**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 19 August 2025. Afternoon Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) Evaluate **THREE** approaches that a portfolio manager could use to undertake economic forecasting. (6 marks)

(b) A pension fund is required to make a single liability payment of Sh.1,000,000 in 5 years. The fund is considering investing in a bond portfolio to immunise this future liability. The current term structure is flat at 5% and available bonds are:

**Bond A:** 3-year zero coupon bond with a face value of Sh.1,000
**Bond B:** 7-year zero coupon bond with a face value of Sh.5,000

**Required:**

(i) The optimal weight of bond A and bond B to meet the duration matching requirement of an immunised portfolio. (2 marks)

(ii) Initial cost of the immunised portfolio. (2 marks)

(iii) Justify whether the classical immunisation strategy is effective given that interest rates drop to 4% after one year. (3 marks)



(c) A pension fund has engaged an equity manager who computed the following return and risk data:

1. Manager's actual return = 17.5%
2. Broad market benchmark return = 14.0%
3. Manager's normal portfolio return = 16.2%
4. Total active risk = 5.5%
5. True active risk = 3.0%
6. Misfit active risk = 4.5%

**Required:**

(i) Distinguish between "true active" and "misfit active" return. (4 marks)

(ii) Decompose the total active return into true active return and misfit active return for the pension fund above. (3 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Peter Wanjala, a 45-year-old entrepreneur has recently sold his tech company and received Sh.30 million. He has no debt, earns no regular income and plans to pursue passion projects that may or may not generate future income. His annual living expenses amount to Sh.2,400,000. Peter also supports his elderly parents with Sh.600,000 per year and donates Sh.1,000,000 annually to a conservation foundation. Peter is moderately risk tolerant and desires to leave a lasting legacy for his family and continue supporting charitable causes after his death. He plans to retire fully at the age of 60 years and wants to ensure he can maintain his current lifestyle without financial worry.

**Required:**
Formulate an investment policy statement (IPS) for Peter Wanjala under the following sections:

(i) Return requirements. (3 marks)

(ii) Liquidity requirements. (3 marks)

(iii) Unique circumstances. (2 marks)

(iv) Time horizon constraints. (2 marks)

(b) Linda Otieno has constructed a portfolio consisting of three bonds: A, B and C in equal par amount of Sh.1,000,000 each. The initial prices and durations are as follows:

| Bond | Price (per par Sh.100) | Duration (years) |
|---|---|---|
| A | 102.50 | 4.80 |
| B | 97.00 | 2.00 |
| C | 101.20 | 3.50 |

The prices and durations after one year are:

| Bond | Price (per par Sh.100) | Duration (years) |
|---|---|---|
| A | 99.30 | 4.00 |
| B | 99.10 | 1.00 |
| C | 98.60 | 2.80 |

Linda wants to maintain the portfolio's shilling duration at its initial level by rebalancing the portfolio using the same proportions, that is, one-third in each bond.

**Required:**
(i) The initial portfolio shilling duration. (3 marks)

(ii) The portfolio shilling duration after one year. (3 marks)

(iii) The rebalancing ratio required. (2 marks)

(iv) The cash required for the rebalancing. (2 marks)

**(Total: 20 marks)**



**QUESTION THREE**
(a) Describe **THREE** sources of tracking error in an indexed equity portfolio. (6 marks)

(b) The following table shows current and future expected asset prices measured in their domestic currencies for both Eurozone and Canadian assets. The table below shows the corresponding data for the CAD/EUR spot rate.

| | Eurozone | | Canada | |
|---|---|---|---|---|
| | **Today** | **Expected** | **Today** | **Expected** |
| Asset price | 100.69 | 101.50 | 101.00 | 99.80 |
| CAD/EUR spot rate | 1.4500 | 1.4700 | | |

**Additional information:**
1. From the perspective of the Canadian investor, assume the expected risk for the foreign currency asset is 3% and the expected risk of exchange rate movements is 2%.
2. The expected correlation between movements in foreign currency asset returns and movement in the CAD/EUR is +0.5.

**Required:**
(i) The expected domestic currency return (RDC) for Eurozone investor holding the Canadian assets. (2 marks)

(ii) The expected domestic currency return (RDC) for a Canadian investor holding the Eurozone asset. (2 marks)

(iii) The expected risk of the domestic currency return, $\delta^2$ (RDC). (2 marks)

(c) Sunkuli Soipan has compiled the following data on the performance of a pension plan portfolio for the year 2024:

**Pension plan portfolio performance**

| Sub portfolio | Weight | | Return | |
|---|---|---|---|---|
| | Plan portfolio (%) | Benchmark (%) | Plan portfolio (%) | Benchmark (%) |
| Equity | 65 | 60 | 8.2 | 8.0 |
| Fixed income | 20 | 30 | 2.4 | 2.5 |
| Alternative investments | 15 | 10 | 9.2 | 10.8 |
| Total | 100 | 100 | | |

**Additional information:**

1. Each sub-portfolio has its own (external) manager, with the plan trustees determining the portion of the overall portfolio allocated to each manager.
2. Sunkuli uses the Brinson Model for performance attribution analysis.

**Required:**

(i) Return on the plan's portfolio. (2 marks)

(ii) Benchmark return. (2 marks)

(iii) The allocation effect. (2 marks)

(iv) Security selection and interaction effects. (2 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Nassim Asset Management Firm (NAMF) has been managing equity, fixed income and balanced accounts since 2012. The firm attained investment performance standards (IPS)-compliant on 1 January 2017 and has prepared investment policy statement (IPS) composite using time weighted returns for the 2012-2024 period. Fixed income performance was poor prior to 2020, when a new team of managers was brought on board. When Karoki joined (NAMF) as marketing director in June 2025, he suggested showing performance starting with the year 2020, the first year that performance started to improve. He proposes to show composite with returns for the five calendar years 2020 through 2024.



**Required:**

Citing **THREE** reasons, discuss whether the course of action by Karoki complies with the investments performance standards (IPS). (6 marks)

(b) An investment bank enters into a repurchase agreement with the following terms:

1. The bank sells Sh.10,000,000 face value of treasury securities at a market price of Sh.9,800,000.
2. The repo term is 7 days.
3. The agreed repo rate is 3.5% per annum based on actual/360-day count convention.
4. At the end of the term, the bank will repurchase the securities at the original price plus interest.

**Required:**

(i) Interest cost of the repo financing. (2 marks)

(ii) Repurchase price the bank will pay at maturity. (2 marks)

(iii) The implied annualised yield (effective rate) for the lender based on the actual term. (2 marks)

(c) Faith Nasieka is a portfolio manager who believes that Tulia Steel Ltd. (TSL) is undervalued. Faith obtains approval at 11:00 am to purchase 100,000 shares of TSL when the stock is trading at Sh.50.00 and she places a limit order at Sh.51.00. The order is released when the price is at Sh.50.30. The only transaction cost is a commission of Sh.0.03 per share. By the end of the trading day, 70,000 shares had been executed. TSL closes the day at Sh.52.00 and the average execution price was Sh.50.85. Details of the executed trades are as follows:

| Trade | Execution price (Sh.) | Shares executed |
|---|---|---|
| 1 | 50.40 | 20,000 |
| 2 | 50.80 | 25,000 |
| 3 | 51.20 | 25,000 |
| **Total** | | 70,000 |

**Required:**
Determine the following Implementation Shortfall (IS) components for the purchase of 70,000 shares of TSL:

(i) Execution costs. (2 marks)

(ii) Opportunity costs. (3 marks)

(iii) Arrival costs. (3 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) With respect to trade execution decisions and tactics:

(i) Explain the meaning of the term "best execution". (2 marks)

(ii) Identify **FOUR** factors that constitute the criteria considered in best execution. (4 marks)

(b) Akili Fund has the following existing portfolio characteristics:

- Expected return = 75%
- Sharpe ratio = 0.375
- Standard deviation = 12%
- Risk free rate = 3.0%

A new asset class, Frontier Markets Equity is being evaluated with the following characteristics:

- Expected return = 10%
- Standard deviation = 25%
- Current correlation with the portfolio = 0.20

**Required:**

(i) Explain how mean-variance optimisation (MVO) approach is applied to determine whether a new asset class should be added to an existing portfolio. (2 marks)

(ii) Using suitable computations, justify whether Frontier Markets Equity class should be added to Akili Fund.

(4 marks)

(c) On 1 July 2024 an equity portfolio was invested as follows:

| Stock | Price per share (Sh.) | Number of shares | Beta |
|---|---|---|---|
| A | 25 | 120,000 | 1.10 |
| B | 18 | 160,000 | 1.50 |
| C | 30 | 100,000 | 0.90 |

On 1 October 2024, the following changes occurred:

1. The price of stock A decreased by 10%.
2. The price of stock B increased by 25%.
3. Stock C is not traded.
4. The price of stock C remained unchanged.
5. The beta of stock A increased to 1.2 and the beta of stock B increased to 1.6.

**Required:**

Rebalance the portfolio to re-establish the target beta of 1.2. (8 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**WEDNESDAY: 23 April 2025. Afternoon Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) Describe **FOUR** limitations of undertaking portfolio performance measurements. (4 marks)

(b) Discuss **THREE** roles of portfolio performance standards in the context of return calculation methodologies. (6 marks)

(c) Solomon Mukwesi is a portfolio manager of Tatu Mutual Fund and is reviewing with his firm's chief trader the execution of a ticket to sell 1,000 shares of Alpha Limited. The ticket was split into three trades and executed in a single day as follows:

**Trade A**
A market order to sell 200 shares was executed at a price of Sh.10.15. The quote that was in effect at that time was as follows:

| Ask price | Ask size | Bid price | Bid size |
|---|---|---|---|
| Sh.10.24 | 200 | Sh.10.12 | 300 |



**Trade B**
A market order to sell 300 shares was executed at a price of Sh.10.11. The quote that was in effect at that time was as follows:

| Ask price | Ask size | Bid price | Bid size |
|---|---|---|---|
| Sh.10.22 | 200 | Sh.10.11 | 300 |

**Trade C**
A market order to sell 500 shares was executed at an average price of Sh.10.01. The quote that was in effect at that time was as follows:

| Ask price | Ask size | Bid price | Bid size |
|---|---|---|---|
| Sh.10.19 | 200 | Sh.10.05 | 300 |

This order exceeded the quoted bid size and "walked down" the limit order book.

**Required:**
Compute the following for the stock for the day:

(i) The quoted spread. (2 marks)

(ii) The mid-point. (2 marks)

(iii) The effective spread. (3 marks)

(iv) The share-volume weighted spread. (3 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Examine **THREE** effects of currency movements on portfolio risk and return. (6 marks)

(b) David Samuel, a portfolio manager at Amani Wealth Management, has a portfolio consisting of three stocks; Stock A: 40%, Stock B: 35% and Stock C: 25%. David follows a percentage of portfolio rebalancing strategy with a 5% threshold. After three months of market fluctuations, the new portfolio allocations are: Stock A: 45%, Stock B: 30% and Stock C: 25%.

**Required:**

(i) Identify which stock(s) require rebalancing based on the threshold. (2 marks)

(ii) Calculate the trades needed to restore the portfolio to its original allocation. (2 marks)

(c) The family of Grace Nyambura and Amos Kuria recently moved from Cape Town to Nairobi and have temporarily rented a townhouse in Nairobi. Kuria is 45 years old and works as a partner at the consulting firm, KPMW. He earns an annual salary of Sh.1,600,000 before taxes. Nyambura is 38 years old and as a housewife and mother, takes care of their two children aged 3 and 5 years on a full-time basis. Nyambura recently inherited Sh.10 million after taxes from her parents. In addition, the couple owns the following assets:

1. Cash worth Sh.200,000.
2. Portfolio of equities and bonds worth Sh.2 million.
3. Equity securities worth Sh.2.5 million in the consulting company, KPMW. The value of KPMW shares has risen sharply in the recent years due to the company's good earnings situation. Kuria is confident that the value of the equity shares will continue to rise in the foreseeable future. The Kuria's family requires a down payment of Sh.2 million for the purchase of a townhouse. The family's annual living expenses amounted to Sh.1.2 million. The couple would like to accumulate sufficient funds to retire in 20 years' time. They also want to finance their two children's university studies in Japan. In addition, the following information is known about their attitude to investing:
   - They describe the volatility of their equity and bond portfolio as too high and do not wish to lose more than 10% of portfolio value in a given year.
   - They do not want stocks and bonds of pork and gambling industry companies in their portfolio.
   - George Makumi, a portfolio advisor has calculated that a net worth of Sh.25 million will be needed in 20 years to finance the children's education costs and retirement. The tax rate on the working income and investment earnings including capital gains is 30%.

Assume that the inflation for the cost of living and that for earned income cancel each other out and the risk adjusted interest rate is 4%.



**Required:**

Determine the following to be included in the long-term investment policy statement (IPS) for the Kuria's family:

(i) The risk objective. (3 marks)

(ii) The return objective. (2 marks)

(iii) The annual return after taxes required. (5 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Explain **THREE** credit derivatives instruments that could be used to transfer risk between the buyer and the seller in the financial market. (6 marks)

(b) An Australian bond represents 10% of an international bond portfolio of Kiama Capital. The portfolio has a duration of 7 and a yield beta of 1.2. The domestic interest rates change by 50 basis points.

**Required:**

(i) Estimate the percentage price change for the Australian bond held by Kiama Capital. (2 marks)

(ii) Determine the duration contribution of the Australian bond to Kiama Capital's portfolio. (2 marks)

(c) Pengo LLC, an investor, uses a core-satellite approach to allocate funds amongst equity managers. The equity manager's active risk, active return and allocations are as follows:

| | Expected active Return (%) | Expected active Risk (%) | Allocations (%) |
|---|---|---|---|
| Passive index | 0.00 | 0.00 | 15 |
| Enhanced indexing | 1.70 | 2.50 | 45 |
| Active manager - Delta | 1.90 | 3.00 | 25 |
| Active manager - Theta | 3.30 | 5.50 | 10 |
| Active manager - Rho | 3.90 | 7.20 | 5 |

**Note:** Correlations between equity manager's active return is zero.

**Required:**

(i) Identify Pengo LLC's core and satellite investments. (3 marks)

(ii) Determine the investor's active return. (2 marks)

(iii) Calculate the investor's active risk. (3 marks)

(iv) Compute the information ratio. (2 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Identify **FOUR** considerations that a portfolio manager should make in determining whether a given asset class or set of asset classes is appropriately specified in asset allocation decisions. (4 marks)

(b) The investment account of Wepra Ltd. was valued at Sh.1,000,000 at the start of January 2025 and Sh.1,200,000 at the end of January 2025. During the month, there was a cash inflow of Sh.30,000 on day 11 and another cash inflow of Sh.20,000 on day 17. The values of the account were Sh.1,050,000 and Sh.1,150,000 on days 11 and 17 respectively.



**Required:**

Calculate the time-weighted rate of return (TWRR) of the investment. (6 marks)

(c) Peter Mukwesi, a financial expert, manages a portfolio of bonds with the following details:

| Bond | Market value of bond (Sh.) | Number of bonds | Spread duration |
|---|---|---|---|
| A Ltd. | 1,200 | 5,000 | 3.80 |
| B Ltd. | 900 | 4,000 | 4.50 |
| C Ltd. | 1,050 | 5,400 | 6.80 |

**Required:**

(i) The spread duration of the portfolio. (6 marks)

(ii) Describe **TWO** roles of spread duration. (4 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Explain **SIX** components of a systematic framework for capital market forecasts. (6 marks)

(b) Assess **TWO** effects of return enhancements of adding an alternative investment to a reference portfolio. (4 marks)

(c) Samson Simiyu is a financial analyst of Heko Capital, a Kenyan Foundation with Sh.100 million in assets that supports medical research relating to cancer treatments. For the annual asset allocation review, Simiyu has prepared the set of capital market expectations as shown in table 1 below:

**Table 1: Capital market expectations**

| Asset class | Expected return (%) | Standard deviation (%) | | Correlation | | |
|---|---|---|---|---|---|---|
| Kenya equities | 8.6 | 20 | 1.00 | | | |
| Ex-Kenya equities | 6.7 | 15 | 0.65 | 1.00 | | |
| Kenyan bonds | 4.1 | 10 | 0.34 | 0.25 | 1.00 | |
| Real estate | 5.0 | 12 | 0.50 | 0.35 | 0.17 | 1.00 |

Based on these capital market expectations, Simiyu has developed the analysis shown in table 2 below.

**Table 2: Analysis of capital market expectations:**

| Portfolio | Expected return (%) | Standard deviation (%) | Sharpe ratio | Asset class (portfolio weight) % | | | |
|---|---|---|---|---|---|---|---|
| | | | | **1** | **2** | **3** | **4** |
| 1 | 8.60 | 20.00 | 0.33 | 100 | 0.00 | 0.00 | 0.00 |
| 2 | 7.91 | 16.78 | 0.352 | 63.53 | 36.47 | 0.00 | 0.00 |
| 3 | 7.55 | 15.48 | 0.358 | 53.22 | 37.23 | 0.00 | 9.55 |
| 4 | 5.03 | 8.42 | 0.360 | 0.00 | 24.70 | 43.30 | 32.00 |
| 5 | 4.69 | 8.15 | 0.329 | 0.00 | 10.90 | 55.56 | 33.53 |

Simiyu also noted the following facts:

1. Heko Capital's spending rate is 3.5%, the expected long term inflation rate is 2.25% and the cost of earning investment returns has averaged 43.6 basis points annually.
2. Heko Capital uses multiplicative return requirement based on the spending rate, the expected inflation rate and the cost of earning investment returns.

**Required:**

(i) Heko Capital's return requirement. (3 marks)

(ii) The optimal weights of the corner portfolio. (3 marks)

(iii) Recommend the strategic asset allocation that Simiyu should present for approval at the asset allocation review meeting. (4 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 3 December 2024. Afternoon Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) Development of capital market forecasts is fundamental for portfolio management.

Explain **FOUR** challenges to developing capital markets forecasts. (4 marks)

(b) Boma Limited is a non-profit making foundation that provides funding through county government to construct houses for the homeless. The foundation gets its major funding though Rafiki endowment fund. The endowment fund was set up by the Wesley family as a way to leave a legacy for their father. The endowment fund has assets worth Sh.500 million and directors of the endowment fund anticipate a spending rate of 6%. Inflation is expected to average 3% per annum.

**Required:**

(i) Outline **ONE** factor that increases the endowment fund's risk objective and **ONE** factor that decreases the endowment fund's risk objective. (2 marks)



(ii) Calculate the return objective of the endowment fund. (2 marks)

(iii) The following asset allocations have been provided for consideration by the fund manager:

| Asset Class | Expected total return (%) | Cash flow yield (%) | Portfolios | | | |
|---|---|---|---|---|---|---|
| | | | A (%) | B (%) | C (%) | D (%) |
| Domestic equities | 12 | 2.0 | 20 | 40 | 35 | 20 |
| Foreign equities | 15 | 1.5 | 15 | 20 | 15 | 0 |
| Corporate bonds | 8 | 8.0 | 20 | 0 | 25 | 40 |
| Treasury bonds | 7 | 7.0 | 5 | 0 | 2 | 35 |
| Real estate | 10 | 4.0 | 10 | 20 | 0 | 0 |
| Treasury bills | 4 | 4.0 | 30 | 20 | 5 | 5 |
| Expected total return | | | 8.8 | 10.6 | 10.1 | 8.3 |
| Expected cash flow yield | | | 4.2 | 2.7 | 4.5 | 6.3 |
| Sharpe measure | | | 0.20 | 0.21 | 0.26 | 0.27 |

**Required:**

Select **ONE** asset allocation that best serves the needs of the endowment fund. (1 mark)

(iv) Provide **THREE** justifications why your selection in (b) (iii) above is most appropriate. (3 marks)

(c) The following information relates to an extract from a micro-attribution analysis of one of the investment managers of the Hiatus fund:

| Economic sectors | Portfolio weight (%) | Sector benchmark weight (%) | Portfolio return (%) | Sector benchmark return (%) |
|---|---|---|---|---|
| Energy | 8.38 | 7.72 | 3.55 | 3.32 |
| Financial | 15.48 | 13.42 | 1.66 | 1.10 |
| Technology | 17.89 | 22.01 | 3.21 | 3.18 |

Overall benchmark return was 2.32%.

