



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

**Date:** Friday, 4<sup>th</sup> August 2023

**Time:** 2 Hours

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**Instructions**

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

**QUESTION ONE**

**{TOTAL 30 MARKS}**

Consider the following three scenarios relating to the determination of portfolio returns:

**Scenario A**

A portfolio manager manages a portfolio of illiquid technology stocks for a trust fund. These stocks are shares in private equity funds. Although the trust requires annual, predetermined disbursements from the fund, the manager controls investment choices and the timing of the liquidation of investments to meet the disbursements. The manager prepares monthly valuations for the trustees.

**Scenario B**

A portfolio of publicly traded blue chip stocks and money market securities for a client has performed quite well over time. The client's contributions, however, have been quite variable. Contributions have been lumpy in nature because of the client's performance- based executive compensation.

**Scenario C**

A portfolio manager is preparing a presentation for a long-term client where the portfolio has underperformed its benchmarks, partly because the client had made a large, one- time contribution from an inheritance to the fund during a prolonged bear market. The client is considering a switch to another manager and wishes to know how much a dollar invested in the current fund at inception would be worth as of the most recent quarter.

- a) In each of the scenarios above, would the money- weighted return or time- weighted return be the most appropriate measure of the portfolio manager's performance? State the reasons for your choice.

**[9 Marks]**

A large manufacturer offers its employees a pension plan but has not paid retirement benefits yet. In April 2022, the company made a contribution to the plan. In October of that year, following a partial windup of the business, a large number of employees withdrew the value of their accumulated benefits. The pension fund earns quarterly dividends that are reinvested in the fund. The pension fund values shown in the table below reflect dividends, withdrawals by employees, and sponsor contributions (in millions).

	(shs.000)	(shs.000)	(shs.000)	(shs.000)
Date	Dividends	Withdrawals	Contributions	Fund Value
I Jan	8,000			372,800
I April	8,000		55,000	445,200
I July	8,000			271,600
I October	8,000	84,000		199,600
I December				269,400

**Required:**

- b) What is the fund's time-weighted rate of return for 2022? [9 Marks]
- c) Blue Asset Management runs a blue-chip equity portfolio. The portfolio generated 9% return during 2022. Blue uses the Zamara Index as the most appropriate benchmark. The Zamara Index yielded 9.5% over the same evaluation period. The NSE All Share Index, a broad equity market index, yielded 8.5% over the same evaluation period.

**Required:**

- i. Calculate Blue Asset Management's return due to style and due to active management. [2 Marks]
- ii. Assess Blue's performance compared to the benchmark and to the market. [3 Marks]
- iii. List and discuss the seven characteristics for a benchmark to effectively evaluate management performance. [7 Marks]

**QUESTION TWO**

**{TOTAL 20 MARKS}**

- a) Briefly describe the role of the following players in the pension industry:
- i. Actuary [3 Marks]
  - ii. Trustee [3 Marks]
  - iii. Custodian [3 Marks]
  - iv. Fund manager [3 Marks]
- b) A fund manager wishes to invest in one of the following money market securities
1. A 180 days commercial paper with a face value of shs.1million selling for shs.975,000
  2. A 182 days treasury bill selling for shs.980,000 with a par value of shs1million.
- The fund will hold the security purchased to maturity

**Required:**

- i. What is the yield to maturity of each security? [4 Marks]
- ii. Which security should the fund manager purchase? [1 Mark]
- iii. Provide three reasons for selecting the security in (ii) above [3 Marks]

**QUESTION THREE**

**{TOTAL 20 MARKS}**

- a) Distinguish between the following types of pension schemes:
- i. Occupational Schemes [3 Marks]
  - ii. Individual Schemes [3 Marks]
  - iii. National Social Security Fund [3 Marks]

You recently carried out a survey of the challenges that retirees in Kenya face.

- b) Identify at least five challenges that the retirees you interviewed face and suggest measures that the pension schemes can adopt to improve the welfare of their pensioners. **[11 Marks]**

#### **QUESTION FOUR**

**{TOTAL 20 MARKS}**

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

- a) Advise the committee of the risks of investing in the two asset classes. **[8 Marks]**
- b) Two years 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
Blue Fund	13%	CBR
Green Ltd	14%	CBR

- i. Design a swap that will net a bank acting as intermediary 0.1 percent per annum and be equally attractive to both the companies. **[6 Marks]**
- ii. Highlight the disadvantages and advantages to Diamond Pension of using a swap to hedge interest rate risk **[6 Marks]**

#### **QUESTION FIVE**

**{TOTAL 20 MARKS}**

- a) The Defined Contribution (DC) plan has become the retirement plan of choice for many businesses and individuals instead of the defined benefit plan.
- i. Distinguish between a defined benefit plan and a defined contribution scheme **[4 Marks]**
- ii. Highlight four advantages of a DC scheme to an employee **[4 Marks]**
- b) 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's 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? **[4 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]**