Strathmore
UNIVERSITY

STRATHMORE BUSINESS SCHOOL

BACHELOR OF FINANCIAL SERVICES

SPECIAL EXAMINATION

BCF 3204: FINANCIAL RISK MANAGMENT

DATE: Thurs, 18th April 2024 **TIME:** 10:30 – 12:30

Answer Question ONE in Section A and TWO other Questions in Section B.

Section A-COMPULSORY

QUESTION ONE

(a) The Arbitrage Pricing Theory (APT) is an extension of the CAPM**.** An analyst has collected the following details and wants to use APT to get the expected return of ABC Ltd. The Risk Free rate of return is 8%.

Factor	Factor Return (%)	Factor Sensitivity
1	10	1.2
2	12	0.9
3	13	1.5

Required: Calculate the expected Return**.** **(3marks)**

(b) There are two broad Risk management strategies used by financial institutions; Risk decomposition and Risk aggregation. Explain the difference between Risk decomposition and Risk aggregation **(4marks)**

(c) The current Price of a bond is \$101.76 if the term structure of interest rate is flat at 5%. The following bond prices are given for up and down shifts of the term structure of interest rates:
Bond price: \$98.46 if the term structure of interest rates is flat at 6%
Bond price: \$105.56 if the term structure of interest rates is flat at 4%
Required:
Using the above information what is the effective duration of the bond **(3marks)**

(d) The return distribution of ABC corporation is normally distributed with an annual mean of \$25 million and a standard deviation of \$20 million.

Required: Calculate the VaR at the 95% confidence level using delta normal approach. Interpret your answer **(4marks)**

(e) An analyst has collected the following data of the last 20 days of XYZ stock.

29%	-10%	-13%	-8.50%	-23%	14%	18%	-10.50%	17%	19%
-7%	4.50%	-7.50%	11%	14.50%	9.60%	-6.50%	-18.50%	12.35%	17.80%

Required: Using historical simulation approach, calculate the daily VaR for this security at a confidence level of 95% with \$10 million portfolio**.** Interpret your answer using both the confidence level and the minimum loss level. **(5 marks)**

(f) Discuss **TWO** limitations of duration as a measure of a bond price to changes in interest rates. **(4 marks)**

(g) (i) A British portfolio manager is considering investing in Japanese government bonds denominated in Yen. What are the major risks associated with this investment?
(4 marks)
(ii). Comment on the following statement. "Sovereign risk is the risk that a foreign government default on its obligation" **(3 marks)**
Total: 30 marks

SECTION B ANSWER ANY TWO QUESTIONS

QUESTION TWO

(a) Explain **Four** primary components of credit risk evaluation **(4marks)**

(b) A bond has a par value of $100 and an annual coupon rate of 5%. The time to maturity of the bond is 1 year. The recovery rate is 60% and the probability of default is 2%. Assume that the 1 year- risk free rate is 2%

Required: Calculate the Present Value of Expected Loss on the bond **(4marks)**

(c) Explain the difference between systematic and non-systematic risk? Which is more important to an equity investor and why? **(3marks)**

(d) The Actual Portfolio Return for a fund manager is 20%. The portfolio beta is 1.5 and the market risk premium is 8%. The Risk free rate is 6%.

Required: Calculate the portfolio's Jensen's Alpha **(2marks)**

(e) Explain **Two** ways that portfolio managers use to ensure they produce a positive alpha **(2marks)**

(e) A bond investor holds a 15 years and coupon rate of 8%. The par value of the bond is $100 and the current Yield to Maturity (YTM) is 7.4%. If the Yield changes by 1 basis point, calculate the Approximate convexity of the bond. **(5marks)**

Total: 20 marks

QUESTION THREE

(a) A bond has a par value of $1,000 and 3 years to maturity. The bond pays interest semi-annually at a rate of 10% p. a. The Yield to maturity of the bond is 12% p. a

Required:

Calculate the Macaulay's duration of the bond and the modified duration of the bond **(5marks)**

(b) What is the significance of the Macaulay's duration calculated in (b) above? **(2marks)**

(c) Given the following spot rates, Calculate the value of a 3-year, 5% annual coupon bond with a par value of $1,000