**Required:**

(i) Distinguish between "micro portfolio performance attribution analysis" and "macro portfolio performance attribution analysis". (2 marks)

(ii) Compute the pure sector allocation return for the energy sector. (2 marks)

(iii) Compute within-sector selection return for the financial sector. (2 marks)

(iv) Determine the selection interaction for the technology sector. (2 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Describe **THREE** techniques that could be used in hedging multiple currencies in portfolio management. (6 marks)

(b) Bancy Wawira's existing portfolio has a Sharpe ratio of 0.35. Bancy Wawira is considering adding the following asset classes to her portfolio:

| Asset class | Sharpe ratio | Predicted correlation with existing portfolio |
|---|---|---|
| X | 0.11 | 0.35 |

**Required:**

(i) Advise Bancy Wawira on the criteria to follow in order to add an investment to an existing portfolio. (2 marks)

(ii) Determine whether Bancy Wawira should add asset class X to her existing portfolio. (2 marks)

(c) Paul Kilonzo has Sh.100 million and would like to institute a contingent immunisation strategy over the next six years. Current rates of return for immunisation strategies are 10% but Paul Kilonzo is willing to accept 8.5% rate of return. His active strategy is to purchase Sh.100 million with 8% coupon, semi-annually compounded, 25-year bonds priced to yield 10%.

**Required:**

(i) The cushion spread. (2 marks)

(ii) The required terminal value. (3 marks)

(iii) The amount of assets necessary to achieve the required terminal value. (3 marks)

(iv) The current shilling value of the safety margin. (2 marks)

**(Total: 20 marks)**



**QUESTION THREE**

(a) Describe **THREE** roles of ethics in the trading of financial assets. (6 marks)

(b) Maxwel Kibibi is a consultant for Bluematt Pension Fund. Based on the past performance, he proposes replacing Bluematt's large capitalisation growth equity mandate with a pure indexing mandate with zero alpha and zero tracking risk. He reviews the pension fund's current equity allocation as shown below.

**Bluematt pension fund equity allocation details**

| | Weight in equity allocation (%) | Expected Alpha (%) | Expected active risk (%) |
|---|---|---|---|
| Large cap growth | 55 | 2.5 | 5.0 |
| Developed economy large cap growth | 20 | 2.3 | 4.0 |
| Emerging market | 25 | 3.5 | 8.0 |

All expected active returns are uncorrelated.

**Required:**

Calculate the information ratio for the total equity allocation assuming Maxwel Kibibi's proposal is adopted. (4 marks)

(c) Mzalendo Kubwa is a portfolio manager of a defined benefit pension scheme of a major retail company, Tawa Ltd. The retirement age for the plan is 61 years for both men and women. The scheme is closed for new employees and benefits cannot be taken early. The assets of the fund are managed by pension fund trustees who are legally obliged to consider the best interest of the beneficiaries of the fund. For actuarial purposes, the assumed long-term rate of return on plan assets is 6%.

The discount rate applied to the fund's assets is 5%. Tawa Ltd. directors believe that the fund should aim for a 7.5% return to reduce the contributions the company has to make to the fund and release more cash to invest in the company's online operations. The trustees take the view that the fund should aim to build up a small surplus by exceeding the required return by 50 basis points.

The information below relates to an analysis of Tawa Ltd. pension plan compared to other major companies with defined benefit schemes in the NSE 20:

| | **Workforce average age** | **Workforce average service length (years)** | **Retired lives to active lives ratio** | **Pension fund status** | **Correlation coefficient of plan assets to Business** | **Debt equity ratio** | **% held in Government bonds** |
|---|---|---|---|---|---|---|---|
| Tawa Ltd. | 39 | 9 | 0.58 | Fully funded | 0.45 | 0.74 | 80 |
| NSE 20 | 43 | 13 | 0.75 | Deficit | 0.39 | 0.86 | 75 |

**Required:**

(i) Summarise **FOUR** factors that would lead Tawa Ltd. pension fund to have a higher risk tolerance than the average NSE 20 company. (4 marks)

(ii) Determine the required rate of return for Tawa Ltd. pension fund. (2 marks)

(iii) Citing **TWO** reasons in each case, formulate the liquidity and time horizon constraints for Tawa Ltd. pension fund. (4 marks)

**(Total: 20 marks)**



**QUESTION FOUR**

(a) Explain **THREE** accounting policies related to valuation and performance measurement. (6 marks)

(b) A portfolio consist of two bonds. The details of the positions are shown below:

| **Security** | **Market value (Sh.)** | **Duration** | **Shilling duration (Sh.)** |
|---|---|---|---|
| Bond A | 55,580 | 10.67 | 5,930.39 |
| Bond B | 30,157 | 19.21 | 5,793.16 |

The total shilling duration is Sh.11,723.55

After a parallel shift of the yield curve, the result change to the following:

| **Security** | **Market value (Sh.)** | **Duration** | **Shilling duration (Sh.)** |
|---|---|---|---|
| Bond A | 52,133 | 10.67 | 5,562.59 |
| Bond B | 26,874 | 19.21 | 5,162.50 |

The new total shilling duration is Sh.10,725.

**Required:**

(i) The rebalancing ratio. (2 marks)

(ii) The amount of cash required to rebalance the portfolio. (2 marks)

(iii) The increases in shillings required for the individual bonds in the portfolio. (2 marks)

(c) On Wednesday, 13 March 2024, Ndovu Limited share price closed at Sh.50 per share. On Thursday, 14 March 2024, a portfolio manager decides to buy Ndovu Limited shares and place a limit order for 1,000 shares at Sh.49.95 per share. The order expires unfilled. The shares closes at Sh.50.05.

On Friday, 15 March 2024, the order is revised to a limit of Sh.50.07. The order is partially filled that day as 700 shares are bought at Sh.50.07. The commission is Sh.23. The share closes at Sh.50.09 and the order is cancelled.

**Required:**

(i) Justify the correct decision price (DP) and Benchmark Price (BP) to be used. (2 marks)

(ii) Compute explicit cost of trade. (1 mark)

(iii) Calculate the realised profit or loss from trade. (2 marks)

(iv) Calculate delay cost. (1 mark)

(v) Determine the missed trade opportunity cost. (1 mark)

(vi) Compute the total implementation cost. (1 mark)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Highlight **FOUR** delivery options available to market participants in the use of repurchase agreements (repos) to finance bond purchases. (4 marks)

(b) Discuss **THREE** factors to consider when selecting active managers of alternative investment scheme. (6 marks)

(c) Daniel Mwanzo manages a portfolio of South African and Kenyan equities. Their respective benchmarks are the JSI and NSE 20 indexes respectively and the South African and Kenyan portfolios are closely matched to their benchmarks in risk. There has been no movements during the year (cash flows, sales or purchase, dividends paid). Valuation and performance analysis is done in South African rand (ZAR). The following are the valuations at the start and the end of the year:

| | **January 1** | **December 31** |
|---|---|---|
| South African equities | ZAR 600,000 | ZAR 660,000 |
| Kenyan equities | ZAR 600,000 | ZAR 702,000 |
| **Total** | ZAR 1,200,000 | ZAR 1,362,000 |
| Exchange rate | ZAR 0.166 Per KES | ZAR 0.1494 Per KES |
| JSI index | 100 | 120 |
| NSE 20 index | 100 | 125 |



**Required:**

(i) Calculate the total return on the portfolio. (2 marks)

(ii) Decompose the return calculated based on capital gain. (5 marks)

(iii) Decompose the return based on currency contribution of Kenyan investment. (2 marks)

(iv) Decompose the return based on portfolio currency contribution. (1 mark)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 20 August 2024. Afternoon Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) Alois Mwenda, a financial analyst with Fadhili Capital LLC is conducting a capital markets expectations forecast for the upcoming year for their international portfolio.

Mwenda gathers the following details:

- Maldina county has a GDP of Sh.60 billion and has an economy dominated by the mining industry. It is an emerging market and Maldina's current account deficit has been growing over time.
- Ocenia county has a GDP of Sh.1.2 trillion and has an economy that sells a variety of items.
- Mwenda predicts a global economic slowdown for the upcoming year.
- Mwenda believes that Gross Domestic Product (GDP) is the best forecast using a system of equations that can capture the fact that GDP is a function of many variables both current and lagged values.

**Required:**

(i) Explain to Alois Mwenda why a growing current account deficit is a sign of increasing risk. (2 marks)

(ii) Explain which county between Maldina and Ocenia is at a greater risk given the expected global economic slowdown. (2 marks)

(iii) Recommend to Alois Mwenda which economic forecasting method is most appropriate to use. (1 mark)

(b) Joseph Lemayan has selected two adjacent corner portfolios; Acqua and Beta. Their expected return are 10% and 15% respectively while their standard deviations are 12% and 16% respectively.

**Required:**

(i) Determine the weights of portfolio Acqua and portfolio Beta necessary to construct a portfolio with an expected return of 11%. (2 marks)

(ii) Determine the new portfolio's standard deviation assuming portfolios Acqua and Beta are not correlated. (2 marks)

(iii) Four asset classes; 1, 2, 3 and 4 are combined into portfolios Acqua and Beta according to the following weights:

Portfolio Acqua → $W_1 = 0.25, W_2 = 0.15, W_3 = 0.20, W_4 = 0.40$
Portfolio Beta → $W_1 = 0.30, W_2 = 0.20, W_3 = 0.35, W_4 = 0.15$

Calculate the asset class weightings (for asset class 1, 2, 3 and 4) for the efficient new portfolio with an expected return of 11% in (b) (i) above. (2 marks)

(c) On 1 June 2024, Rodgers Wasilwa had Sh.100,000 invested in shares and Sh.35,000 invested in treasury bills giving a total investment of Sh.135,000. The securities market index on 1 June 2024 was at 1,240 and on 30 June 2024 it rose at 1,350. As at 31 July 2024, the securities market index has fallen back to 1,300. Wasilwa had the most optimal shares-to-total-assets(S/TA) ratio.

**Required:**

(i) Determine Wasilwa's share holdings as at 30 June 2024 under the buy-and-hold (BH) strategy. (2 marks)

(ii) Compute Wasilwa's share holdings as at 31 July 2024 under the BH strategy. (2 marks)

(iii) The amount of shares that Wasilwa should buy or sell as at 30 June 2024 under a constant-mix (CM) strategy. (2 marks)

(iv) The amount of shares that Wasilwa should buy or sell as at 31 July 2024 under the CM strategy. (3 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Explain **THREE** sources of the total return for a fixed income investment portfolio. (6 marks)

(b) A domestic hedge fund intends to expand its portfolio to include global equities. The hedge fund does not seek to purchase individual stocks. The fund engages in an equity total return swap whereby it will receive the return on MSCI global equity index in exchange for interest payment on domestic treasury bonds.

**Required:**

(i) Discuss **TWO** advantages of the fund's global equity allocation strategy. (4 marks)

(ii) In relation to hedge fund return statistics, distinguish between "backfill bias" and "survivorship bias". (4 marks)

(c) A chief investment officer is currently evaluating the expected performance for a group of portfolio managers they have hired for a subset of their client's portfolios. The following information is provided for the portfolio managers performance:

| Portfolio manager | Expected alpha | Expected tracking risk | Allocations |
|---|---|---|---|
| A | 2.80% | 5.20% | 10% |
| B | 0% | 0% | 20% |
| C | 2.00% | 3.10% | 25% |
| D | 3.50% | 6.80% | 5% |
| E | 1.10% | 1.62% | 40% |

**Required:**

Compute the expected information ratio. (6 marks)

**(Total: 20 marks)**



**QUESTION THREE**

(a) Emilio Kipsang is the Principal Investment Officer of Arusha International Financial Advisor (AIFA) and has decided that AIFA will comply with Investment Performance Standards (IPS). Kipsang begins by reviewing all monthly composite calculations to ensure that AIFA has complied with all of the IPS composite calculation requirements. AIFA currently presents its investment performance using a composite, calculated on a monthly basis for each investment objective. AIFA's growth equity composite consists of four client portfolios that are fully invested in large capitalisation growth equities as shown below:

**AIFA**
**Growth equity composite**
**Performance period: December 2023**

| Client portfolio | Beginning market value (Sh."million") | Ending market value (Sh."million") | Monthly return (%) |
|---|---|---|---|
| A | 125.0 | 126.5 | 1.20 |
| B | 220.0 | 218.0 | 0.91 |
| C | 68.0 | 69.8 | 1.65 |
| D | 92.0 | 93.9 | 1.10 |
| Total | 505.0 | 508.2 | |

**Additional information:**

1. The monthly returns are gross of both management fees and transaction costs.
2. Kipsang has decided that AIFA will obtain an independent third party verification prior to claiming compliance with IPS and has contracted a local firm to perform a verification of only the growth equity composite.

**Required:**
Discuss whether AIFA can present each of the following in compliance with the account level calculation requirements of IPS:

(i) Returns that are gross of management fees. (2 marks)

(ii) Returns that are gross of transaction costs. (2 marks)

(iii) Discuss whether AIFA could claim compliance with IPS without independent third party verification. (2 marks)

(iv) Explain whether Kipsang's plan to obtain independent verification of only the growth equity composite would comply with IPS. (2 marks)

(b) In relation to pure bond indexing, explain **TWO** reasons as to why investors prefer investing in an indexed portfolio. (4 marks)

(c) Tropical Consultants is working with a pension fund focused on fixed income investments. The investment committee of the pension fund has three alternatives which it has requested the consultant to address:

**Alternative 1**
The pension fund is concerned about the use of leverage in the portfolio. By employing 100% leverage, the pension fund can generate incremental returns and provide a portfolio with the following characteristics:

| | **Portfolio characteristics** | |
|---|---|---|
| | **Assets** | **Liabilities** |
| Portfolio (Sh.million) | 200 | 100 |
| Duration | 6.00 | 1.00 |
| Expected return (%) | 5.50 | |
| Interest rate on borrowed funds (%) | | 4.75 |



**Alternative 2**
The pension fund is interested in using the futures market to manage the interest rate risk of the portfolio. The committee would like a target duration of 4. The data relating to futures market is provided below:

| | **Futures market data** |
|---|---|
| Futures contract price | Sh.100,000 |
| Conversion factor | 1.15 |
| Duration of the cheapest to deliver bond | 5.2 |
| Market price of the cheapest to deliver bond | Sh.98,000 |

**Alternative 3**
The committee is aware that the international interest rates are not perfectly correlated. Their portfolio is invested in their domestic country at the rate of 60% and the average duration of the portfolio is 7. The 40% of the portfolio is invested in neighbouring country with the average duration of 4.5, before any hedging activities to meet the committee duration target.

Historically, the country beta of the neighbouring country is estimated to be 0.55.

**Required:**
(i) Calculate the duration of the equity in the leveraged portfolio with respect to alternative 1 above. (2 marks)

(ii) Compute the number of futures contracts that need to be sold in order for the committee's target duration of 4 to be realised with respect to alternative 2 above. (3 marks)

(iii) Determine the contribution to the portfolio's overall duration from neighbouring country's bond with respect to alternative 3 above. (3 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Elaborate on the following sell disciplines commonly used by active equity investors:

(i) An opportunity cost sell discipline. (2 marks)

(ii) Deteriorating fundamentals sell discipline. (2 marks)

(iii) Up-from-cost sell discipline. (2 marks)

(b) A Djiboutian (DJF) investor holds an international portfolio with beginning investments of United States Dollar (USD) of 1,253,000 and Euro (EUR) of 2,347,000.

Measured in the foreign currencies, these investments appreciate at the rate of 5% and 7% respectively.

The following information is provided:

| **Beginning spot Exchange rate** | **Beginning forward Exchange rate** | **Ending spot Exchange rate** |
|---|---|---|
| DJF/USD 179.54 | DJF/USD 185.67 | DJF/USD 192.85 |
| EUR/DJF 0.00416 | EUR/DJF 0.00413 | EUR/DJF 0.00421 |

**Required:**

(i) The ending value of USD investment stated in DJF. (3 marks)

(ii) The unhedged return to the investor of the USD investment. (3 marks)

(c) Diana Musau, an investment analyst, is estimating various measures of spread for Nyati Limited. The following is the bid and ask quote for a trade in July 2024:

| **Bid price (Sh.)** | **Ask price (Sh.)** |
|---|---|
| 226.10 | 226.22 |

Diana initiated a buy trade that was executed at a price of Sh.226.17.

**Required:**

(i) The quoted spread. (3 marks)

(ii) The effective spread. (3 marks)

(iii) Determine the condition under which the effective and quoted spread would be equal. (2 marks)

**(Total: 20 marks)**



**QUESTION FIVE**

(a) Describe the following rebalancing strategies as used in portfolio management:

(i) Calendar rebalancing strategy. (2 marks)

(ii) Percentage of portfolio rebalancing strategy. (2 marks)

(b) The following shares of AQR Ltd. are sold at different times in the course of a trading day:

| **Trading volume (number of shares)** | **Transaction price per share (in Sh.)** |
|---|---|
| 400 | 50.00 |
| 800 | 50.50 |
| 1,100 | 50.75 |
| 700 | 51.00 |

**Required:**

(i) Calculate the volume weighted average price (VWAP) of the trading day. (2 marks)

(ii) Determine the implied trading costs for a trader who sold 800 AQR Ltd. shares at a price of Sh.50.50 per unit. (2 marks)

(c) Rhino is a foundation for a wildlife conservation college. The foundation has a market value of Sh.2 billion Mark Mugo is a financial advisor and works with Rhino Foundation. At its Investment Policy Statement (IPS) formulation meeting, Mark notes the following points:

- Rhino Foundation must spend 3% of its beginning of the year asset value annually to meet legal obligations.
- The investment committee seeks exposure to private equity investments and requests that Mark reviews the CRF private equity fund as a potential new investment.
- Enrolment is strong and growing, leading to increased operating revenues from tuition.
- A recent legal settlement eliminated an annual obligation of Sh.50 million from the portfolio to support a biodigester used in the college's centre for renewable energy.

Mark instructs his junior analyst to formulate new allocations for Rhino Foundation. This analyst proposes the allocation presented below:

| **Fund name** | **Existing allocation (%)** | **Proposed allocation (%)** | **Fund size (in billions) Asset under management (AUM) (Sh.)** | **Fund minimum investment (Sh.)** |
|---|---|---|---|---|
| Large-cap equity fund | 49 | 29 | 50 | 250,000 |
| Investment-grade bond fund | 49 | 59 | 80 | 500,000 |
| CRF private equity fund | 0 | 10 | 0.50 | 5,000,000 |
| Cash equivalent | 2 | 2 | 50 | 250,000 |

**Required:**
Discuss **THREE** reasons why the proposed Investment Policy Statement (IPS) asset allocation is inappropriate for Rhino Foundation. (6 marks)

(d) The following information relates to Daudi Investment Fund:

| | **Annual performance attribution** |
|---|---|
| Beginning value | Sh.150,000,000 |
| Net contributions | Sh.850,000 |
| Incremental value contributions (Risk free asset) | Sh.675,000 |
| Fund value (asset category) | Sh.165,500,000 |
| Fund value (benchmark) | Sh.165,900,000 |
| Incremental return contribution for allocation effects | Sh.0% |
| Total Fund return | 11.05% |



**Required:**

(i) Determine how much of the total return was attributed to style bias. (4 marks)

(ii) Determine how much value active stock selection added to the fund. (2 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 23 April 2024. Afternoon Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) Examine **FOUR** phases of an individual life cycle as used in the investment policy statement (IPS). (4 marks)

(b) Explain **THREE** factors that could influence the optimal corridor width for an asset class. (6 marks)

(c) Kilimo Foundation has a stated goal of reducing the impact of damage caused by insects on farms. The foundation risk tolerance and return requirements are summarised below:
**Risk tolerance:** Above average (maximum 15% annual standard deviation of returns).
**Return requirement:** To earn an average annual return to meet a spending rate of 7.5% (including expected inflation) and management/administration fees of 0.6%.

