STRATHMORE BUSINESS SCHOOL

MASTER OF SCIENCE IN DEVELOPMENT FINANCE

END OF SEMESTER EXAMINATION

MDF 8105: FINANCIAL RISK MANAGEMENT

Date: Wednesday, 27th March 2024 **Time: 3** Hours

Instructions

1. This examination consists of **FOUR** questions.
2. Answer **QUESTION ONE** and **ANY OTHER TWO** questions. Formulas are provided at the end of the Question Paper.

Question 1 (50 Marks) (Compulsory)

(a) You have just been appointed the risk manager for a large multinational agricultural concern, Agrikenya. The company grows its own corn, wheat, and soybeans but pays large sums to third parties for pesticides, fertilizer, and other supplies. For this, it must borrow heavily to finance its purchases. Customers typically purchase Agrikenya goods on credit. Moreover, Agrikenya buys and sells its products and raw materials worldwide, often transacting in the domestic currency of its customers and suppliers.

The board of directors is also aware that, due to corporate collapses and significant changes in both local and global environment, risk management is now critical for companies at all levels from the board to the midlevel managers. All organizations must have in place an effective enterprise risk management (ERM) framework.

Required

(i) As part of the ERM, discuss the risk management process in the context of Agrikenya, providing a highlight of THREE financial and THREE nonfinancial risks that the company is facing **(20 Marks).**

(ii) Discuss the importance of corporate governance in ERM and the role of the board of directors and the risk management committee in achieving an effective ERM

(10 Marks)

(b) You are the investment manager of Afya Pension fund. You have obtained the following information about two shares (Alpha and Delta) and other market data:

	Alpha		Delta	
Situations	Return (%)	Probability	Return (%)	Probability
1	6	0.05	-100	0.15
2	8	0.15	0	0.20
3	10	0.60	15	0.30
4	12	0.15	30	0.20
5	14	0.05	130	0.15

Beta		Alpha = 1.40		Delta = 1.90
Risk Free Rate				6%
Market Return				9%
Correlation between Alpha and Delta				0.25

(i) Compute the expected return of Alpha and Delta **(2 Marks)**

(ii) Compute the risk (Standard deviation of Alpha and Delta) **(4 Marks)**

(iii) Compute the Return using the Capital Asset Pricing Model (CAPM) and compare with the expected return in (i). State if the company is understated or overstated. **(4 Marks)**

(iv) Compute the expected return and risk of an equally weighted portfolio of Alpha and Delta **(8 Marks)**

(v) You are considering reducing the overall portfolio risk by investing more in Alpha, so that it has a higher weight in the portfolio. Discuss briefly if this is a feasible strategy and the alternative strategy that you can use if at all there is any? **(2 Marks)**

Question 2 (25 Marks)

(a) Distinguish between duration and convexity in relation to interest rate risk **(4 Marks)**

(b) Discuss three approaches used for measuring Value at Risk in a firm **(6 marks)**

(c) The table below shows the average annual return on three unit-linked funds over a 35-year period together with the standard deviation of returns:

Fund	A	B	C
Average annual return (%)	13	17	19
Standard deviation of return (%)	5	8	10

Which of the funds would be chosen by an investor adopting:

a) Roy's criterion (lower acceptable return, $\mathbb{R}_j = 6\%$) **(5 marks)**

b) Kataoka's criterion ($\alpha = 10\%$) **(5 marks)**

c) Telser's criterion ($\mathbb{R}_j = 6\%, \alpha = 10\%$)? **(5 marks)**

Question 3 (25 Marks)

(a) Clifford Mongare is the marketing manager of Jenga Supplies Limited. Jenga supplies has seen a significant growth in revenues mainly due to credit sales. However, the finance manager is concerned that this has also led to a significant increase in credit risk. The finance manager is recommending that the marketing team led by Clifford should, together with the finance team, design an effective credit policy and carry out detailed credit analysis for new customers.

Required

(i) Highlight FOUR major components of a credit policy **(4 Marks)**
(ii) Discuss FIVE factors that would be used in the credit analysis **(10 Marks)**

(b) You are given the following summarized extracts of the financial statements of Sasini Limited (An agricultural company quoted Listed on the Nairobi Securities Exchange).