Spot Rates

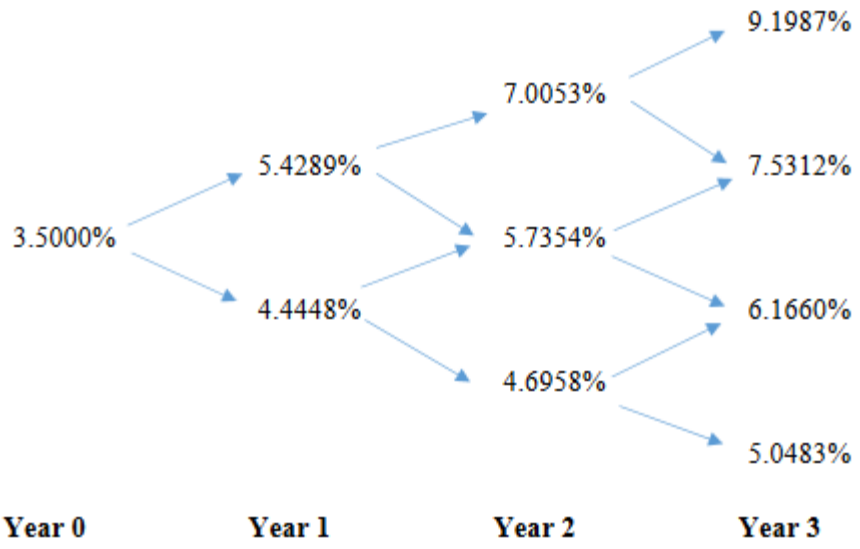
1-year: 3%

2-year: 4%

3-year: 5% **(3marks)**

(d) Explain **Two** Interest rate risk mitigation techniques **(4marks)**

(e) Consider an option free bond with four years remaining to maturity. The par value of the bond is $100 and the annual coupon rate is 6.5%. The following binomial interest rate tree has been provided;



Required:

(i) Calculate the value of the option free bond **(5 marks)**

(ii) What is the name of the process used to calculate the value of the option free bond in (i) above? **(1marks)**

Total: 20 marks

QUESTION FOUR

(a) You are analyzing a bond with a face value of $1,000, 12% coupon rate and five years' maturity. The bond pay interest annually.

Required:

(i) The price of bond when yield to maturity (YTM) is 10%, 12% and 16% **(4marks)**

(ii) Sketch a graph to illustrate the relationship between price and yield of the bond. **(4marks)**

(ii) What explains the relationship between the bond price and the yield as illustrated on the graph sketched above? **(3marks)**

(b) Discuss how each of the following theories could account for downward slopping of the term structure of interest rates:

(i) Pure expectation theory **(3marks)**

(ii) Liquidity preference theory **(3marks)**

(iii) Market segment theory **(3marks)**

Total: 20 marks

QUESTION FIVE

(a) The profit/Loss distribution for XYZ is normally distributed with an annual mean of $15 million and a standard deviation of $10 million.

Required:

Calculate the Value at Risk (VaR) at the 95% and 99% confidence levels using a parametric approach. Interpret your answer. **(5marks)**

(b) Explain **Three** Characteristics of Forex Swaps as a technique for hedging Foreign Exchange Risk**.** **(6marks)**

(c) A US company buys goods worth €720,000 from a German company payable in 30 days. The US company wants to hedge against the € strengthening against the dollar.

Current spot is 0.9215 – 0.9221 $/€ and the € futures rate is 0.9245 $/€.

The standard size of a 3 month € futures contract is €125,000.

In 30 days' time the spot is 0.9345 – 0.9351 $/€.

Closing futures price will be 0.9367.

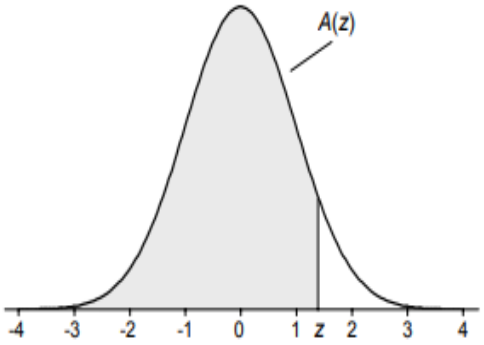
Required: Evaluate the hedge. **(7 marks)**

(d) Explain the Mean- Variance Rule as used in risk and return **(2marks)**

Total: 20 marks

TABLE A.1

Cumulative Standardized Normal Distribution



$A(z)$ is the integral of the standardized normal distribution from $-\infty$ to z (in other words, the area under the curve to the left of z). It gives the probability of a normal random variable not being more than z standard deviations above its mean. Values of z of particular importance:

z	$A(z)$	
1.645	0.9500	Lower limit of right 5% tail
1.960	0.9750	Lower limit of right 2.5% tail
2.326	0.9900	Lower limit of right 1% tail
2.576	0.9950	Lower limit of right 0.5% tail
3.090	0.9990	Lower limit of right 0.1% tail
3.291	0.9995	Lower limit of right 0.05% tail