The foundation has approached an asset management firm to assess the appropriate strategic asset allocation for the foundations portfolio, which has generated the corner portfolios shown below:



**Asset classes (Portfolio weights %)**

| Corner portfolio | Expected return (%) | Standard deviation (%) | Sharpe ratio | Global equities | Domestic equities | Long term treasury bonds | Short term treasury bonds | Global bonds | Real estate |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.8 | 16.1 | 0.42 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | 10.4 | 14.2 | 0.45 | 82.4 | 0.0 | 0.0 | 0.0 | 0.0 | 17.6 |
| 3 | 10.3 | 13.6 | 0.46 | 74.1 | 4.0 | 0.0 | 0.0 | 0.0 | 21.9 |
| 4 | 9.1 | 9.1 | 0.55 | 33.7 | 12.0 | 36.7 | 0.0 | 0.0 | 17.6 |
| 5 | 8.9 | 8.7 | 0.56 | 31.4 | 12.0 | 26.7 | 13.0 | 0.0 | 16.9 |
| 6 | 8.5 | 7.4 | 0.60 | 25.0 | 11.8 | 0.0 | 45.3 | 3.4 | 14.5 |
| 7 | 7.2 | 5.2 | 0.62 | 0.0 | 13.7 | 0.0 | 53.0 | 27.1 | 6.2 |
| 8 | 7.3 | 5.1 | 0.61 | 0.0 | 11.2 | 0.0 | 53.0 | 31.5 | 4.3 |

**Additional information:**
1. The risk free rate is 4.0%.
2. The foundation by-law prohibits short position, or the use of margin but allows investment in any portfolio or a combination of portfolios described above.
3. The foundation considers Sharpe ratio to be a dominant factor in asset allocation decisions.

**Required:**

(i) Identify with reason the two adjacent corner portfolios to be used in finding the most appropriate strategic allocation for Kilimo Foundation investment portfolio. (3 marks)

(ii) Determine the most appropriate strategic asset allocation between the two adjacent corner portfolios identified in (c) (i) above. (3 marks)

(iii) Calculate the percentage amount of the most appropriate strategic asset allocation that should be invested in domestic equities and real estates based on your allocation in (c) (ii) above. (4 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) In relation to equity portfolio management, describe **THREE** substyles in value investing style. (6 marks)

(b) Eliud Warigo is a small cap growth manager who invests in United States (U.S.) equities. Eliud was hired by a pension fund that benchmarks him against a broad U.S. market index. The following information is gathered:

| | |
|---|---|
| Manager return | 18% |
| Broad market return | 15% |
| Normal portfolio return | 20% |
| Total active risk | 5% |
| Misfit active risk | 3.5% |

**Required:**
Calculate the manager's information ratio that must accurately reflect his abilities. (4 marks)

(c) Rona Ltd. is a company listed in the securities exchange. A trader sold 100 shares of this company on 10 April 2024 at 15:52:59 at a price of Sh.2.66 per share. All the trades that occurred in Rona Ltd. on that day are listed below:

| Time of trade | Price (Sh.) | Shares traded |
|---|---|---|
| 10:00:37 | 2.71 | 200 |
| 10:00:39 | 2.72 | 200 |
| 10:00:43 | 2.76 | 100 |
| 13:09:07 | 2.77 | 100 |
| 14:13:11 | 2.70 | 1100 |
| 15:52:59 | 2.66 | 100 |
| 15:53:01 | 2.65 | 100 |

The trader is analysing the implicit costs of the trade, focusing on the bid-ask spread and market impact using specified price benchmarks.

**Required:**
The estimated implicit transaction costs using each of the following as the price benchmark:

(i) Opening price. (3 marks)

(ii) Closing price. (3 marks)

(iii) Volume-weighted average price (VWAP). (4 marks)

**(Total: 20 marks)**



**QUESTION THREE**

(a) Describe the **THREE** main inputs to the macro attribution analysis approach as used in portfolio management. (6 marks)

(b) Dhahabu Fund is a portfolio managed by Abby capital. The reporting currency for the fund is the Korean won (KRW) and the portfolio holds investments denominated in Euro (EUR), United States Dollars (USD) and Swiss Francs (CHF). The current exchange rate information is provided below along with the manager's expectation for the spot rate in six months:

| | Spot rate | Six-month forward exchange rate | Portfolio manager's forecast |
|---|---|---|---|
| KRW/EUR | 1,483.99 | 1,499.23 | 1,450.87 |
| KRW/USD | 1,108.78 | 1,112.56 | 1,146.63 |
| KRW/CHF | 1,265.22 | 1,257.89 | 1,212.65 |

**Required:**

(i) Explain whether the two foreign currencies (EUR/USD) are trading at a forward premium or discount. (2 marks)

(ii) Justify which currency hedges would earn a positive roll yield to the fund manager. (1 mark)

(iii) Calculate the implied un-annualised roll yield of a currency hedged for the portfolios long exposure to the Swiss Francs (CHF). (3 marks)

(c) Emily Karambu is the portfolio manager of KBU Corporate Bond investors and is evaluating two bond portfolios whose information is given as follows:

**Bond portfolio 1:** The bond has a value of Sh.10 million whose position is as shown below:

| Bond | Market value weight (%) | Effective duration |
|---|---|---|
| 1 | 50 | 2.00 |
| 2 | 40 | 3.00 |
| 3 | 10 | 4.00 |

The investment policy statement (IPS) allows the portfolio manager to leverage the portfolio by 20% or Sh.2 million.

**Bond portfolio 2:** Karambu analyses the spread duration (based on option adjusted spread (OAS) for KBU. This portfolio 2 consist of Sh.5 million in Treasury Bills and Sh.10 million in corporate bonds. The portfolio's spread duration is 5.6.

**Required:**

(i) The duration of bond portfolio 1. (2 marks)

(ii) The contribution of bond 2 to the duration of bond portfolio 1. (2 marks)

(iii) The spread duration of the corporate bonds in bond portfolio 2. (4 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Describe the following approaches used in setting capital market forecasts:

(i) Surveys. (2 marks)

(ii) Panel method. (2 marks)

(iii) Judgement. (2 marks)



(b) Pamela Akinyi is a local domestic equities investor. Her portfolio has a zero factor value of 0.5 and a beta of 1.15 at the beginning of the investment period. During the first quarter of the year 2023, the return on a broad domestic market index was 5.9%. Akinyi has just been hired by a large plan sponsor. The sponsor is sosphicated in her use of benchmarks. The sponsor has developed a custom benchmark for her portfolio. This benchmark has a zero factor value of 1.5 and a beta of 0.95. Her portfolio actually returned 8.13% during the period.

**Required:**

Determine how much of the return can be attributed to the value added investment skill of Pamela Akinyi. (4 marks)

(c) The Tala health Foundation is a company-sponsored foundation, with the sole mission of supporting the Afya Clinic. Over the past five years, Tala Foundation has contributed 75.80% of Afya clinic's operating budget. Health care costs have grown at a rate of 1% above the annual rate of inflation and this trend is expected to continue in the foreseeable future. This year, Tala Foundation estimates its spending budget for the clinic will be Sh.11 million. Tala's management expenses average 0.40% of assets. In addition to the ongoing spending budget, Tala Foundation is funding a new facility for the clinic, which will require a final cash outlay of Sh.4 million within six months.

Tala Foundation was founded five years ago by Global Pharmaceuticals with a gift consisting of Global company stock and a 100% ownership interest in a privately held computer consulting business. Global Pharmaceuticals has contributed Sh.2 million annually to Tala Foundation since the initial gift. However, Global Pharmaceuticals has faced increasing capital expenditure and recently announced that it will be unable to make additional contributions to Tala Foundation. The computer consulting business is expected to generate Sh.1.25 million of pretax income this year; pretax income will grow with little volatility at the annual inflation rate, which is expected to be 1.5% for the foreseeable future. The corporate tax rate is 30%.

The board of trustees for Tala Foundation has diversified the portfolio over time and has expressed a desire to sell the computer consulting business. Excluding the computer consulting business, Tala's portfolio has a market value of Sh.200 million. The board is concerned about the uncertainty of the exact amount of required spending during the year. The board has designated a portion of the portfolio to serve as a reserve of approximately 15% of its spending budget for the clinic to ensure that Tala's annual spending goals will be met.

The board is aware of the market risk/return trade off and is willing to accept the risk necessary to support Tala Foundation long term growth orientation. With respect to return on investable assets, the trustees have agreed that a shortfall risk limit defined as expected total return minus two standard deviations of -14% in any one year is acceptable.

**Required:**

(i) Formulate the risk objective of an investment policy statement for Tala Foundation. (4 marks)

(ii) Formulate the return objective of an investment policy statement for Tala Foundation. (2 marks)

(iii) Calculate the rate of return that is required to achieve the return objective in (c) (ii) above. (4 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Discuss **FOUR** objectives of investment performance standards. (8 marks)

(b) Paul Rotich has a portfolio worth Sh.160 million, Sh.40 million of which is his own funds and Sh.120 million is borrowed.

**Additional information:**

1. The return on the invested funds is 7% and the cost of borrowed funds is 4%.
2. The duration of the invested funds is 4.20 and the duration of borrowed funds is 0.8.

**Required:**

(i) The return on the portfolio. (3 marks)

(ii) The duration of the equity invested. (3 marks)

(c) Tamadi Recylers, a recycling company, contacts fixed income consultant, Jerusha Mwai. Tamadi Recyclers recently acquired a ground along with the associated liability to pay its reclamation costs. Jerusha is asked to construct a portfolio that will fund Tamadi's liability, which will be payable in full at the end of the ground usage in 10 years. The objective for the portfolio is to immunise the liability while minimising reinvestment risk. Jerusha reviews three potential portfolio shown below. The initial value of each portfolio equals the present value of the estimated reclamation costs.



| Portfolio | Duration | Spread duration | Average maturity (Years) | Average coupon |
|---|---|---|---|---|
| 1 | 10.00 | 4.33 | 13.44 | 5.19% |
| 2 | 10.00 | 2.00 | 13.25 | 4.91% |
| 3 | 8.00 | 6.80 | 10.00 | 4.85% |

Jerusha also reviews the bonds in a different Tamadi portfolio shown below. She wants to rebalance the portfolio's money duration to Sh.240,000 while maintaining the existing security weights.

| Security | Price | Market value (Sh.) | Duration |
|---|---|---|---|
| Domestic government bond | 96.42 | 771,360 | 11.2 |
| Quickcom corporate bond | 95.00 | 855,000 | 9.4 |
| Daylever corporate bond | 104.00 | 728,000 | 9.1 |
| **Total** | - | 2,354,360 | - |

**Required:**

(i) Justify the portfolio that is most appropriate given the stated objective. (2 marks)

(ii) Explain why each of the other two portfolios is less appropriate given the stated objective. (2 marks)

(iii) Determine the amount of cash required to rebalance the portfolio's money duration. (2 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 5 December 2023. Afternoon Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) In relation to forming capital market expectations, explain **THREE** approaches to economic forecasting. (6 marks)

(b) Jane Maingi, a 50-year old single parent has recently inherited a fortune of Sh.20 million from her late uncle. Jane is a successful lawyer and earns an annual income of Sh.5,000,000. She lives a luxurious lifestyle with annual expenses of Sh.3,000,000. Jane has a niece in college to whom she wants to provide an annual support of Sh.500,000. She also wishes to donate Sh.1,000,000 each year to her favourite charity.

Jane is risk averse and would like to ensure her wealth lasts her lifetime and beyond. She plans to retire at the age of 65 years and maintain her current lifestyle. She also wants to leave a substantial portion of her wealth to her niece and the charity.



**Required:**
Formulate an investment policy statement (IPS) for Jane Maingi under the following sections:

(i) Return requirements. (2 marks)

(ii) Liquidity requirements. (2 marks)

(iii) Unique circumstances. (2 marks)

(iv) Time horizon constraints. (2 marks)

(c) Wilberforce Makandi is an investment consultant for a Jua Kali Fund. He has identified two portfolios; portfolio A and portfolio B to be appropriate to Jua Kali Fund in meeting the Fund's risk and return objectives. Both portfolios comprise portfolio asset classes 1, 2, 3 and 4 and Makandi gathers the following additional information:

1. Portfolio A comprises 25%, 15%, 20% and 40% weights in asset class 1, 2, 3 and 4 respectively.
2. Portfolio B comprises 30%, 20%, 35% and 15% weights in asset class 1, 2, 3 and 4 respectively.
3. Portfolio A and B have expected returns of 10% and 15% respectively.

**Required:**
Determine the individual asset class weightings for the efficiency portfolio with an expected return of 11%.
(6 marks)
**(Total: 20 marks)**

**QUESTION TWO**

(a) Describe **THREE** roles of fixed income securities in portfolio management. (3 marks)

(b) Highlight **FOUR** reasons for the establishment of globally accepted investment performance standards (GIPs) in your country. (4 marks)

(c) The long-term market expectations for XDZ Ltd. and emerging market equities portfolio are provided below:

| | Return (%) | Standard deviation (%) |
|---|---|---|
| Current XDZ portfolio | 4.5 | 6.5 |
| Emerging market equities | 7.5 | 13.5 |

A portfolio manager is evaluating whether adding an additional asset class to XDZ Ltd.'s portfolio will improve its risk-return characteristics. He establishes that the applicable inflation rate is 0.5%, the applicable risk free rate is 1.0% and the correlation between the current portfolio and emerging market equities is 0.79.

**Required:**

(i) The Sharpe ratio of the current portfolio. (2 marks)

(ii) The Sharpe ratio of the new asset class. (1 mark)

(iii) Explain the criteria the portfolio manager must follow in evaluating whether to add an additional asset class to XDZ Ltd.'s portfolio. (2 marks)

(iv) Determine whether adding a new asset class in XDZ Ltd.'s portfolio is recommended. (2 marks)

(d) Ephraim Mpole is a small cap growth manager who invests in domestic equities. He was hired by an investment firm that benchmarks against a broad domestic market index. He has gathered the following information:

| | (%) |
|---|---|
| Portfolio manager's return | 18.0 |
| Broad market return | 15.0 |
| Normal portfolio return | 20.0 |
| Total active risk | 5.0 |
| Misfit active risk | 3.5 |

**Required:**

Compute the following:

(i) Misfit active return. (2 marks)

(ii) Time active risk. (2 marks)

(iii) Misfit information ratio. (2 marks)

**(Total: 20 marks)**



**QUESTION THREE**

(a) With respect to emerging markets debts (EMDs) investing, outline the following:

(i) **THREE** advantages of investing in EMDs. (3 marks)

(ii) **THREE** risks associated with EMDs. (3 marks)

(b) Michael Simba, a trader with Capera Brokers made the following trades for Wasafiri Limited's shares on Tuesday, 7 November 2023:

- At 10 a.m. : Traded 100 shares at Sh.12.11 each.
- At 1 p.m. : Traded 300 shares at Sh.12.00 each.
- At 2 p.m. : Traded 600 shares at Sh.11.75 each.

**Required:**

(i) Calculate the volume weighted average price (VWAP) for Michael Simba's trades. (3 marks)

(ii) Justify using **THREE** reasons why VWAP may not be a suitable measure to evaluate trades. (3 marks)

(c) Bemuka Investment managers are desirous of making investment performance comparison with a different portfolio in another jurisdiction but of comparable investment nature.

Bemuka's portfolio of interest has the following performance:

| Date | Market value | External cash flow | Market value post cash flow |
|---|---|---|---|
| | Sh."million" | Sh."million" | Sh."million" |
| 31 December 2022 | 200 | | |
| 31 January 2023 | 208 | | |
| 16 February 2023 | 217 | +40 | 257 |
| 28 February 2023 | 263 | | |
| 22 March 2023 | 270 | –30 | 240 |
| 31 March 2023 | 245 | | |

**Additional information:**

1. In order to have a like-for-like investment performance comparison with the other portfolio, Bemuka Investment adopts a revaluing for large cash flows methodology where "large" is defined as greater than 5% in conformity to the investment performance standards.
2. Mathematical linking applies where appropriate.

**Required:**

(i) Time weighted rate of return (TWRR) for the months of January, February and March 2023 that accommodates only the large cash flows for comparison purposes. (6 marks)

(ii) The return for the first quarter of the year 2023 by chain linking the daily TWRR in (c) (i) above. (2 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Explain the following types of rebalancing strategies used in portfolio management:

(i) Buy and hold strategy. (2 marks)

(ii) Constant mix strategies. (2 marks)

(iii) Constant proportion strategy. (2 marks)

(b) Describe the following trading tactics as used in the execution of portfolio decisions:

(i) Liquidity-at-any-cost trading. (2 marks)

(ii) Costs-are-not-important trading. (2 marks)

(iii) Need-trustworth-agent trading. (2 marks)

(c) Anastacia Wambura, a portfolio manager at Hepo Fund invests in small and medium sized companies whose shares are primarily listed. The benchmark of the active investment is the market index.

The following performance data are available for the benchmark and the active portfolio:

| Sector | Weight of the benchmark (%) | Sector return of the benchmark (%) | Weight of the portfolio (%) | Sector return of the portfolio (%) |
|---|---|---|---|---|
| Industry | 33.0 | 5 | 20.2 | 6 |
| Finance | 29.5 | –5 | 39.4 | 8 |
| Consumer goods and services | 19.3 | 8 | 29.4 | 10 |
| Technology | 18.2 | 12 | 11.0 | 8 |
| Total | 100.0 | | 100.0 | |

**Required:**

(i) Calculate the active return of the portfolio. (2 marks)

(ii) Determine the portfolio returns attributable to the following:

- Pure sector allocation. (2 marks)
- Security selection within sector. (2 marks)
- Sector allocation/security selection interaction. (2 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Highlight **THREE** active currency portfolio management approaches. (3 marks)

(b) In relation to alternative investments portfolio management, summarise **THREE** risks associated with investing in distressed securities. (3 marks)

(c) John Opiyo is an investment advisor at an asset management firm. He is developing an asset allocation for James Mwamba, a client of the firm. Opiyo considers two possible allocations for James.

**Allocation A:** Consist of four asset classes; cash, domestic bonds, domestic equities and global equities.

**Allocation B:** Includes the same asset classes in allocation A as well as global bonds.

James Mwamba has a relatively low risk tolerance with a risk aversion coefficient ($\lambda$) of 7. John Opiyo runs a mean-variance optimisation (MVO) to maximise the following utility function to determine the preferred allocation for James.

$$Um = E(Rm) - 0.005\lambda \sigma^2 m$$

The resulting MVO statistics for the two asset allocations are presented below:

| | **Allocation A** | **Allocation B** |
|---|---|---|
| Expected return | 6.7% | 5.9% |
| Expected standard deviation | 11.9% | 10.7% |

**Required:**

Determine, with reasons, the allocation that John Opiyo should recommend to James Mwamba. (4 marks)



(d) A portfolio manager is desirous of implementing a contingent bond immunisation strategy to his fixed income portfolio and has gathered the following information:

1. The firm has a three year investment horizon.
2. The firm must earn an annual return of 3% as a minimum and can immunise its assets portfolio at a rate of 4.75% per annum.
3. The manager can actively invest part or all of the portfolio until it reaches the safety net return of 3%.
4. If the portfolio drops to its safety net level, the portfolio is immunised and active management is dropped.
5. The manager's portfolio is worth Sh.500 million and immunisation is carried out using semi-annual pay coupon bonds with the par value equal to the portfolio value.