	2017	**2018**	**2019**
Assets	KShs'000	KShs'000	KShs'000
Current assets			
Inventories	535,248	694,745	912,890
Receivables	1,015,229	731,321	451,610
Tax recoverable	27,817	83,756	93,118
Cash and cash equivalents	1,406,876	1,135,609	429,264
Total Current Assets	2,985,170	2,645,431	1,886,882
Current liabilities			
Trade Payables	547,586	411,595	296,808
Borrowings	100,852	-	114,488
Post Employment Benefits	41,602	36,042	24,746
Tax Payable	13,901	11,442	7,555
Total Current Liabilities	703,941	459,079	443,597
Total Liabilities	1,880,148	1,637,597	1,789,304

Required

Using relevant information and computations, discuss the liquidity risk of the company over the three years (3 Marks)

(c) You are given the following data about Abel bank over the last five years:

	2015	**2016**	**2017**	**2018**	**2019**
Loan-to-deposit ratio	424.56	436.42	438.44	444.30	460.21
Interbank Ratio	120.75	118.31	117.14	117.2	116.85
Liquidity ratio	84.22	82.36	82.24	81.79	81.72

Required

(i) The management is concerned that the liquidity risk of the bank has increased over the years. While explaining the meaning of the metrics provided, discuss whether the management's concern is valid **(6 Marks).**

(ii) Explain briefly how the liquidity risk of an insurance company differs from that of a bank **(2 Marks)**

Question 4 (25 Marks)

(a) Distinguish between Scenario analysis and Monte Carlo Simulation as risk management techniques in project analysis **(4 Marks)**

(b) Melta manufacturers in Kenya produce car engines. They have been in the business for almost 10 years. They have been profitable enough to employ more staff and increase their production. But with a recent loan taken to facilitate automation, investors want to know how the company is doing. Their total assets are worth KES 3,500,000 while they have a working capital of KES 4,200,000. Their liabilities stand at KES 5,000,000 while retained earnings amount to KES 800,000. Earnings Before Interest and Tax come to KES 6,500,000. Sales total KES 8,300,000 while the market value of equity is KES 7,000,000.

Required:

Advise the investors on the financial health of the company (A Z-score of 3 or more indicates non-failure and a Z-score of 1.8 or less indicates failure

Z- Score = 1.2X1 +1.4X2 + 3.3X3 + 0.4X4 + 1.0X5

i. The Altman formula for prediction of bankruptcy is given as follows:

$$\text{Z score} = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.4X_4 + 1X_5$$

Where:

X_1 = Working capital/Total assets

X_2 = Retained earnings/Total assets

X_3 = Earnings before interest and tax/Total assets

X_4 = Market value of Equity/Liabilities

X_5 = Sales/Total assets

In this model, a Z-score of 3 or more indicates non-failure and a Z-score of 1.8 or less indicates failure. You are provided with the following information in respect of four listed companies.

	Working capital	Retained earnings.	EBIT	Market value of equity	Total assets	Liabilities	Sales
	Sh.'000'	Sh.'000'	Sh.'000'	Sh.'000'	Sh.'000'	Sh.'000'	Sh.'000'
A Ltd	4,000	60,000	10,000	20,000	200,000	120,000	200,000
B Ltd	2,000	20,000	0	5,000	100,000	80,000	120,000
C Ltd	6,000	20,000	-30,000	48,000	800,000	740,000	900,000
D Ltd	40,000	200,000	30,000	100,000	1,800,000	1,000,000	2,000,000

Required

i. The Z-Score for each of the companies. Comment on the results obtained. **(16 marks)**

ii. It has been suggested that other ratios such as cash flow ought to be incorporated into Altman's bankruptcy prediction model. What is your opinion on this? **(5 marks)**

FORMULAS

$$\text{Var } X = \sigma_x^2 = \sum_{i=1}^{n} [(X_i - \overline{X})^2]P(X_i).$$

$$E(R_p) = w_1E(R_1) + w_2E(R_2)$$

$$\sigma_{portfolio} = \sqrt{w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\rho_{12}\sigma_1\sigma_2}$$

$$E(R_i) = R_f + \beta_i \times (E(R_m) - R_f))$$

Table A-3 Present Value Interest Factors for One Dollar Discounted at k Percent for n Periods: $PVIF_{k,n} = 1 / (1 + k)^n$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432	0.6944
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407	0.5787
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523	0.4823
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761	0.4019