



**STRATHMORE BUSINESS SCHOOL**  
**BACHELOR OF COMMERCE**  
**SPECIAL EXAMINATION**  
**AMS 3101: PENSION FUND MANAGEMENT**

**DATE:** Thurs, 25<sup>th</sup> April, 2024

**TIME:** 10:30 – 12:30

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**Instructions**

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

**Question 1**

**(Total 30 marks)**

- a. Distinguish between a defined benefit plan and a defined contribution scheme  
**[8 marks]**
- b. The Defined Contribution (DC) plan has become the retirement plan of choice for many businesses and individuals instead of the defined benefit plan. Discuss the pros and cons of the DC scheme to a pensioner.  
**[10 marks]**
- c. Assume you are the owner of a business with 50 employees, each of whom now receives compensation of shs.1.2million a year. You have signed a pension contract with the employees promising to pay a yearly individual pension benefit equal to 20% of the retiring employee compensation during his last year of employment. This retirement benefit will be paid at year end during each year of the employee's retirement until the employee dies. A pension investment portfolio has been set up to help pay these future benefits. At present the portfolio has a market value of shs.7million. In order to calculate the expected benefit payments and required contributions a number of assumptions need to be made:
  - Salary growth- 7% per year
  - Mortality rate: post retirement-15 years after retirement
  - Termination rate- no one leaves employment until retirement in 30 years
  - Years to retirement- Everyone will retire in 30 years
  - Postretirement benefit increases: None
  - Investment returns- 15% per year after inflation
  - Funding method- Annual annuity sufficient to fully fund by retirement

**Required:**

- i. What is the desired portfolio value of the firm? **[8 marks]**
- ii. Is the current portfolio value sufficient to meet the needs of part a **[2 marks]**
- iii. If the firm wishes to make year-end annuity contributions to its investment portfolio, what must the contribution be? **[2 marks]**

**Question two****(Total 20 marks)**

- a. An analyst wants to evaluate Portfolio X, consisting entirely of common stocks, using both the Treynor and Sharpe measures. The following table provides the average annual rate of return for Portfolio X, the market portfolio (NSE ALL share index) and 91 day T-bills during the past 8 years.

	<b>Avg. Return</b>	<b>Std. Dev.</b>	<b>Beta</b>
Portfolio X	10%	18%	0.6
NSE All share index	12%	13%	
T-bills	6%		

- i. Calculate both the Treynor and Sharpe measure for Portfolio X and the market. **[4 marks]**
  - ii. Did Portfolio X over perform or underperform based on each of the measures? **[2 marks]**
  - iii. Why do we find conflicting results using the two measures? **[4 marks]**
- b. A different way to evaluate performance is to use time weighted and money weighted returns. Highlight **two** advantages of using the:
- i. The time weighted return **[2 marks]**
  - ii. The money market return **[2 marks]**

Assume that a fund manager purchases one share of stock for shs.42.50. Exactly one year later, the share is worth shs.44 and the company pays a dividend of shs.1.00 per share. This is followed by two more annual dividends of shs.1.5 and shs.2.75 in successive years. At the end of the second year the share price falls back to shs.42.50 and upon receiving the third dividend, the investor sells the share for shs50.

- c. Based on the information given calculate the annualized time weighted rate of return **[6 marks]**

**Question three****(Total 20 marks)**

- a. Briefly describe the role of the following players in the pension industry:
- i. Actuary **[4 marks]**
  - ii. Trustee **[4 marks]**
  - iii. Custodian **[4 marks]**
  - iv. Fund manager **[4 marks]**
  - v. Retirement benefits Authority **[4 marks]**

**Question four****(Total 20 marks)**

- a. Highlight the disadvantages and advantages to a Pension Scheme of using a swap to hedge interest rate risk. **[12 marks]**

One year ago the fund invested in a 30 year Kes 1 billion fixed income bond, the bond pays semi-annual coupons. The pension fund wishes to receive variable rate coupons and wants to swap its interest receivable with Green Ltd who desires to invest in a fixed income bond. The following information relating to the two companies have been provided:

	Fixed rate	Floating rate
Diamond Pension	13%	CBR
Green Ltd	14%	CBR

- b. Design a swap that will net a bank acting as intermediary 0.1 percent per annum and be equally attractive to both the companies. **[8 marks]**

**Question five****(Total 20 marks)**

The investment committee of Blue Fund wishes to diversify its portfolio holding to include private equity, offshore funds, and commercial real estate however the committee is concerned about risk exposure to the fund from these three asset classes.

- a. Advise the committee of the risks of investing in each of the three asset classes. **[12 marks]**

One method of measuring risk is to use Value at Risk (VAR). However, this risk measure suffers from several drawbacks

- b. Discuss the advantages and disadvantages of using VAR to measure risk. **[8marks]**