**Required:**

(i) Explain the term "cushion spread" as used in contingent immunisation strategies. (1 mark)

(ii) Determine the cushion spread for the portfolio manager's immunisation. (1 mark)

(iii) Compute the ending value of the immunisation portfolio after 3 years using the safety net rate of return. (2 marks)

(iv) Determine the required terminal value of the portfolio at the beginning of the immunisation, assuming the portfolio is immunised at a rate of 4.75% per annum. (2 marks)

(v) If the manager invests the entire Sh.500 million at the rate of 4.75% per annum and the yield to maturity (YTM) immediately drops to 3.75% per annum, determine the value of the safety margin. (4 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 22 August 2023. Afternoon Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) Describe how each of the **FIVE** phases of business cycle affect the short-term and long-term capital market expectations. (5 marks)

(b) A consultant has recently acquired a new client, Uzima pension scheme which is a defined benefit scheme. The consultant has compiled the following data for the scheme:

| | |
|---|---|
| Active employees | 5277 |
| Retired employees | 1595 |
| Active employees' average age | 51.7 years |
| Pension assets | Sh. 760 million |
| Pension liabilities | Sh. 720 million |
| Pension payment, current year | Sh. 48 million |
| Pension payment: inflation-adjusted? | Yes |
| Lump sum distribution option? | Yes |
| Open to new employees? | No |



For new workers, the scheme has been replaced by a defined contribution scheme, but the scheme sponsors are committed to ensuring that the scheme will be fully funded. Workers typically retire at age 60.

**Required:**

In the preparation of the scheme's investment policy statement (IPS):

(i) Identify **TWO** factors that will most likely contribute to an increase in the scheme's ability to take risk. (2 marks)

(ii) Identify **TWO** factors that will contribute to a decrease in the scheme's ability to take risk. (2 marks)

(iii) Formulate the time horizon section of the scheme's IPS. (4 marks)

(iv) Highlight **TWO** factors that will most likely contribute to an increase in the scheme's liquidity needs. (2 marks)

(c) Kiegoi Fund is a Fund of Funds (FoFs) that comprise the following funds:

| Fund | Return | Beta ($\beta$) | Total risk |
|---|---|---|---|
| KBU | 18% | 1.2 | 17% |
| KBR | 12% | 1.05 | 15% |

The applicable risk free rate for the two funds is 4.5%.

**Required:**
Advise Kiegoi Fund on the fund to choose based on the following performance measures:

(i) Sharpe measure. (2 marks)

(ii) Treynor's measure. (3 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) A security market should provide liquidity, transparency and assurity of completion as essential qualities of markets in execution of portfolio decisions.

**Required:**
In reference to the above statement, assess **THREE** factors that are necessary for a market to be liquid. (6 marks)

(b) Explain **TWO** types of target rebalancing that are aimed at protecting the future value of a portfolio. (4 marks)

(c) Maurine Akinyi has constructed a portfolio consisting of three bonds; X, Y and Z in equal par amounts of Sh.1,000,000 each.

The initial values and durations are as shown below:

| Bond | Price (per par value of Sh. 100) | Duration |
|---|---|---|
| X | 104.013 | 5.025 |
| Y | 96.089 | 1.232 |
| Z | 103.063 | 4.479 |

The portfolio values and durations after one year are as follows:

| Bond | Price (per par value of Sh. 100) | Duration |
|---|---|---|
| X | 99.822 | 4.246 |
| Y | 98.728 | 0.305 |
| Z | 99.840 | 3.596 |



Maurine Akinyi would like to maintain the portfolio's shilling duration at the initial level by rebalancing the portfolio. She chose to rebalance using the existing bond proportions of one third each.

**Required:**

(i) The initial portfolio shilling duration. (3 marks)

(ii) The portfolio shilling duration after one year. (3 marks)

(iii) The rebalancing ratio necessary for the rebalancing. (2 marks)

(iv) The cash required for the portfolio rebalancing. (2 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) With respect to mean variance optimisation approaches to asset allocation, explain:

(i) **TWO** advantages of using the Black – Litterman approach. (2 marks)

(ii) **TWO** advantages of using a Monte Carlo simulation. (2 marks)

(b) Identify **THREE** reasons for more price inefficiencies on the short side of the market than on the long side in equity portfolio management and execution of short extension portfolios. (3 marks)

(c) One of the Bernard Muya's client allows the use of leverage in his portfolio. Muya considers a 6-month loan to leverage an investment in Faida Ltd. 5 year bonds, which today made their semi-annual coupon payment.

The details on Muya's analysis of the investment are provided below:

| | |
|---|---|
| Amount to borrow | Sh. 3 million |
| Borrowing rate (annual, nominal) | 1.40% |
| Investment in Faida Ltd. bonds | Sh. 5 million |
| Faida Ltd. bond par value | Sh. 1000 |
| Faida Ltd. bond price today | Sh. 1,024.73 |
| Faida Ltd. bond coupoun rate | Sh. 4.50% |
| Projected Faida Ltd. bond price in 6 months | Sh. 1,022.47 |

**Required:**
Calculate the expected 6 month holding period return on Bernard Muya's proposed investment in Faida Ltd. bonds. (4 marks)

(d) A bond portfolio manager is contemplating purchase of a corporate bond and gathers the information below:

1. Coupon rate of 11% paid semi-annually.
2. Four years are remaining until maturity.
3. The current price of the bond is Sh. 98.4321 with a yield to maturity of 11.5%.
4. The treasury yield curve is flat at 8.0%
5. The credit spread for the issuer is 350 basis points for all maturities.
6. The manager's investment horizon is 1 year.
7. Coupon re-investment rate is 6% (stated annually).
8. There is a forecasted decline in the credit spread for all maturities to 250 basis points.



**Required:**
Perform an assessment of the return characteristic of the proposed investment in the corporate bond using total return analysis by computing:

(i) The horizon price of the bond using 9% yield. (3 marks)

(ii) End of value accumulated coupon income at a re-investment rate of 6% annually. (2 marks)

(iii) The semi-annual total return. (2 marks)

(iv) The investment's effective annual return. (2 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) In relation to selection of active managers of alternative investment scheme, identify **TWO** considerations under each of the following due diligence check points:

(i) Assessment of market opportunity offered. (2 marks)

(ii) Assessment of investment process. (2 marks)

(iii) Assessment of terms and structure of investment. (2 marks)

(b) Alfred Sirma is a financial analyst for a fund sponsor and has prepared a performance attribution analysis for the fund. He identifies the fund's sources of return and develops the macro attribution table shown below:

**Macro attribution for 1 April – 30 June 2023**

| **Decision making level (investment alternative)** | **Find Values Sh. "000"** | **Incremental contribution (%)** | **Incremental value contribution/(withdrawal) Sh. "000"** |
|---|---|---|---|
| Beginning value | 360,000 | - | - |
| Risk free asset | 361,800 | 0.50 | 1,800 |
| Asset category | 388,872 | 7.52 | 27,072 |
| Benchmarks | 389,376 | 0.14 | 504 |
| Investment managers | 389,664 | 0.08 | 288 |
| Allocation effects | 389,304 | -0.10 | (360) |
| **Total fund** | **389,304** | **8.14** | **29,304** |

**Required:**

(i) Determine how much of the fund's return was due to each of the following:

1. Style bias. (2 marks)
2. Active management. (2 marks)

(ii) Demonstrate whether the total fund outperformed a pure indexing strategy. (4 marks)

(c) Augustine Nemayian is a portfolio manager who believes that Magadi Cement Limited (MCL) is undervalued. Augustine obtains approval at 10 a.m. to buy 120,000 shares of MCL when the price is Sh 40 using a limit order of Sh 42. The order is released for market execution when the price is at Sh. 40.50. The only fee is a commission of Sh. 0.02 per share. By the end of the trading day 90,000 shares of the order had been executed, and MCL closes at Sh. 42.50. The trade was executed at an average price of Sh 41.42. Details about the executed trades are presented below:



| **Trades** | **Execution price Sh.** | **Shares Executed** |
|---|---|---|
| 1 | 40.75 | 10,000 |
| 2 | 41.25 | 30,000 |
| 3 | 41.50 | 20,000 |
| 4 | 41.75 | 30,000 |
| **Total** | | **90,000** |

**Required:**

Determine the following costs for purchasing 90,000 shares of Magadi Cement Limited:

(i) The execution costs. (2 marks)

(ii) The opportunity costs. (2 marks)

(iii) The arrival costs. (2 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Outline **SIX** general characteristics of investment performance standards (IPSs) in your jurisdiction. (6 marks)

(b) The following investment performance is an extract from a micro attribution analysis for the second quarter ending 30 June 2023 of Fanaka Fund:

| **Economic sectors** | **Portfolio weight (%)** | **Sector benchmark weight (%)** | **Portfolio return (%)** | **Sector benchmark return (%)** |
|---|---|---|---|---|
| Energy | 8.38 | 7.72 | 3.55 | 3.32 |
| Financial | 15.48 | 13.42 | 1.66 | 1.10 |
| Technology | 17.89 | 22.01 | 3.21 | 3.18 |

**NOTE**: The overall benchmark return was 2.32%.

**Required:**
Perform micro attribution analysis for Fanaka fund using:

(i) Pure sector allocation return for the energy sector. (2 marks)

(ii) Within - sector selection return for the financial sector. (2 marks)

(iii) The allocation/selection interaction return for the technology sector. (2 marks)

(c) Zachary Onsore is a currency overly manager with Odipo Global Analysts, which is based in Canada. Onsore is responsible for hedging the currency exposure of Odipo's investments in Great Britain valued at £1,500,000. The spot exchange rate at the time of the investment was C$ 1.89/£ and the futures contract rate was C$ 1.91/£. One hundred and eighty (180) days later into the futures contract undertaken, the investment is liquidated realising a 6 percent return (for the six months).



The spot exchange rate at the time of liquidation is C$ 1.85/£ and the futures rate is C$ 1.87/£.

**Required:**
Evaluate the effects of currency movements on Odipo's portfolio return in the following aspects:

(i) Translation gain/loss on the unhedged British Investment. (4 marks)

(ii) Since Onsore hedged the principal amount using the British Pound futures, determine the domestic return of the portfolio. (4 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 25 April 2023. Afternoon Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) Identify **TWO** characteristics of each of the following phases of a business cycle on short-term and long-term capital market returns:

(i) Initial recovery. (2 marks)

(ii) Early upswing. (2 marks)

(iii) Slowdown. (2 marks)

(iv) Recession. (2 marks)

(b) Concord Insurance Limited underwrites auto and home owners insurance. The company is licensed to do business in all the 47 counties of country X. The company has achieved stable growth rate and the Board of Directors (BOD) of the company has approved a strategic plan for increasing the company's growth rate and profitability. The company's total assets exceed Sh.5 billion and its surplus approaches Sh.2 billion. The company is facing increased competition in its markets from competitors through internet sales. The competitive environment has focused the BOD on increasing the after-tax returns on the bond portfolio and the growth of the portfolio. The company's chief investment officer (CIO) has been tasked by the BOD to revise the company's investment policy statement (IPS) to reflect the changes that will be necessary to meet the new growth targets.



**Required:**

Formulate, for the CIO the following aspects of the IPS for Concord Insurance Limited:

(i) Investment philosophy. (2 marks)

(ii) Return objectives. (2 marks)

(iii) Risk tolerance. (2 marks)

(c) Edna Maasai placed three sell orders for Rahisi Limited shares and gathered the following data for the quoted bid and ask quotes at various points in the day:

| Time of trade | Bid price | Bid volume | Ask price | Ask volume |
|---|---|---|---|---|
| 1 pm | Sh.20 | 400 | Sh.20.08 | 500 |
| 2 pm | Sh.20.08 | 400 | Sh.20.18 | 500 |
| 4 pm | Sh.20.12 | 400 | Sh.20.24 | 500 |

Edna has provided the following further information:

1. At 1 pm, she placed an order to sell 200 shares. The execution price was Sh.20.02.
2. At 2 pm, she placed an order to sell 300 shares. The execution price was Sh.20.11.
3. At 4 pm, she placed an order to sell 500 shares. The average execution price was Sh.20.09.

**Required:**

Calculate the effective spreads for each of Edna's orders. (6 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Highlight **FIVE** fixed income enhancement strategies available to portfolio managers seeking to reduce the component of tracking errors associated with the expenses and transaction costs of portfolio management.

(5 marks)

(b) Mbunika Ltd. offers its employees attractive benefits which include a defined contribution pension plan. An asset only (AO) approach to strategic asset allocation is currently used for the investment management of the pension plan. Titus Mezo is a consultant to the board of trustees of the pension plan. The board has requested Titus Mezo to recommend a strategic asset allocation for the pension plan given the following investment policy objectives:

1. **Return requirement:** Earn an average annual return of 8.7% plus management and administrative fees of 0.7%.

2. **Risk objectives:** A maximum standard deviation of portfolio returns of 10%.

For the strategic asset allocation analysis, Titus Mezo has generated the corner portfolio shown below:

**Corner portfolios**

| | | | | Asset classes (portfolio weights, %) | | | | |
|---|---|---|---|---|---|---|---|---|
| **Corner portfolio number** | **Expected return (%)** | **Expected standard deviation (%)** | **Sharpe ratio** | **Domestic equities** | **Non domestic equities** | **Intermediate domestic bonds** | **Non domestic bond** | **Domestic real estate** |
| 1 | 10.8 | 16.1 | 0.39 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | 10.4 | 14.2 | 0.42 | 82.4 | 0.0 | 0.0 | 0.0 | 17.6 |
| 3 | 10.3 | 12.7 | 0.46 | 74.1 | 4.0 | 0.0 | 0.0 | 21.9 |
| 4 | 9.1 | 9.1 | 0.51 | 33.7 | 12.0 | 36.7 | 0.0 | 17.6 |
| 5 | 8.0 | 7.4 | 0.47 | 25.0 | 11.8 | 45.3 | 3.4 | 14.5 |
| 6 | 6.9 | 5.2 | 0.46 | 0.0 | 13.7 | 53.0 | 27.1 | 6.2 |
| 7 | 6.6 | 4.8 | 0.44 | 0.0 | 11.2 | 53.0 | 31.5 | 4.3 |



**Additional information:**

1. The risk free rate is 4.5%.
2. Currently, the pension plan investment policy statement (IPS) prohibits short positions and the use of leverage.
3. The IPS allows investment in any single portfolio or combination of portfolio described above.
4. Titus is proposing a change in the IPS to allow borrowing or lending at the risk free rate.

**Required:**

Using traditional mean-variance analysis:

(i) Determine with **TWO** reasons the most appropriate portfolio or combination of portfolios for the strategic asset allocation of the current pension plan. (2 marks)

(ii) Determine the weight of total equities in the most appropriate strategic asset allocation of the current pension plan. (3 marks)

(iii) Determine the optimal asset allocation for the overall portfolio for the pension plan based on Titus' proposal. (4 marks)

(iv) Explain how the proposed allocation by Titus improves the plan's risk adjusted return. (2 marks)

(c) (i) State **TWO** advantages of the resampled efficient frontier approach relative to the traditional mean-variance efficient frontier approach. (2 marks)

(ii) Highlight **TWO** advantages of the Asset Liability Management (ALM) approach to the Asset Only (AO) approach. (2 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Distinguish between "micro attribution analysis" and "macro attribution analysis" in relation to portfolio performance evaluation. (4 marks)

(b) Discuss **THREE** key areas that must be addressed in formulating a private equity investment strategy as used in alternative investment portfolio management. (6 marks)

(c) Eliud Omondi has compiled data on the performance of a plan's portfolio for the year ending 31 December 2022. Eliud has noted that each sub-portfolio has its own external manager with the plan trustees determining the portion of the overall portfolio allocated to each manager as shown below:

| Sub-portfolio | Weight | | Return | |
|---|---|---|---|---|
| | Plan portfolio (%) | Benchmark (%) | Plan portfolio (%) | Benchmark (%) |
| Equity | 65 | 60 | 8.2 | 8.0 |
| Fixed income | 20 | 30 | 2.4 | 2.5 |
| Alternative investments | 15 | 10 | 9.2 | 10.8 |
| **Total** | **100** | **100** | | |

Eliud uses the Brinson model for performance attribution:

Hint: The Brinson model is given as follows:

- Allocation effect = $\sum_{i=1}^{n} Ai = \sum_{i=1}^{n} (Wp - Wi) * Bi$
- Security selection + interaction effects = $\sum_{i=1}^{n} = Wp(Rp - RB)$

**Required:**

(i) The return attributable to asset owner. (2 marks)

(ii) The return attributable to the managers. (2 marks)

(iii) Comment on your results in (c) (i) and (c) (ii) above. (1 mark)

(d) Wangechi Joy, a Fund manager is responsible for the Uganda equity portion of her company's pension plan. She is thinking about trying to boost the overall alpha in Ugandan equities by using an enhanced index to replace her core index fund. Further, it is established that:

- The Uganda equity portion of the pension plan currently consists of three managers (one index, one value and one growth) and the portion is expected to produce a target annual alpha of 2.4% with a tracking risk of 2.75%.
- By replacing the index manager with an enhanced indexer, the target alpha changes to 2.8% with a tracking risk of 2.9%.
- Wangechi Joy is willing to accept a slightly higher level of tracking risk.

**Required:**

Using information ratio, justify whether there is any change in the equity portfolio. (5 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Describe **TWO** benefits that each of the following players could derive by complying with performance standards in the investment industry:

(i) Investment managers. (2 marks)

(ii) Prospective clients. (2 marks)

(b) Job Wambua manages a Kenya (KES) based hedge fund. A portion of the fund is currently allocated 60% and 40% respectively to Uganda (UGX) and Rwanda (RWF) risk free investments, pending other investment opportunities.

Job has collected the following information:

| **Estimates** | **Uganda** | **Rwanda** |
|---|---|---|
| Asset return in foreign currency | 2.0% | 2.5% |
| Change in spot exchange rate versus the KES | –1.0% | 3.0% |
| Asset risk measured in foreign currency (σ) | 0.0% | 0.0% |
| Currency risk (σ) | 7.0% | 9.0% |
| Correlation of currency returns (KES/UGX, KES/RWF) | +0.70 | |

**Required:**
Determine the following from the portfolio perspective, measured in KES:

(i) The expected returns as measured in investor's domestic currency. (2 marks)

(ii) The standard deviation of the risk free assets as measured in the investor's domestic currency. (2 marks)

(c) Mema Capital Ltd. is a United States based investment firm that invests in a portfolio of bonds that trade in Euros. Over a one year holding period, the value of the portfolio increases by 5% (in Euros) and the Euro-Dollar exchange rate increases from 1.300 USD/EUR to 1.339 USD/EUR.

**Required:**
(i) The currency that has appreciated. (1 mark)

(ii) The returns from foreign exchange. (2 marks)

(iii) Investor's return in domestic currency terms (USD) over a one-year holding period. (2 marks)

(d) The following information is available regarding four managers benchmarked against the MSCI World Index:

| **Manager constraints** | **A** | **B** | **C** | **D** |
|---|---|---|---|---|
| Target active risk | 10% | 1% | 4% | 7% |
| Maximum sector deviations | 0% | 3% | 10% | 15% |
| Maximum risk contributions, single security | 5% | 1% | 1% | 3% |



**Required:**
Based on major types of traders and their motivation to trade, justify which manager is:

(i) A closet indexer. (1 mark)

(ii) Concentrated stock picker. (2 marks)

(iii) Diversified multi-factor investor. (2 marks)

(iv) Sector rotator. (2 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Highlight **TWO** weaknesses of using each of the following benchmarks to measure the performance of a portfolio:

(i) Market index. (2 marks)

(ii) Benchmark normal portfolio. (2 marks)

(iii) Median of the manager universe. (2 marks)

(b) A client hires a fixed income portfolio manager to pursue a contingent immunisation strategy for his portfolio. The goal is to reach a terminal distribution in 6.75 years of Sh.525 million. The required amount to immunise the portfolio is Sh.375 million. The portfolio was funded with Sh.400 million. Three months later, the portfolio is worth Sh.390 million. The immunisation rate for the remaining term of the portfolio is now 5.0%.

