties in the swap market. (5 marks)

(b) Describe the three major types of participants in the swap market. (5 marks)

(c) A Kenyan company enters into a currency swap in which it pays a fixed rate of 6% in dollars and the counter party pays a fixed rate of 5% in Kenya shillings. The notional principals are Kshs. 75 million and $10.5 million. Payments are made semiannually and on the basis of 30 days per month and 360 days per year.

(i) Calculate the initial exchange of payments that take place at the beginning of the swap. (3 marks)

(ii) Calculate the semi-annual payments. (3 marks)

(iii) Calculate the final exchange of payments that takes place at the end of the swap. (4 marks)

(Total: 20 marks)

QUESTION FIVE

Consider a fund manager who expects to receive a cash inflow of Shs. 30 Million in two months. The manager wishes to use futures contracts to take a Shs. 21 Million synthetic position in stocks and Shs. 9 Million in bonds today. The stock would have a Beta of 1.25 and the bonds a modified duration of 6.56. A stock index futures contract with a Beta of 0.96 is priced at Shs. 225,130. A bond futures contract with a modified duration of 7.25 is priced at Shs. 105,120.

(a) Calculate the number of stock and bond futures contracts the fund manager would have to trade in order to synthetically take the desired position in stock and bonds today. Indicate whether the futures positions are long or short. (10 marks)

(b) When the futures contract expires in two months, stocks have risen by 3.75% and bonds have declined by 2.3%. Stock index futures are priced at Shs. 231,614 and bond futures are priced at Shs. 102,453.

Illustrate how the profits on the futures positions are essentially the same as the change in the value of stocks and bonds during the two-month period. (10 marks)

(Total: 20 Marks)

……………………………………………………………………………….