**Required:**
Determine whether the manager has increased or decreased the surplus during the first three months of managing the portfolio. (3 marks)

(c) Sherly Achieng initially has Sh.100,000 invested in shares at the Nairobi Securities Exchange (NSE) and Sh.35,000 in T-bills so that the total portfolio is worth Sh.135,000. Sherly observes that the share market index rise from 1,240 to 1,350 following the recently concluded peaceful general election that boosted investors' confidence. The index rise was from 1 September 2022 to 30 September 2022. By the end of 30 October 2022, the share market had fallen to 1,300. Sherly discloses that her initial position held her most optimal stock-to-total assets ratio (S/TA).

**Required:**
Advise Sherly Achieng on the following:

(i) Optimal S/TA ratio. (1 mark)

(ii) Stockholding as at 30 September 2022 under a buy and hold strategy. (2 marks)

(iii) Stockholding as at 30 October 2022 under the buy-and hold strategy. (2 marks)

(iv) The amount of stock to buy or sell as at 30 September 2022 under the constant-mix strategy. (3 marks)

(v) The amount of stock to buy or sell as at 30 October 2022 under the constant-mix strategy. (3 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 6 December 2022. Afternoon Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) Describe how the following factors could affect an individual investor's risk tolerance:

(i) Source of wealth. (1 mark)

(ii) Measure of wealth. (1 mark)

(iii) Stage of life. (1 mark)

(b) Capital market expectations are the essential inputs to deciding on a strategic asset allocation.

In relation to the above statement, identify the **SEVEN** steps involved in the process of capital markets expectations setting. (7 marks)



(c) XYZ is an investments practitioner and is analysing Elimu Msingi endowment fund with Sh.20 million in assets. The fund has a targeted spending rate of 4.5%. The fund has been incurring 0.75% as management costs.

The trustees would like to preserve the purchasing power of the fund and curtail the risk in terms of standard deviation to no more than 10%. Inflation expectation for the coming year is 2%.

**Additional information:**

1. XYZ is considering the following domestic investments to recommend to Elimu Msingi Board of trustees for incorporation into their investment portfolio:

| Investment | Return (%) | Standard deviation (%) |
|---|---|---|
| A | 15.50 | 19 |
| B | 10.85 | 12 |
| C | 8.50 | 14 |
| D | 14.25 | 16 |

The risk free rate applicable for these investments is 3% and XYZ estimates Elimu Msingi to be moderately risk averse with a numerical ranking of 5.

2. XYZ identifies further foreign investment opportunities presented by various portfolios listed below:

| | | | Asset class weights (%) | | | |
|---|---|---|---|---|---|---|
| **Portfolio** | **Expected return (%)** | **Standard deviation (%)** | **1** | **2** | **3** | **4** |
| E | 12.00 | 10.5 | 65 | –20 | 35 | 20 |
| F | 16.50 | 15.00 | 15 | 20 | 50 | 15 |
| G | 18.00 | 20.00 | 30 | 20 | 25 | 25 |
| H | ? | ? | ? | ? | ? | ? |

**Required:**

(i) Determine Elimu Msingi's endowment fund required rate of return. (1 mark)

(ii) Advise XYZ on the most appropriate domestic investment to recommend to the Board of trustees of Elimu Msingi using the utility adjusted rate of return. (5 marks)

(iii) Given that portfolio H is composed of 35% of portfolio E and 65% of portfolio F, determine the optimal asset class weights in portfolio H. (4 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Describe **THREE** primary portfolio rebalancing strategies. (6 marks)

(b) Daniel Menzo who is 35 years old has recently retired from playing football. He is meeting with his portfolio manager to update his investment policy statement (IPS):

**Income**

He will receive an annual pension of Sh.1,000,000 before tax in the coming year. In future years, this amount will be indexed for inflation which is expected to be 5% per year. The pension is taxed at 30%.

**Expenses**

His living expenses over the previous twelve months were Sh.1,200,000. He expects these expenses will grow at the expected rate of inflation this year and in each future year.

**Assets**

In addition to his pension payments, his investment portfolio is currently valued at Sh.15 million. Next month, he wants to make a direct equity real estate investment of Sh.1,000,000 in a junior school sports training facility. He also anticipates that he will receive a performance cash bonus of Sh.3,500,000 which will be immediately invested in his portfolio. This bonus and all investment returns are taxed at 30%.

**Goals**

Daniel wants his portfolio to fund any expenses not covered by his pension, while maintaining its real value over time. He is eager to consider investments in more risky asset classes. He is not concerned about volatility in the value of his portfolio as long as it continues to support his living expenses. He does not intend to seek further employment in retirement.



**Required:**

(i) Calculate Daniel's nominal after tax required rate of return for the coming year. (8 marks)

(ii) Identify **FOUR** factors that indicate Daniel has a high ability to take risk. (4 marks)

(iii) Formulate the time horizon and unique circumstances constraints section of Daniel's IPS. (2 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Describe **TWO** spread duration measures used for fixed rate bond. (4 marks)

(b) An investor gathers the following information relating to Kimbo shares listed at the securities exchange:

- On Wednesday, the shares closed the day at Sh.40 per share.
- On Thursday morning before market open, the investor decides to buy Kimbo Ltd.'s shares and transfers a limit order for Sh.39.95 per share for 1,000 shares. The price never falls to Sh.39.95 during the day and the order expires unfilled. The shares closes the day at Sh.40.04 per share.
- On Friday, the order is revised to limit of Sh.40.05. The order is partially filled that day as 700 shares are bought at Sh.40.05. The commission is Sh.17. The share closes at Sh.40.08 and the order is cancelled.

**Required:**

Calculate the following:

(i) Explicit cost of trade. (1 mark)

(ii) Realised profit or loss. (1 mark)

(iii) Delay cost. (1 mark)

(iv) Missed trade opportunity costs. (1 mark)

(v) Implementation shortfall. (2 marks)

(c) Silvester Onyango, a high net worth (HNW) investor has approached Antony Makau, an independent financial consultant to review the performance of his investment account over the past four years. The account is managed by an external portfolio manager, but Silvester Onyango has full control over the timing and the size of the cash flows being invested into and withdrawn from the account.

**Account values and cash flows:**

| **Year** | **Year end Cash flow Sh.“million”** | **Year end value (including year end cash flow) Sh.“million”** |
|---|---|---|
| 2017 | - | 90 |
| 2018 | 5 | 100 |
| 2019 | 5 | 110 |
| 2020 | 120 | 230 |
| 2021 | –30 | 250 |

**Required:**

(i) The annualised time weighted rate of return (TWRR). (4 marks)

(ii) The annualised money weighted rate of return (MWRR). (4 marks)

(iii) Advise on the most appropriate return measure for use in evaluating the external portfolio manager’s investment performance. (2 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Assess **THREE** potential sources of excess return for an international bond portfolio. (6 marks)

(b) Explain **THREE** guiding principles that firms should consider while applying the global investment performance standards (GIPS) to wrap fee portfolios. (6 marks)



(c) Caroline Wesula is evaluating several alternatives for the Ugandan equity portfolio of her company’s pension plan involving the following managers:

| | **Active return (%)** | **Active risk with respect to Benchmark (%)** | **Normal benchmark** |
|---|---|---|---|
| Index | 0 | 0 | Dumax 3000 |
| Semi-active | 1 | 1.5 | Dumax 3000 |
| Active N(value) | 3 | 5 | Dumax 1000 value |
| Active M(Growth) | 4 | 6 | Dumax 1000 growth |
| Long-short | 6 | 6 | Cash with Dumax 1000 overlay |

**Additional information:**

1. Active versus misfit risk is 7.13%.
2. Active returns are uncorrelated.
3. Overall equity portfolio benchmark is Dumax 3000.
4. Caroline Wesula has taken information in the table above and used mean-variance optimizer to create an implementation efficient frontier. The highest risk point on the efficient frontier is 100% allocation to the long-short manager with a 100% Dumax 1000 overlay.
5. The active risk of this portfolio with the adjustments in point (4) above is 6.1%.

**Required:**

(i) Justify why the active risk is greater than 6%. (2 marks)

(ii) Calculate the total active risk for Active N. (2 marks)

(iii) Caroline Wesula’s current equity manager allocation is 30% Dumax Index and 70% semi-active:

Calculate total current expected active return, active risk and information ratio. (4 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Describe **TWO** approaches used in constructing an index portfolio. (4 marks)

(b) Explain **THREE** components of returns for commodity futures contracts. (6 marks)

(c) A portfolio manager has a portfolio worth Sh.100 million, Sh.30 million of which is his own funds and Sh.70 million is borrowed. If the return on the invested funds is 6% and the cost of borrowed funds is 5%.

**Required:**

Calculate the return on the portfolio. (4 marks)

(d) Brian Maritim is the portfolio manager of Rich Corporate Bond investors. His current Sh.100 million bond position is as follows:

| **Bond** | **Market value weights (%)** | **Effective duration** |
|---|---|---|
| A | 50 | 2.00 |
| B | 40 | 3.00 |
| C | 10 | 4.00 |

The investment policy statement (IPS) allows the portfolio manager to leverage the portfolio by 20%.

**Required:**

(i) The effective duration of the bond portfolio. (2 marks)

(ii) The contribution of bond B to the effective duration of portfolio. (1 mark)

(iii) Identify **THREE** types of risks that Brian's bond portfolio is potentially exposed to. (3 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**PILOT**

**ADVANCED PORTFOLIO MANAGEMENT**

**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) Using historical data, F.A. Cherono calculated the covariance between Kenyan and Rwandan stocks to be 230. She estimates the correlation as 190 using a factor model method based on a proxy for the world market portfolio. She uses a shrinkage estimator to estimate covariances and finds that 0.30 is the best weight on the historical estimate.

**Required**

(i) Calculate the shrinkage estimate of the covariance between Kenyan and Rwandan equities. (2 marks)

(ii) Describe the theoretical advantage of a shrinkage estimate of covariance compared to a raw historical estimate. (1 mark)



(b) Consider the responsibilities for two investment managers, F.A. Theuri and F.A. Gitahi. Theuri works in a Kenyan investment bank portfolio management department and manages separately managed accounts (SMA's) for high-net-worth clients. The accounts' requirements limit investments to Kenyan stocks, Kenyan fixed-income securities, and prime Kenyan money market products. The investing objective of these balanced accounts is long-term capital growth and income. Gitahi, on the other hand, is the chief investment officer of a big South African – based, internationally oriented asset management that invests in the following categories of assets:

| **Equities** | **Fixed Income** | **Alternative Investments** |
|---|---|---|
| South African equities | West African sovereign debt | East African venture capital |
| West African equities | Kenyan government debt | DR Congo timber assets |
| Kenyan large-cap equities | | Kenyan apartment properties |
| Kenyan small-cap equities | | |
| Tanzanian large -cap equites | | |

*NB: Venture capital is equity investment in private companies.*

Gitahi also runs SMA's with generally long-term time horizons and global tactical asset allocation programs.

**Required**

Using the above information, compare and contrast the information and knowledge requirements of Theuri and Gitahi. (5 marks)

(c) Describe how an equity manager's investment universe can be segmented. (6 marks)

(d) The following data is provided for four managers who are benchmarked against the same index:

| **Manager Constraints** | **A (%)** | **B(%)** | **C (%)** |
|---|---|---|---|
| Target Active Risk | 8 | 5 | 9 |
| Maximum sector deviations | 20 | 8 | 0 |
| Maximum risk contributions, single security | 3 | 1 | 6 |

**Required:**
Identify and justify the manager most likely to be:

(i) A shrewd stock picker. (2 marks)

(ii) A multi-factor investor who is well-diversified. (2 marks)

(iii) A rotator for sectors. (2 marks)
**(Total: 20 marks)**

**QUESTION TWO**

(a) Ngwiri is managing a diversified portfolio which has the following characteristics:

| | **Portfolio Weight** | **Standard Deviation** |
|---|---|---|
| **Asset A** | 20% | 22% |
| **Asset B** | 30% | 12% |
| **Asset C** | 50% | 10% |
| **Portfolio** | 100% | 8.6% |

The Covariances are shown below:

| | **Asset A** | **Asset B** | **Asset C** |
|---|---|---|---|
| **Asset A** | 0.050000 | 0.006700 | 0.001300 |
| **Asset B** | 0.006700 | 0.014400 | 0.002000 |
| **Asset C** | 0.001300 | 0.002000 | 0.009800 |

**Required:**

(i) Calculate the absolute contribution to portfolio variance of asset A. (2 marks)

(ii) Given that the absolute contribution to portfolio variance of assets B and C are 0.001998 and 0.002880 respectively, calculate the relative contribution to portfolio variance of asset A. (1 mark)

(b) The following information on three bonds is provided.

| | **Price** | **Yield (YTM)** | **Maturity** | **Effective Duration** |
|---|---|---|---|---|
| 7-year corporate bond | 101.5 | 3.77% | 6.7 | 6.1 |
| 5-year government bond | 99.96 | 1.9% | 4.9 | 4.7 |
| 7-year government bond | 99.56 | 2.2% | 7.0 | 6.5 |

F.A. Mwende plans to buy 1 million par of the corporate bond and she is aware that there is some controversy in the financial services industry regarding whether it is best to compute G-spread by matching maturity or duration. Maturity has been used in the industry for sometime and is regarded as simpler. Some theoretical arguments favour an interpolation based on duration as more accurate. She has determined the difference in the two methods is not generally large and favours the more traditional "use maturity "approach.

**Required:**

(i) Calculate the initial benchmark (G-spread) of the corporate bond based on interpolated maturity matching. (2 marks)

(ii) Calculate the hedge position to abolish interest rate risk for the 1 million par of the corporate bond and calculate the expected return on the hedged position. (2 marks)

(iii) After buying the corporate bond, the yield of the 5 and 7 year government bonds increase 10 and 15 bp respectively, while the corporate bonds yield declines 3 bp. Estimate the new price of the corporate bond. (2 marks)

(c) Western Kenya Investment Management (WKIM) wishes to capitalize on the prestige associated with presenting GIPS-compliant performance statistics for promotional purposes. WKIM chooses to develop five composites for marketing reasons to save time and money. These portfolios constitute 60% of the firm's fee-paying discretionary holdings. Recognising that it cannot claim compliance for all of its portfolios, WKIM intends to incorporate the following compliance statement in its performance presentation: "The investment results contained in this report have been compiled and presented in accordance with the requirements of the Global Investment Performance Standards (GIPS) for the bulk of assets managed by Western Kenya Investment Management, Incorporated."

**Required:**
Discuss if WKIM's claim of GIPS compliance is appropriate. (3 marks)

(d) Nyamongo is in charge of investing a fresh Sh.10 billion contribution to Koner Bank's pension fund. The mandate is to work with active managers to make investments. The equity portion of the pension plan is benchmarked against the wider equity market.

**Required:**

Discuss the benefits and drawbacks of employing a single manager with either a growth or value style, one manager with each style, or one manager with a market-oriented style. (8 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) KBA, a big charity organisation, intends to invest in one or more hedge funds. Amina, KBA's CIO, is reviewing data provided by the organisation's senior analyst, F.A. Saroni. Amina questions Saroni about why a market-neutral long-short hedge fund that KBA is exploring has refused to use an equity index as a benchmark.

**Required:**

(i) Prepare an answer to Amina's inquiry to Saroni. (2 marks)

(ii) Suggest an alternative to utilising a stock index benchmark as a baseline for a market-neutral long-short fund. (2 marks)

(iii) Discuss how the following variables affect index development in the context of hedge funds:

- Survival bias. (2 marks)
- Value-weighted indices. (2 marks)
- Price staleness. (2 marks)

(b) The following strategic asset allocation is being reviewed by an investing committee:

| | |
|---|---|
| Domestic equities | 50% ± 5% |
| International equities | 15% ± 1.5% |
| Domestic bonds | 35% ± 3.5% |



The committee believes that the corridors outlined above are suitable if each asset type has the same risk and transaction-cost characteristics. It now seeks to account for asset class disparities when determining corridors.

**Required:**
Evaluate the consequences of the following sets of facts on the specified tolerance range, given an all-else-equal assumption in each case:

(i) Domestic bond volatility is much lower than that of domestic or international equities, which are equal. Tolerance band for domestic bonds. (1 mark)

(ii) Transaction costs in international equities are 10% higher than those for domestic equities. Tolerance band for international equities. (1 mark)

(iii) Transaction costs in international equities are 10% higher than those for domestic equities, and international equities have a much lower correlation with domestic bonds than do domestic equities. Tolerance band for international equities. (1 mark)

(c) F.A. Kamau manages the equity portion of the pension portfolio of Klinker Minerals, a large Kenyan mining company. Kamau is responsible for a portfolio of Sh.700 million of Kenyan equities. Kamau's annual reward is related to the performance of this portfolio versus the MSCI Kenyan Index, the benchmark for the pension portfolio's equity portion. He has hired the following managers with expected alphas and active risk shown below:

| | **AUM (millions)** | **Expected Alpha** | **Expected Tracking Risk** |
|---|---|---|---|
| Manger A | 400 | 0% | 0% |
| Manger B | 100 | 2% | 4% |
| Manger C | 100 | 4% | 6% |
| Manger D | 100 | 4% | 6% |

All four managers' alphas are uncorrelated and are measured against the MSCI Kenyan benchmark. The pension fund's trustees have stated objectives of achieving an information ratio of 0.6 or greater, with tracking risk of no more than 2% a year. An optimisation model results in weights on Managers A, B, C and D of 4/7, 1/7, 1/7, and 1/7, respectively.

**Required:**

(i) Identify the investment approach of Manager A. (2 marks)

(ii) Characterise the structure of the optimal portfolio of managers. (2 marks)

(iii) Evaluate whether the optimal portfolio of managers is expected to meet the trustees' investment objectives. (3 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) A Kenyan fixed-income fund has substantial holdings in euro-denominated German bonds. The portfolio manager of the fund is considering whether to leave the fund's exposure to the euro unhedged or fully hedge it using a dollar–euro forward contract. Assume that the short-term interest rates are 4% in Kenya and 3.2% in Germany. The fund manager expects the euro to appreciate against the shilling by 0.6%. Assume that IRP holds.

**Required:**

Explain which alternative has the higher expected return based on the short-term interest rates and the manager's expectations about exchange rates. (3 marks)

(b) The manager of an investment-grade fixed-income fund is concerned about the possibility of a rating downgrade of Alpha Ltd. The fund's holding in this company consists of 5,000 bonds with a par value of Ksh 1,000 each. The fund manager doesn't want to liquidate the holdings in this bond, and instead decides to purchase a binary credit put option on the bond of Alpha Ltd. This option expires in six months and pays the option buyer if the rating of Alphas' bond on expiration date is below investment grade (Standard & Poor's/Moody's BB/Ba or lower.) The payoff, if any, is the difference between the strike price and the value of the bond at expiration. The fund paid a premium of Sh. 130,000 to purchase the option on 5,000 bonds.

**Required:**

(i) What would be the payoff and the profit if the rating of Alpha Motors' bond on expiration date is below investment grade and the value of the bond is Sh.870. (4 marks)

(ii) What would be the payoff and the profit if the rating of Alpha Motors' bond on expiration date is investment grade and the value of the bond is Sh.980. (3 marks)



(c) Explain event risk, market liquidity risk, market risk, and "J – factor risk" in relation to investing in distressed securities. (8 marks)

(d) Define algorithmic trading and its motivation. (2 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) As an analyst, you are provided with the following information:

Neutral rate 4%
Inflation target 3%
Expected inflation 7%
GOP long-term trend 2%
Expected GOP growth 0%

**Required:**

Calculate the short-term interest rate target and comment on your answer. (5 marks)

(b) Compare the major approaches to economic forecasting. (6 marks)

(c) Explain the requirements for compliance with the GIPS Advertising Guidelines (9 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 2 August 2022. Afternoon paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) Describe two costs associated with rebalancing a portfolio. (4 marks)

(b) Discuss three factors that should be considered when setting the corridor for an asset class. (6 marks)

(c) Peter Mwangangi is a financial analyst. He manages a portfolio consisting of three bonds with equal par value amounts of Sh.1,000,000 each. Table 1 shows the market value of the bonds and their durations (the price includes accrued interest).
Table 2 contains the market value of the bonds and their durations one year later.

**Table 1: Initial values**

| Security | Market value (Sh.) | Duration |
|---|---|---|
| Bond A | 1,060,531 | 5.909 |
| Bond B | 981,686 | 3.691 |
| Bond C | 1,090,797 | 5.843 |



**Table 2: Values after one year**

| Security | Market value (Sh.) | Duration |
|---|---|---|
| Bond A | 1,042,043 | 5.177 |
| Bond B | 980,461 | 2.817 |
| Bond C | 1,068,319 | 5.125 |

Peter Mwangangi would like to maintain the portfolio's shilling duration at the initial level by rebalancing the portfolio. He chose to rebalance using the existing security proportions of one third each.

**Required:**

(i) The initial portfolio shilling duration. (3 marks)

(ii) The portfolio shilling duration after one year. (3 marks)

(iii) The rebalancing ratio necessary for the rebalancing. (2 marks)

(iv) The cash required for the rebalancing. (2 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Examine five challenges faced when managing emerging markets currency exposures. (5 marks)

(b) Outline four characteristics of a customised benchmark. (4 marks)

(c) Hope University (HU) is a private domestic university with a Sh.2 billion endowment fund as of fiscal year ended 31 May 2022. The fund is heavily dependent on its endowment fund to support ongoing expenditures because the university's enrolment growth and tuition revenue have not met expectations in recent years. The endowment fund must make a Sh.126 million annual contribution which is indexed to inflation to HU's general operating budget. The domestic inflation is expected to rise by 2.5% annually and the higher education cost index is anticipated to rise by 3% annually. The endowment has also budgeted Sh.200 million due on 31 January 2023 representing a final payment for construction of a new main library.

The HU endowment fund asset allocation as at 31 May 2022 is shown below:

| Asset | Current allocation (Sh. million) | Current allocation percentage (%) | Current yield (%) | Expected annual return (%) |
|---|---|---|---|---|
| Money Market Fund | 40 | 2 | 4 | 4 |
| Global Bond Fund | 60 | 3 | 5 | 5 |
| Global Equity Fund | 300 | 15 | 1.0 | 10.0 |
| Domestic Equity Fund | 400 | 20 | 0.1 | 15 |
| Direct Real Estate | 700 | 35 | 3.0 | 11.5 |
| Venture Capital | 500 | 25 | 0.0 | 20.0 |
| Total | 2,000 | 100 | | |

**Required:**
Investment policy statement (IPS) for Hope University endowment fund clearly covering the following elements; return, risk, time horizon and liquidity. (11 marks)
**(Total: 20 marks)**



**QUESTION THREE**

(a) Agnes Kwamboka is a financial consultant at Puma Asset Managers. A client is meeting with her and Agnes asks the client to consider adding international investment to his portfolio. Agnes explains to the client her methodology for developing capital market expectations and determining a recommended asset allocation. In her approach to developing capital market expectations, Agnes utilises sample statistics from the most recent twenty years of market security and foreign exchange price data as estimates of asset class expected returns, expected volatilities of return and expected correlations of returns. Agnes recommends the possible allocation of investments to South African real estate because prices of real estate tend to lag returns from the stock market. With the South Africa stock market index registering positive returns recently, Agnes expects that the wealth gains from the equity market will now be a positive factor for real estate prices.

**Required:**

(i) Propose five specific limitations to Agnes Kwamboka's approach to developing capital market expectations. (5 marks)

(ii) Identify one problem in using historical estimates of return correlations for alternative asset such as real estate. (1 mark)

(iii) Explain how the problem in (a) (ii) above biases the formulation of expectations for real estate investment. (2 marks)

(b) Neema Foundation is an organisation whose mission is to ensure credible elections in the country. The risk tolerance and return requirement for the foundation are provided below:

**Risk tolerance:** Above average (maximum 15% annual standard deviation of returns).

**Return requirement:** To earn an average annual return to meet a spending rate of 7.5% (including expected inflation) and management fee of 0.6%.

To help the directors of the Foundation assess the appropriate strategic asset allocation for their portfolio, a financial consultant has prepared the following data which describes eight corner portfolios and risk a free portfolio.

| | Portfolio weights | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Corner Portfolio** | **Domestic equities** | **Nondomestic equities** | **Domestic intermediate term bonds** | **Domestic long term bonds** | **Domestic real estate** | **Expected return** | **Standard deviation** | **Sharpe ratio** |
| | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** |
| 1 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.9 | 18.0 | 0.272 |
| 2 | 76.2 | 23.8 | 0.0 | 0.0 | 0.0 | 8.7 | 16.8 | 0.280 |
| 3 | 64.6 | 24.0 | 0.0 | 0.0 | 11.4 | 8.5 | 16.0 | 0.281 |
| 4 | 55.6 | 22.6 | 0.0 | 9.5 | 12.3 | 8.2 | 14.9 | 0.282 |
| 5 | 53.2 | 24.7 | 13.3 | 0.0 | 8.8 | 8.0 | 14.1 | 0.284 |
| 6 | 32.6 | 26.2 | 41.2 | 0.0 | 0.0 | 7.1 | 11.0 | 0.282 |
| 7 | 0.0 | 24.8 | 75.2 | 0.0 | 0.0 | 5.7 | 7.7 | 0.221 |
| 8 | 0.0 | 15.5 | 84.5 | 0.0 | 0.0 | 5.5 | 7.5 | 0.200 |

A risk free portfolio is available and is expected to return 4%. Neema Foundation regulations prohibits short positions or the use of margin but allows investment in any portfolio or combination of portfolios described above. In addition to satisfying the risk tolerance and return requirement, Neema Foundation Directors consider the Sharpe ratio to be a dominant factor in asset allocation decision.

A director of Neema Foundation is concerned how the strategic asset allocation would change if the return requirement for the foundation including expected inflation and management fee was only 6% and the endowments risk tolerance was consistent with a maximum 12% annual standard deviation of returns.

**Required:**

Using mean variance analysis:

(i) Determine, with three reasons the portfolios to be combined in the optimal strategic asset allocation for the Foundation. (3 marks)

(ii) Determine the appropriate portfolio weights for the domestic equities and domestic intermediate term bonds in the optimal strategic asset allocation. (5 marks)

(iii) Determine with reference to the tangency portfolio, the portfolio to be combined in a new strategic asset allocation based on the information in the directors' concern. (4 marks)

**(Total: 20 marks)**



**QUESTION FOUR**

(a) In relation to active equity investing, explain the two major approaches in identifying equity investment styles. (4 marks)

(b) Twiga Investments is a large investment firm that utilises a core-satellite approach to allocate funds in its portfolio amongst equity managers. For each equity manager that has been allocated funds in the last 6 months up to 30 June 2022, the expected active return, expected active risk and allocations are as follows:

| | **Expected active return** | **Expected active risk** | **Allocations** |
|---|---|---|---|
| Passive index | 0.00% | 0.00% | 15% |
| Enhanced indexing | 1.70% | 2.50% | 45% |
| Active manager – Alphax | 1.90% | 3.00% | 25% |
| Active manager – Betax | 3.30% | 5.50% | 10% |
| Active manager – Cetax | 3.90% | 7.20% | 5% |

**Required:**

(i) Determine Twiga Investments' core and satellites. (2 marks)

(ii) The portfolio expected active return. (2 marks)

(iii) The portfolio active risk. (2 marks)

(iv) The information ratio. (2 marks)

(c) The following data have been collected to appraise the performance of two asset management firms:

| | Zebra fund | Adams fund | Market Index |
|---|---|---|---|
| Return | 5.12% | 7.68% | 6.4% |
| Beta | 0.95 | 1.08 | 1.00 |
| Variance | 14.05 | 15.50 | 12.25 |

The risk free rate of return is 4%.

**Required:**
Calculate the following risk adjusted performance measures and rank them from the highest performing fund to the lowest.

(i) Treynor's measurers. (2 marks)

(ii) Modigliani – Modigliani ($M^2$) measure. (2 marks)

(iii) Sharpe's measure. (2 marks)

(v) Jensen's alpha measure. . (2 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) In the context of investment performance standards, summarise four fundamental compliance requirements. (4 marks)

(b) Assess four types of risk associated with distressed securities investments that a portfolio manager should take into consideration before including distressed securities in the portfolio. (4 marks)

(c) John Kirima, an investment analyst with Ndege Asset management firm has gathered the following sell orders that he executed on the afternoon hours on 26 July 2022. The quoted bid and ask quotes were as follows:

| Time of trade | Bid Price Sh. | Bid size | Ask Price Sh. | Ask Size |
|---|---|---|---|---|
| 13.00 Hours | 40 | 400 | 40.16 | 500 |
| 14.00 Hours | 40.16 | 400 | 40.36 | 500 |
| 16.00 Hours | 40.24 | 400 | 40.48 | 500 |



**Additional Information:**
1. At 13.00 hours, John Kirima placed an order to sell 200 shares. The execution price was Sh.40.04.
2. At 14.00 hours, John Kirima placed an order to sell 300 shares. The execution price was Sh.40.22.
3. At 16.00 hours, John Kirima placed an order to sell 500 shares. The average execution price was Sh.40.18.

**Required:**

(i) The quoted spread at each time of trade. (2 marks)

(ii) The mid-point at each time of trade. (2 marks)

(iii) The effective spread at each time of trade. (2 marks)

(iv) Comment on any possible price improvement based in your answer in (c) (i) - (c) (iii) above. (2 marks)

(d) Determine four considerations that a bond portfolio manager should take into account before moving from a pure indexing position to more active management. (4 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**TUESDAY: 5 April 2022. Afternoon paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.**

**QUESTION ONE**

(a) A financial analyst at Wema Capital, is studying different approaches to economic forecasting. He notes that "consensus forecasting" and "multiple-scenario forecasting" often lead to differences in economic forecasts that have major implications for asset allocation decisions.

**Required:**
In context of the above statement:

(i) Describe one similarity between the consensus approach and the multiple-scenario approach to developing economic and market expectations. (2 marks)

(ii) Describe two differences between the consensus approach and the multiple-scenario approach to developing economic and market expectations. (4 marks)

(b) Two junior financial analysts, Jane and Virginia, at Mega Investment Firm are examining a partial list of corner portfolios and have noted some problems with the output.

| Portfolio | Expected return (%) | Expected standard deviation (%) | Asset class weights (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F |
| 1 | 6.50 | 5.95 | 12 | 0 | 5 | 70 | 7 | 6 |
| 2 | 7.25 | 8.30 | 22 | 0 | 10 | 52 | 6 | 5 |
| 3 | 8.00 | 8.30 | 32 | 8 | 15 | 38 | 0 | 7 |
| 4 | 8.75 | 14.25 | 42 | 11 | 20 | 15 | 0 | 12 |

Analyst Jane points out that portfolio 1 cannot be a corner portfolio because it does not show an asset class appearing or dropping out when compared to portfolio 2. Analyst Virginia responds "You do not know what you are talking about, but it is obvious portfolio 2 cannot be a corner portfolio".

**Required:**

(i) Explain the term "corner portfolio". (1 mark)

(ii) Explain three conditions that are necessary to make a corner portfolio, which would resolve who is right in Jane and Virginia's argument. (3 marks)

(c) A married couple, Anthony and Jennifer Mwanzia are in their mid 50s. Over the years, the Mwanzias have built a successful residential construction company and recently sold their business by exchanging the equity in their business for publicly traded shares of a national home builder. The Mwanzia's now work for the company who bought it.

They have two children who live on their own and are financially independent and have one grandchild. The couple have no debt and a sizeable net worth consisting of: the shares of the company which bought them out, their primary residence, a rental property, a second home and some other equity and fixed income assets.

The Mwanzia's plan to retire in one year's time and would like to maintain their standard of living, taking into account an expected inflation rate of 3%. The couple's before tax annual income consist of Sh.1,610,000 salary from the company, Sh.280,000 from rental property and Sh.40,000 from bonds. The couple are taxed at a rate of 30%. Jennifer has expressed the desire to take less risk when they retire. She also wants to make annual tax deductible donations of Sh.160,000 to charitable non-profit organisations through retirement adjusted for inflation. The following is a list of their assets and the expected value of the assets in one year:

| **Asset** | **Expected value in one year (Sh.)** |
|---|---|
| Money market account | 160,000 |
| Taxable bonds | 790,000 |
| Ordinary shares from sale of their business | 47,170,000 |
| Other ordinary shares | 240,000 |
| Primary residence | 7,860,000 |
| Vacation home | 3,930,000 |
| Rental property | 4,720,000 |
| Total | 64,870,000 |

**Required:**

(i) State three factors that show the Mwanzia's family has a higher ability to take risk. (3 marks)

(ii) Calculate the current spendable before tax income adjusted for inflation and determine the required return after tax income. (4 marks)

(iii) Advise Mwanzia's family on the total investable assets and evaluate the nominal after tax required rate of return. (3 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Explain the following classifications of bond portfolio management strategies:

(i) Pure bond indexing. (1 mark)

(ii) Enhanced indexing by matching primary risk factors. (1 mark)

(iii) Active management by larger risk factor mismatches. (1 mark)

(iv) Full-blown active management. (1 mark)

(b) (i) Explain the term "passive investment management strategy" as used in equity portfolio management. (2 marks)

(ii) Describe two approaches to passive equity portfolio management. (4 marks)

(c) Wazalendo Firm Managers (WFM), a diversified investments firm, has conducted equity portfolio performance evaluation and has generated the following values:

| | |
|---|---|
| Manager return | 15.0% |
| Investor's benchmark | 11.0% |
| Normal portfolio return | 8.0% |
| Total active risk | 5.2% |
| Misfit active risk | 3.8% |

**Required:**

Calculate the fund manager's information ratio that must accurately reflect his abilities. (4 marks)

(d) The following information relates to a market index and a portfolio:

| | |
|---|---|
| Value of market index | 4,000 |
| Value of portfolio | Sh.10 million |
| Risk free rate | 8% |
| Dividend yield on index | 6% |
| Beta of the portfolio | 1.5 |

A future contract on the market index with five months to maturity is used to hedge the value of the portfolio over the next three months. One futures contract is for delivery of 50 times the index.

**Required:**

(i) Calculate the hedge ratio. (4 marks)

(ii) Determine the gain or loss on the position if the index declines to 3,500 in three months. (2 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Describe four common features of alternative investments. (4 marks)

(b) The following trade information has been obtained from Mtandao Trading platform for Elimu Ltd. shares. A trader sold 100 shares of Elimu Ltd. on 28 March 2022 at 12.42 p.m. at a price of Sh.542.23 per share. All the trades below encompass all trades for that day.

| Time | Trade price (Sh.) | Shares traded |
|---|---|---|
| 9:30 | 538.20 | 300 |
| 9:48 | 538.72 | 200 |
| 12:28 | 543.61 | 600 |
| 12:42 | 542.23 | 100 |
| 12:58 | 543.44 | 300 |
| 13:58 | 545.84 | 500 |
| 15:59 | 539.34 | 300 |

The trader is analysing the implicit costs of the trade focusing on the bid-ask spread and market impact using specified price benchmarks.

**Required:**

(i) The estimated implicit transaction costs using opening price, closing price and volume weighted average price (VWAP) as the price benchmark. (7 marks)

(ii) Describe the relationship between the estimated implicit transaction costs and the choice of benchmark price based on your answer in (b) (i) above. (1 mark)

(c) Silver Investments firm has prepared a micro attribution analysis for the month of March 2022. The March 2022 return figures by sector for the portfolio and benchmark are shown below:



| Economic sectors | Portfolio weight (%) | Sector benchmark weight (%) | Portfolio return (%) | Sector benchmark return (%) |
|---|---|---|---|---|
| Materials | 3.56 | 6.03 | –2.40 | –1.61 |
| Communication | 1.53 | 2.33 | –0.13 | –0.13 |
| Cyclical consumer | 8.69 | 5.97 | 4.10 | 4.62 |
| Cyclical defensive | 13.92 | 18.80 | 3.08 | 3.03 |
| Energy | 8.46 | 6.69 | 4.42 | 4.05 |
| Financials | 14.52 | 18.36 | –0.05 | –1.43 |
| Agriculture | 15.55 | 12.59 | 3.65 | 4.49 |
| Industrials | 3.71 | 2.40 | 0.12 | 0.10 |
| Real estate | 6.76 | 5.44 | –1.84 | 0.13 |
| Technology | 15.72 | 13.52 | 3.55 | 3.57 |
| Utilities | 4.96 | 7.87 | 0.10 | 0.07 |
| Cash and cash equivalents | 2.62 | .0.00 | 0.12 | |
| Buy/hold + cash | 100.00 | 100.00 | 2.08 | 1.82 |
| Trading and other | | | –0.12 | |
| Total portfolio | | | 1.96 | 1.82 |

Market portfolio on 31 March 2022 is Sh.26,520,000

**Required:**

(i) Calculate the pure sector allocation return for the month of March 2022 for the real estate, cyclical consumer and cyclical defensive sector. (3 marks)

(ii) Calculate the within-sector selection return for the month of March 2022 for the materials sector, communication sector and financials sector. (3 marks)

(iii) Determine the total value added to the Silver Investments Ltd. account for the month of March 2022. (2 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Highlight four general characteristics of a good capital markets forecast. (4 marks)

(b) Explain the following major types of traders by highlighting their motivation to trade:

(i) Information motivated traders. (2 marks)

(ii) Value motivated traders. (2 marks)

(iii) Liquidity motivated traders. (2 marks)

(c) On 1 January 2021 an equity portfolio was invested as shown below:

| Stock | Price per share | Number of shares | Beta |
|---|---|---|---|
| X | Sh.20 | 166,500,000 | 1.20 |
| Y | Sh.15 | 222,000,000 | 1.60 |
| Z | Sh.35 | 95,143,000 | 0.80 |
| | | | 1.20 |

On 1 April 2022, the price of stock X was down by 20%, the price of stock Y was up by 40%, while the price of stock Z was unchanged. The beta for stock X had changed to 1.3 while that of stock Y had changed to 1.70.

**Required:**

Rebalance the portfolio to re-establish the target beta of 1.20. (10 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Wen Capital Investments Holdings LLP manages money for both retail and institutional clients. These are two autonomous groups within Wen Capital. "Wen Capital Institutional Investment Management" which manages institutional assets and "Wen Capital Retail Investors", which manages retail assets.

**Required:**

Explain how Wen Capital Investments Holdings LLP should define itself as a firm to comply with the internationally acceptable performance standards. (2 marks)

(b) A Kenyan equity composite contains three portfolios. The cash flow weighting factors are presented below:

| | Cash flow weighting factor | Portfolio (Sh.millions) A | B | C |
|---|---|---|---|---|
| Fair value as at 31 December 2021 | | 74.9 | 127.6 | 110.4 |
| External cash flows | | | | |
| 8 December 2021 | 0.7419 | | –15 | |
| 12 December 2021 | 0.6129 | 7.5 | | |
| 19 December 2021 | 0.3871 | | –5 | 15 |
| Fair value as at 31 December 2021 | | 85.3 | 109.8 | 128.4 |

**Required:**

(i) Calculate the returns of portfolios A, B and C for the month of December 2021 using the Modified Dietz formula.

**Modified Dietz formula**

$$\text{Modified Dietz Return} = \frac{V(1) - V(0) - (CF'S)}{V(0) + \Sigma\left[\frac{T-t}{T} * CF(t)\right]}$$

**Where:**

V(0) = Value of portfolio at start date.
V(1) = Value of portfolio at end date.
CF'S = Cash flows throughout the investment horizon.
T = Length of the investment horizon.
t = Time of cash flow.
CF(t) = Cash flow at certain time.

(3 marks)

(ii) Calculate the December 2021 composite return by asset-weighting the individual portfolio returns using beginning of period values. (5 marks)

(c) Jewel Muthoni has recently been recruited to Mweka Hazina Capital LLC as a portfolio manager and she is considering three investments, only one of which she will add to her portfolio. Data on the proposed investments and her portfolio are provided below:

| | Portfolio | Investment N | Investment K | Investment M |
|---|---|---|---|---|
| Expected return | 12.0% | 12.8% | 13.42% | 14.8% |
| Standard deviation | 10.24% | 16.67% | 18.13% | 36.84% |
| Risk free rate | 7.8% | 7.8% | 7.8% | 7.8% |
| Correlation with current portfolio | - | 0.77 | 0.80 | 0.40 |

**Required:**

(i) The sharpe ratios for the existing portfolio and proposed investments. (5 marks)

(ii) Using your results in (c) (i) above, recommend to Jewel Muthoni on the most appropriate investment to increase performance of the portfolio. (5 marks)

**(Total: 20 marks)**

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**CIFA ADVANCED LEVEL**

**ADVANCED PORTFOLIO MANAGEMENT**

**THURSDAY: 16 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) Simon Peter, a financial analyst at ABL Ltd. has prepared financial forecasts regarding the current capital market environment. He recently gave a presentation to the Managing Director of his firm.

Excerpts of his presentation were as follows:

"Noting that year-end holiday sales have been weak over the past several years, I believe that current expectations should be likewise muted. In fact, just last week, I had an occasion to visit Nairobi and noticed that the number of shoppers seemed quite low. The last time I saw a retail establishment with little pedestrian traffic at the beginning of December was in the year 2000 and that coincided with one of the worst holiday sales periods in the past 50 years. Thus, there will be no overall year-over-year retails growth this holiday season".

**Required:**

(i) Examine any two psychological traps that may be interfering with the creation of Simon Peter's forecasts. (4 marks)

(ii) Recommend three measures that could be used to mitigate the bias caused by each of the psychological traps identified in (a) (i) above. (3 marks)

(b) Explain the term "risk tolerance". (2 marks)

(c) As an investment manager of a defined benefit pension plan for ALM Ltd., a large multinational firm, you decide to compare workforce, pension plan and company information for ALM Ltd. with similar information for an average company in the main stock market index as shown below:

| | **Workforce information** | | **Pension plan information** | | **Company information** | |
|---|---|---|---|---|---|---|
| | Average age of workforce (years) | Average service with company (years) | Ratio of plan assets to plan liabilities | Ratio of retired lives to active lives relative to average | Probability relative to average | Debt ratio relative to average |
| ALM Ltd. | 48 | 24 | 0.83 | Higher | Lower | Higher |
| Average company index | 43 | 17 | 0.97 | - | - | - |

**Required:**

(i) Based on the specific circumstances of ALM Ltd., determine whether ALM Ltd.'s pension plan has below average, average or above average risk tolerance compared with the average main stock market index company pension plan. (1 mark)

(ii) Cite five reasons to justify your answer in (c) (i) above. (5 marks)

(d) A portfolio manager presents the following annual performance attribution:

| | Sh. |
|---|---|
| Beginning value | 150,000,000 |
| Net contributions | 850,000 |
| Risk free asset (incremental value contribution) | 675,000 |
| Funds value (asset category) | 165,500,000 |
| Funds value (benchmarks) | 165,900,000 |

**Additional information:**

1. The incremental return contribution for allocation effects is 0%.
2. The total fund return is 11.05%.

**Required:**

(i) Determine how much of the total return was attributed to style bias. (3 marks)

(ii) Determine how much value active stock selection is added to the fund. (2 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) With regard to currency portfolio management, explain four active currency trading strategies. (8 marks)

(b) Samuel Mwamba is a financial advisor for Delta Wealth Management Firm (DWMF). He is reviewing the investment policy statement (IPS) for one of the clients, Eric, with the aim of developing an asset allocation strategy and coming up with an appropriate portfolio.

Eric is 47 years old and has summed his annual spending needs to an annual withdrawal of 5% of assets which should provide a safe stream of income without reducing the principal. The expectation of inflation is 2.5% for the foreseeable future and the tax rate is 30%.

The Financial Advisor has identified the asset classes as follows:



| Asset class | Expected return (%) | Expected standard deviation (%) |
|---|---|---|
| Domestic equities | 9.3 | 15.0 |
| International equities | 11.4 | 20.0 |
| Fixed income | 5.4 | 3.0 |
| Real estate | 6.7 | 12.0 |

For each of these asset classes, he develops four portfolios which will be used to construct an optimal portfolio for Eric. The risk free rate is 2%.

| Corner portfolio | Expected return (%) | Expected standard deviation (%) | Asset class weight (%) A | B | C | D |
|---|---|---|---|---|---|---|
| 1 | 11.50 | 13.75 | 32 | 26 | 25 | 17 |
| 2 | 9.80 | 11.25 | 22 | 23 | 18 | 37 |
| 3 | 7.10 | 8.65 | 12 | 10 | 24 | 54 |
| 4 | 6.25 | 7.05 | 10 | 10 | 40 | 40 |

**Required:**

(i) Calculate before tax return requirement for Eric. (1 mark)

(ii) Identify the optimal portfolio for Eric assuming that borrowing is not allowed. (5 marks)

(iii) Calculate the standard deviation for the optimal portfolio selected for Eric. (2 marks)

(c) Outline two advantages of using each of the following asset allocation optimisation approaches:

(i) Black-Litterman. (2 marks)

(ii) Resampled efficient frontier. (2 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) In relation to structuring equity investment portfolio management, distinguish between "top-down" and "bottom up" approaches to portfolio management. (6 marks)

(b) An analyst is estimating various measures of spread for SAF Limited's shares. The following is a sample of quotes of SAF Limited's share on the Securities Exchange on 10 December 2021 between 10.49 a.m. and 10.57 a.m.

| Time | Bid price (Sh.) | Ask price (Sh.) |
|---|---|---|
| 10:49:44 | 4.69 | 4.74 |
| 10:50:06 | 4.69 | 4.75 |
| 10:50:11 | 4.69 | 4.76 |
| 10:50:14 | 4.70 | 4.76 |
| 10:54:57 | 4.70 | 4.75 |
| 10:56:32 | 4.70 | 4.75 |

A buyer initiated trade in SAF Limited's shares and the order was entered at 10:50:06. The order was executed at 10:50:07 at a price of Sh.4.74.

**Required:**
For the above trade, calculate the following:

(i) Quoted spread. (2 marks)

(ii) Effective spread. (4 marks)

(c) EMCO Investment Group has decided to pursue a contingent immunisation strategy over a 3-year time horizon. They have purchased at par Sh.400 million worth of 11% semi-annual coupon, 15-year bonds. The current rate of return for immunised strategies is 11% and they are willing to accept a return of 10% (this is the safety net return).

**Required:**

(i) Determine the cushion spread. (1 mark)

(ii) Compute the required terminal value and required assets needed at initial implementation. (2 marks)

(iii) Determine whether active management is still viable if interest rates immediately rise to 12%. (5 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Evaluate three roles of ethics in securities trading. (6 marks)

(b) A portfolio manager has gathered the following data for his top performing Fund "M":

| Variables | Fund "M" |
|---|---|
| Rate of return (%) | 18 |
| Beta | 1.25 |
| Standard deviation (%) | 18.55 |
| Downside deviation (%) | 8.75 |

**Additional information:**

1. Risk free rate is 3.5%.
2. Market standard deviation is 15%.
3. Market return is 16.50%.

**Required:**
Calculate the following performance measures for the Fund:

(i) Sharpe Ratio. (2 marks)

(ii) $M^2$ measure. (3 marks)

(iii) Treynor measure. (2 marks)

(iv) Ex post alpha. (3 marks)

(c) Explain the following terms as used in alternative investments portfolio management:

(i) Cost of carry. (1 mark)
(ii) Roll return (or roll yield). (1 mark)
(iii) Backwardation. (1 mark)
(iv) Contango. (1 mark)
**(Total: 20 marks)**

**QUESTION FIVE**

(a) Highlight two advantages and two disadvantages of direct equity investments in real estate. (4 marks)

(b) Biko and Olivia live in South Sudan with their 16 year old twins. Biko, 47, works in a highly cyclical industry, while Olivia, 46 is an accountant. The Bikos are saving for their retirement and university education for both children. Biko's annual salary is Sh.1,900,000, Olivia's annual salary is Sh.850,000. The family's living expenses are currently Sh.950,000 per year. Both Biko and Olivia plan to work for 18 more years and they depend on their combined income and savings to fund their goals. Currently, the Bikos have a term life policy insuring Biko with a death benefit of Sh.1,000,000. Their financial adviser, assesses the family's insurance needs in the event Biko were to die this year. The adviser uses the needs analysis method based on the financial data presented below and the following assumptions:

- The discount rate is 6.0% and the tax rate is 30%.
- Salary and living expenses grow at the rate of 3.5% annually.
- Salary and living expenses occur at the beginning of each year.

The following assumptions apply in the event of Biko's death:

- Olivia will continue to work until retirement.
- Family living expenses will decline by Sh.300,000 per year.
- Olivia's projected living expenses will be Sh.500,000 per year for 44 years.
- The children's projected living expenses will be Sh.150,000 per year for 6 years.



**Capital Available**

| | **Sh.** |
|---|---|
| Cash and investments | 9,000,000 |
| Biko's life insurance | 1,000,000 |
| Total capital available | 10,000,000 |
| Total cash needs | 7,500,000 |

**Required:**
Determine, based on the assumptions given, the additional amount of life insurance coverage needed. (7 marks)

(c) On 1 January 2020, Kozi Investment Limited's equity portfolio had shares invested as shown below:

| **Share** | **Price per share** | **Number of shares** |
|---|---|---|
| | **Sh.** | |
| A | 20 | 166,500 |
| B | 15 | 222,000 |
| C | 35 | 95,143 |

On 1 July 2021, the price of share A was down by 20%, the price of share B was up by 40% while the price of share C was unchanged.

**Required:**
Rebalance the portfolio so that it maintains the original weight which is the target weight. (9 marks)
**(Total: 20 marks)**

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## Present Value Interest factor of 1 Received at the End of *n* Periods at r Percent:

$$PVIF_{r,n} = 1 / (1+r)^{n} = (1+r)^{-n}$$

| Period | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 11% | 12% | 13% | 14% | 15% | 16% | 20% | 24% | 25% | 30% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 0.8065 | 0.8000 | 0.7692 |
| 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 | 0.6504 | 0.6400 | 0.5917 |
| 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 | 0.5245 | 0.5120 | 0.4552 |
| 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 | 0.4230 | 0.4096 | 0.3501 |
| 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 | 0.3411 | 0.3277 | 0.2693 |
| 6 | 0.9420 | 0.8880 | 0.8375 | 0.7903 | 0.7462 | 0.7050 | 0.6663 | 0.6302 | 0.5963 | 0.5645 | 0.5346 | 0.5066 | 0.4803 | 0.4556 | 0.4323 | 0.4104 | 0.3349 | 0.2751 | 0.2621 | 0.2072 |
| 7 | 0.9327 | 0.8706 | 0.8131 | 0.7599 | 0.7107 | 0.6651 | 0.6227 | 0.5835 | 0.5470 | 0.5132 | 0.4817 | 0.4523 | 0.4251 | 0.3996 | 0.3759 | 0.3538 | 0.2791 | 0.2218 | 0.2097 | 0.1594 |
| 8 | 0.9235 | 0.8535 | 0.7894 | 0.7307 | 0.6768 | 0.6274 | 0.5820 | 0.5403 | 0.5019 | 0.4665 | 0.4339 | 0.4039 | 0.3762 | 0.3506 | 0.3269 | 0.3050 | 0.2326 | 0.1789 | 0.1678 | 0.1226 |
| 9 | 0.9143 | 0.8368 | 0.7664 | 0.7026 | 0.6446 | 0.5919 | 0.5439 | 0.5002 | 0.4604 | 0.4241 | 0.3909 | 0.3606 | 0.3329 | 0.3075 | 0.2843 | 0.2630 | 0.1938 | 0.1443 | 0.1342 | 0.0943 |
| 10 | 0.9053 | 0.8203 | 0.7441 | 0.6756 | 0.6139 | 0.5584 | 0.5083 | 0.4632 | 0.4224 | 0.3855 | 0.3522 | 0.3220 | 0.2946 | 0.2697 | 0.2472 | 0.2267 | 0.1615 | 0.1164 | 0.1074 | 0.0725 |
| 11 | 0.8963 | 0.8043 | 0.7224 | 0.6496 | 0.5847 | 0.5268 | 0.4751 | 0.4289 | 0.3875 | 0.3505 | 0.3173 | 0.2875 | 0.2607 | 0.2366 | 0.2149 | 0.1954 | 0.1346 | 0.0938 | 0.0859 | 0.0558 |
| 12 | 0.8874 | 0.7885 | 0.7014 | 0.6246 | 0.5568 | 0.4970 | 0.4440 | 0.3971 | 0.3555 | 0.3186 | 0.2858 | 0.2567 | 0.2307 | 0.2076 | 0.1869 | 0.1685 | 0.1122 | 0.0757 | 0.0687 | 0.0429 |
| 13 | 0.8787 | 0.7730 | 0.6810 | 0.6006 | 0.5303 | 0.4688 | 0.4150 | 0.3677 | 0.3262 | 0.2897 | 0.2575 | 0.2292 | 0.2042 | 0.1821 | 0.1625 | 0.1452 | 0.0935 | 0.0610 | 0.0550 | 0.0330 |
| 14 | 0.8700 | 0.7579 | 0.6611 | 0.5775 | 0.5051 | 0.4423 | 0.3878 | 0.3405 | 0.2992 | 0.2633 | 0.2320 | 0.2046 | 0.1807 | 0.1597 | 0.1413 | 0.1252 | 0.0779 | 0.0492 | 0.0440 | 0.0254 |
| 15 | 0.8613 | 0.7430 | 0.6419 | 0.5553 | 0.4810 | 0.4173 | 0.3624 | 0.3152 | 0.2745 | 0.2394 | 0.2090 | 0.1827 | 0.1599 | 0.1401 | 0.1229 | 0.1079 | 0.0649 | 0.0397 | 0.0352 | 0.0195 |
| 16 | 0.8528 | 0.7284 | 0.6232 | 0.5339 | 0.4581 | 0.3936 | 0.3387 | 0.2919 | 0.2519 | 0.2176 | 0.1883 | 0.1631 | 0.1415 | 0.1229 | 0.1069 | 0.0930 | 0.0541 | 0.0320 | 0.0281 | 0.0150 |
| 17 | 0.8444 | 0.7142 | 0.6050 | 0.5134 | 0.4363 | 0.3714 | 0.3166 | 0.2703 | 0.2311 | 0.1978 | 0.1696 | 0.1456 | 0.1252 | 0.1078 | 0.0929 | 0.0802 | 0.0451 | 0.0258 | 0.0225 | 0.0116 |
| 18 | 0.8360 | 0.7002 | 0.5874 | 0.4936 | 0.4155 | 0.3503 | 0.2959 | 0.2502 | 0.2120 | 0.1799 | 0.1528 | 0.1300 | 0.1108 | 0.0946 | 0.0808 | 0.0691 | 0.0376 | 0.0208 | 0.0180 | 0.0089 |
| 19 | 0.8277 | 0.6864 | 0.5703 | 0.4746 | 0.3957 | 0.3305 | 0.2765 | 0.2317 | 0.1945 | 0.1635 | 0.1377 | 0.1161 | 0.0981 | 0.0829 | 0.0703 | 0.0596 | 0.0313 | 0.0168 | 0.0144 | 0.0068 |
| 20 | 0.8195 | 0.6730 | 0.5537 | 0.4564 | 0.3769 | 0.3118 | 0.2584 | 0.2145 | 0.1784 | 0.1486 | 0.1240 | 0.1037 | 0.0868 | 0.0728 | 0.0611 | 0.0514 | 0.0261 | 0.0135 | 0.0115 | 0.0053 |
| 21 | 0.8114 | 0.6598 | 0.5375 | 0.4388 | 0.3589 | 0.2942 | 0.2415 | 0.1987 | 0.1637 | 0.1351 | 0.1117 | 0.0926 | 0.0768 | 0.0638 | 0.0531 | 0.0443 | 0.0217 | 0.0109 | 0.0092 | 0.0040 |
| 22 | 0.8034 | 0.6468 | 0.5219 | 0.4220 | 0.3418 | 0.2775 | 0.2257 | 0.1839 | 0.1502 | 0.1228 | 0.1007 | 0.0826 | 0.0680 | 0.0560 | 0.0462 | 0.0382 | 0.0181 | 0.0088 | 0.0074 | 0.0031 |
| 23 | 0.7954 | 0.6342 | 0.5067 | 0.4057 | 0.3256 | 0.2618 | 0.2109 | 0.1703 | 0.1378 | 0.1117 | 0.0907 | 0.0738 | 0.0601 | 0.0491 | 0.0402 | 0.0329 | 0.0151 | 0.0071 | 0.0059 | 0.0024 |
| 24 | 0.7876 | 0.6217 | 0.4919 | 0.3901 | 0.3101 | 0.2470 | 0.1971 | 0.1577 | 0.1264 | 0.1015 | 0.0817 | 0.0659 | 0.0532 | 0.0431 | 0.0349 | 0.0284 | 0.0126 | 0.0057 | 0.0047 | 0.0018 |
| 25 | 0.7798 | 0.6095 | 0.4776 | 0.3751 | 0.2953 | 0.2330 | 0.1842 | 0.1460 | 0.1160 | 0.0923 | 0.0736 | 0.0588 | 0.0471 | 0.0378 | 0.0304 | 0.0245 | 0.0105 | 0.0046 | 0.0038 | 0.0014 |
| 30 | 0.7419 | 0.5521 | 0.4120 | 0.3083 | 0.2314 | 0.1741 | 0.1314 | 0.0994 | 0.0754 | 0.0573 | 0.0437 | 0.0334 | 0.0256 | 0.0196 | 0.0151 | 0.0116 | 0.0042 | 0.0016 | 0.0012 | - |
| 35 | 0.7059 | 0.5000 | 0.3554 | 0.2534 | 0.1813 | 0.1301 | 0.0937 | 0.0676 | 0.0490 | 0.0356 | 0.0259 | 0.0189 | 0.0139 | 0.0102 | 0.0075 | 0.0055 | 0.0017 | 0.0005 | - | - |
| 36 | 0.6989 | 0.4902 | 0.3450 | 0.2437 | 0.1727 | 0.1227 | 0.0875 | 0.0626 | 0.0449 | 0.0323 | 0.0234 | 0.0169 | 0.0123 | 0.0089 | 0.0065 | 0.0048 | 0.0014 | - | - | - |
| 40 | 0.6717 | 0.4529 | 0.3066 | 0.2083 | 0.1420 | 0.0972 | 0.0668 | 0.0460 | 0.0318 | 0.0221 | 0.0154 | 0.0107 | 0.0075 | 0.0053 | 0.0037 | 0.0026 | 0.0007 | - | - | - |
| 50 | 0.6080 | 0.3715 | 0.2281 | 0.1407 | 0.0872 | 0.0543 | 0.0339 | 0.0213 | 0.0134 | 0.0085 | 0.0054 | 0.0035 | 0.0022 | 0.0014 | 0.0009 | 0.0006 | - | - | - | - |

## Present Value Interest factors for Annuity of 1 Discounted at r Percent for *n* Periods:

$$PVIFA_{r,n} = [1 - 1/(1+r)^{n}] / r$$

| Period | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 11% | 12% | 13% | 14% | 15% | 16% | 20% | 24% | 25% | 30% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 0.8065 | 0.8000 | 0.7692 |
| 2 | 1.9704 | 1.9416 | 1.9135 | 1.8861 | 1.8594 | 1.8334 | 1.8080 | 1.7833 | 1.7591 | 1.7355 | 1.7125 | 1.6901 | 1.6681 | 1.6467 | 1.6257 | 1.6052 | 1.5278 | 1.4568 | 1.4400 | 1.3609 |
| 3 | 2.9410 | 2.8839 | 2.8286 | 2.7751 | 2.7232 | 2.6730 | 2.6243 | 2.5771 | 2.5313 | 2.4869 | 2.4437 | 2.4018 | 2.3612 | 2.3216 | 2.2832 | 2.2459 | 2.1065 | 1.9813 | 1.9520 | 1.8161 |
| 4 | 3.9020 | 3.8077 | 3.7171 | 3.6299 | 3.5460 | 3.4651 | 3.3872 | 3.3121 | 3.2397 | 3.1699 | 3.1024 | 3.0373 | 2.9745 | 2.9137 | 2.8550 | 2.7982 | 2.5887 | 2.4043 | 2.3616 | 2.1662 |
| 5 | 4.8534 | 4.7135 | 4.5797 | 4.4518 | 4.3295 | 4.2124 | 4.1002 | 3.9927 | 3.8897 | 3.7908 | 3.6959 | 3.6048 | 3.5172 | 3.4331 | 3.3522 | 3.2743 | 2.9906 | 2.7454 | 2.6893 | 2.4356 |
| 6 | 5.7955 | 5.6014 | 5.4172 | 5.2421 | 5.0757 | 4.9173 | 4.7665 | 4.6229 | 4.4859 | 4.3553 | 4.2305 | 4.1114 | 3.9975 | 3.8887 | 3.7845 | 3.6847 | 3.3255 | 3.0205 | 2.9514 | 2.6427 |
| 7 | 6.7282 | 6.4720 | 6.2303 | 6.0021 | 5.7864 | 5.5824 | 5.3893 | 5.2064 | 5.0330 | 4.8684 | 4.7122 | 4.5638 | 4.4226 | 4.2883 | 4.1604 | 4.0386 | 3.6046 | 3.2423 | 3.1611 | 2.8021 |
| 8 | 7.6517 | 7.3255 | 7.0197 | 6.7327 | 6.4632 | 6.2098 | 5.9713 | 5.7466 | 5.5348 | 5.3349 | 5.1461 | 4.9676 | 4.7988 | 4.6389 | 4.4873 | 4.3436 | 3.8372 | 3.4212 | 3.3289 | 2.9247 |
| 9 | 8.5660 | 8.1622 | 7.7861 | 7.4353 | 7.1078 | 6.8017 | 6.5152 | 6.2469 | 5.9952 | 5.7590 | 5.5370 | 5.3282 | 5.1317 | 4.9464 | 4.7716 | 4.6065 | 4.0310 | 3.5655 | 3.4631 | 3.0190 |
| 10 | 9.4713 | 8.9826 | 8.5302 | 8.1109 | 7.7217 | 7.3601 | 7.0236 | 6.7101 | 6.4177 | 6.1446 | 5.8892 | 5.6502 | 5.4262 | 5.2161 | 5.0188 | 4.8332 | 4.1925 | 3.6819 | 3.5705 | 3.0915 |
| 11 | 10.368 | 9.7868 | 9.2526 | 8.7605 | 8.3064 | 7.8869 | 7.4987 | 7.1390 | 6.8052 | 6.4951 | 6.2065 | 5.9377 | 5.6869 | 5.4527 | 5.2337 | 5.0286 | 4.3271 | 3.7757 | 3.6564 | 3.1473 |
| 12 | 11.255 | 10.575 | 9.9540 | 9.3851 | 8.8633 | 8.3838 | 7.9427 | 7.5361 | 7.1607 | 6.8137 | 6.4924 | 6.1944 | 5.9176 | 5.6603 | 5.4206 | 5.1971 | 4.4392 | 3.8514 | 3.7251 | 3.1903 |
| 13 | 12.134 | 11.348 | 10.635 | 9.9856 | 9.3936 | 8.8527 | 8.3577 | 7.9038 | 7.4869 | 7.1034 | 6.7499 | 6.4235 | 6.1218 | 5.8424 | 5.5831 | 5.3423 | 4.5327 | 3.9124 | 3.7801 | 3.2233 |
| 14 | 13.004 | 12.106 | 11.296 | 10.563 | 9.8986 | 9.2950 | 8.7455 | 8.2442 | 7.7862 | 7.3667 | 6.9819 | 6.6282 | 6.3025 | 6.0021 | 5.7245 | 5.4675 | 4.6106 | 3.9616 | 3.8241 | 3.2487 |
| 15 | 13.865 | 12.849 | 11.938 | 11.118 | 10.380 | 9.7122 | 9.1079 | 8.5595 | 8.0607 | 7.6061 | 7.1909 | 6.8109 | 6.4624 | 6.1422 | 5.8474 | 5.5755 | 4.6755 | 4.0013 | 3.8593 | 3.2682 |
| 16 | 14.718 | 13.578 | 12.561 | 11.652 | 10.838 | 10.106 | 9.4466 | 8.8514 | 8.3126 | 7.8237 | 7.3792 | 6.9740 | 6.6039 | 6.2651 | 5.9542 | 5.6685 | 4.7296 | 4.0333 | 3.8874 | 3.2832 |
| 17 | 15.562 | 14.292 | 13.166 | 12.166 | 11.274 | 10.477 | 9.7632 | 9.1216 | 8.5436 | 8.0216 | 7.5488 | 7.1196 | 6.7291 | 6.3729 | 6.0472 | 5.7487 | 4.7746 | 4.0591 | 3.9099 | 3.2948 |
| 18 | 16.398 | 14.992 | 13.754 | 12.659 | 11.690 | 10.828 | 10.059 | 9.3719 | 8.7556 | 8.2014 | 7.7016 | 7.2497 | 6.8399 | 6.4674 | 6.1280 | 5.8178 | 4.8122 | 4.0799 | 3.9279 | 3.3037 |
| 19 | 17.226 | 15.678 | 14.324 | 13.134 | 12.085 | 11.158 | 10.336 | 9.6036 | 8.9501 | 8.3649 | 7.8393 | 7.3658 | 6.9380 | 6.5504 | 6.1982 | 5.8775 | 4.8435 | 4.0967 | 3.9424 | 3.3105 |
| 20 | 18.046 | 16.351 | 14.877 | 13.590 | 12.462 | 11.470 | 10.594 | 9.8181 | 9.1285 | 8.5136 | 7.9633 | 7.4694 | 7.0248 | 6.6231 | 6.2593 | 5.9288 | 4.8696 | 4.1103 | 3.9539 | 3.3158 |
| 21 | 18.857 | 17.011 | 15.415 | 14.029 | 12.821 | 11.764 | 10.836 | 10.017 | 9.2922 | 8.6487 | 8.0751 | 7.5620 | 7.1016 | 6.6870 | 6.3125 | 5.9731 | 4.8913 | 4.1212 | 3.9631 | 3.3198 |
| 22 | 19.660 | 17.658 | 15.937 | 14.451 | 13.163 | 12.042 | 11.061 | 10.201 | 9.4424 | 8.7715 | 8.1757 | 7.6446 | 7.1695 | 6.7429 | 6.3587 | 6.0113 | 4.9094 | 4.1300 | 3.9705 | 3.3230 |
| 23 | 20.456 | 18.292 | 16.444 | 14.857 | 13.489 | 12.303 | 11.272 | 10.371 | 9.5802 | 8.8832 | 8.2664 | 7.7184 | 7.2297 | 6.7921 | 6.3988 | 6.0442 | 4.9245 | 4.1371 | 3.9764 | 3.3254 |
| 24 | 21.243 | 18.914 | 16.936 | 15.247 | 13.799 | 12.550 | 11.469 | 10.529 | 9.7066 | 8.9847 | 8.3481 | 7.7843 | 7.2829 | 6.8351 | 6.4338 | 6.0726 | 4.9371 | 4.1428 | 3.9811 | 3.3272 |
| 25 | 22.023 | 19.523 | 17.413 | 15.622 | 14.094 | 12.783 | 11.654 | 10.675 | 9.8226 | 9.0770 | 8.4217 | 7.8431 | 7.3300 | 6.8729 | 6.4641 | 6.0971 | 4.9476 | 4.1474 | 3.9849 | 3.3286 |
| 30 | 25.808 | 22.396 | 19.600 | 17.292 | 15.372 | 13.765 | 12.409 | 11.258 | 10.274 | 9.4269 | 8.6938 | 8.0552 | 7.4957 | 7.0027 | 6.5660 | 6.1772 | 4.9789 | 4.1601 | 3.9950 | 3.3321 |
| 35 | 29.409 | 24.999 | 21.487 | 18.665 | 16.374 | 14.498 | 12.948 | 11.655 | 10.567 | 9.6442 | 8.8552 | 8.1755 | 7.5856 | 7.0700 | 6.6166 | 6.2153 | 4.9915 | 4.1644 | 3.9984 | 3.3330 |
| 36 | 30.108 | 25.489 | 21.832 | 18.908 | 16.547 | 14.621 | 13.035 | 11.717 | 10.612 | 9.6765 | 8.8786 | 8.1924 | 7.5979 | 7.0790 | 6.6231 | 6.2201 | 4.9929 | 4.1649 | 3.9987 | 3.3331 |
| 40 | 32.835 | 27.355 | 23.115 | 19.793 | 17.159 | 15.046 | 13.332 | 11.925 | 10.757 | 9.7791 | 8.9511 | 8.2438 | 7.6344 | 7.1050 | 6.6418 | 6.2335 | 4.9966 | 4.1659 | 3.9995 | 3.3332 |
| 50 | 39.196 | 31.424 | 25.730 | 21.482 | 18.256 | 15.762 | 13.801 | 12.233 | 10.962 | 9.9148 | 9.0417 | 8.3045 | 7.6752 | 7.1327 | 6.6605 | 6.2463 | 4.9995 | 4.1666 | 3.9999 | 3.3333 |

# KASNEB

## CIFA PART III SECTION 6

## ADVANCED PORTFOLIO MANAGEMENT

**THURSDAY: 26 November 2015.** **Time Allowed: 3 hours.**

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

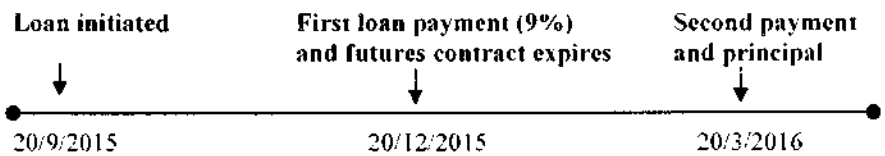
**QUESTION ONE**

(a) Discuss five criteria that could assist a portfolio manager in appropriately specifying asset classes. (5 marks)

(b) George Onyango is considering a possible six-month, Sh.100 million LIBOR based floating-rate bank loan to fund an infrastructure project. However, he fears that there might be a possible rise in the LIBOR rate by December 2015 and intends to use December 2015 Eurodollar futures contract to hedge risk.

The futures contract expires on 20 December 2015, has a Sh.1 million contract size, and a discount yield of 7.3%. George Onyango will ignore the cash flow implications of marking-to-market, initial margin requirements and any timing mismatch between exchange traded futures contract cash flows and the interest payments due in March 2016. The terms of the loan are as shown below:

| 20 September 2015 | 20 December 2015 | 20 March 2016 |
|---|---|---|
| • Borrow Sh.100 million at 20 September 2015 LIBOR + 200 basis points (bps) | • Pay interest for the first three months | • Pay back principal plus interest |
| (20 September 2015 LIBOR = 7%) | • Roll loan over at 20 December 2015 LIBOR + 200 bps | |






**Required:**

(i) Formulate George Onyango's 20 September 2015 floating-rate to fixed-rate strategy using the Eurodollar futures contract. (5 marks)

(ii) Show that the strategy in (b) (i) above would result in a fixed rate loan, assuming an increase in the LIBOR rate to 7.8% by 20 December 2015 which remains at 7.8% through 20 March 2016. (5 marks)

(c) The market value of an emerging market-fixed income investment fund is Sh.74.9 million. The duration of the portfolio is 8.165. According to a consulting economist, the prevailing interest rates are likely to have an unexpected decline over the next month. Based on this forecast, the portfolio manager contemplates increasing the duration of the fund's entire bond duration to 10.11. The futures contract that the fund would use is currently priced at Sh.130.012 and has a duration of 9.356. It is also assumed that the conversion factor for the futures contract is 1.059.

**Required:**

(i) Explain whether the fund would need to buy or to sell the futures contract. Justify your answer. (1 mark)

(ii) The approximate number of futures contracts that would be needed to change the duration of the bond portfolio. (4 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Explain the following fixed income portfolio management strategies:

(i) Full replication approach. (2 marks)

(ii) Enhanced indexing by matching primary risk factors. (2 marks)

(iii) Enhanced indexing by small risk factor mismatches. (2 marks)

(iv) Active management by larger risk factor mismatches. (2 marks)

(v) Full-blown active management. (2 marks)

(b) Evaluate three components of return for commodities futures contracts. (6 marks)

(c) Justine Kangongo is a senior portfolio manager advising international clients. On 1 September 2015, one of Kangongo's clients, an American, bought a Canadian oil company for 1 million CAD (Canadian dollars) and sold Canadian stock index futures (December maturity) for the same amount to hedge the Canadian stock market risk. The stock index futures contract has a multiplier of CAD 25. The current stock index futures price is CAD 2,000. The client sells 20 contracts. The Canadian dollar dropped from 1.0 United States dollars (USD) on 1 September 2015 to 0.90 USD on 1 October 2015. During the same period, the stock index and stock index futures dropped by 10% in CAD, while the portfolio only loses by 7% in CAD.

**Required:**
The profit or loss of this alpha strategy in USD given that the client does not engage in currency hedging. (4 marks)
**(Total: 20 marks)**

**QUESTION THREE**

(a) (i) In relation to global credit bond portfolio management, explain the term "relative value". (2 marks)

(ii) Describe three strategic portfolio implications of the bullet structure with an immediate maturity. (6 marks)

(b) A portfolio manager is evaluating two new asset classes that might provide a mean-variance improvement for his portfolio. He gathers the following data:

| | Asset class expectations | | |
|---|---|---|---|
| **Asset class** | **Expected return** | **Standard deviation** | **Correlation with the current portfolio** |
| Non-domestic developed market equity | 8.0% | 14.0% | 0.70 |
| Emerging market equity | 9.0% | 18.0% | 0.50 |

**Additional information:**
1. The risk free rate is 2.0%.
2. The current portfolio consists of 60% domestic equities and 40% domestic fixed-income securities.
3. The current portfolio has an expected return of 6.25% and a standard deviation of 9.5%.

**Required:**
Using Sharpe ratio, determine whether an addition of non-domestic developed market equity would provide a mean-variance improvement to the current portfolio. (3 marks)

(c) Charles Keter presented the following performance result. The manager invests in a small number of sectors within a broad equity universe. The objective of the manager is to outperform a custom benchmark:

| | Performance results | | | |
|---|---|---|---|---|
| | weight (%) | | Return % | |
| **Industry sector** | **Portfolio** | **Custom benchmark** | **Portfolio** | **Custom benchmark** |
| Agricultural | 21.30 | 21.90 | 4.55 | 4.90 |
| Banking | 36.00 | 34.80 | 3.60 | 3.10 |
| Investment | 19.20 | 20.90 | 3.90 | 3.30 |
| Telecommunication and technology | 23.50 | 22.40 | 1.30 | -0.20 |
| Total portfolio | 100.00 | 100.00 | 3.42 | 2.80 |

**Required:**
(i) The pure sector allocation for the agricultural sector of the portfolio. (3 marks)

(ii) The within-sector allocation (security selection) return for the investment sector of the portfolio. (3 marks)

(iii) The allocation (selection interaction) return for the banking sector of the portfolio. (3 marks)
**(Total: 20 marks)**

**QUESTION FOUR**

(a) Examine five limitations of Sharpe ratio as a performance appraisal measure of a hedge fund. (5 marks)

(b) John Kioko, a Chief Investment Officer (CIO) of a large pension fund has prepared the performance attribution table shown below to assist in evaluation of the performance of the equity real estate portfolio:

| Portfolio type | Portfolio allocation % | Index allocation % | Portfolio returns % | Index return % |
|---|---|---|---|---|
| Office | 55 | 35 | 4.47 | 6.07 |
| Retail | 20 | 25 | 8.23 | 7.51 |
| Warehouse | 20 | 15 | 6.01 | 7.52 |
| Apartment | 5 | 25 | 0.76 | 2.94 |
| Total | 100 | 100 | | |

**Required:**

(i) Index return. (1 mark)

(ii) Effects of property selection. (2 marks)

(iii) Effects of market timing. (2 marks)

(iv) Active return. (2 marks)

(v) Effects of active management. (2 marks)

(c) Jack Sitoti, an investment consultant, has collected the following information which he considers appropriate to compare the performance of two managers; Manager 1 and Manager 2.

| | Five year performance (annualised) | |
|---|---|---|
| **Performance measure** | **Manager 1** | **Manager 2** |
| Rate of return (%) | 21.13 | 21.13 |
| Sharpe ratio | 1.17 | 1.21 |
| $M^2$ (%) | 18.72 | 19.27 |
| Active risk (%) | 2.17 | 4.18 |
| Information ratio | 0.52 | 0.27 |
| Treynor measure (%) | 19.15 | 17.17 |
| Risk-free rate (%) | 2.75 | 2.75 |



**Required:**

Using three risk-adjusted performance measures, explain the causes of the difference in the two managers' performance. (6 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Evaluate three economically significant differences that distinguish "conventional index mutual funds" from "indexed exchange traded funds (ETF)". (6 marks)

(b) Describe the following portfolio rebalancing strategies:

(i) Buy-and-hold strategy. (2 marks)

(ii) Constant-mix strategy. (2 marks)

(iii) Constant-proportion portfolio insurance (CPPI) strategy. (2 marks)

(c) As a portfolio manager of Fiduciary Investment Services (FIS), one of your duties is to ensure timely execution of trades ordered by the clients.

The following information relates to one of your clients:

1. A client ordered for 1,000 shares of East African Cotton Limited (EACL) to be purchased on Tuesday, with a benchmark price of Sh.10 per share.

2. On Tuesday, 600 shares were purchased at a price of Sh.10.02 per share. The commissions and fees for this trade was Sh.20.00. The closing price on that Tuesday was Sh.9.99 per share.

3. On Wednesday, 100 more shares were bought at Sh.10.08 per share with commissions and fees amounting to Sh.12.00. The closing price was Sh.10.01 per share on that day.

4. The remaining shares were not purchased and the order was cancelled on Thursday at the close of the market. EACL shares closed at Sh.10.05 per share on Thursday.

**Required:**

(i) Implementation shortfall for the above trade. (4 marks)

(ii) Components of the implementation shortfall for the above trade. (4 marks)

**(Total: 20 marks)**

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## Present Value of 1 Received at the End of $n$ Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

| Period | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 12% | 14% | 15% | 16% | 18% | 20% | 24% | 28% | 32% | 36% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .9901 | .9804 | .9709 | .9615 | .9524 | .9434 | .9346 | .9259 | .9174 | .9091 | .8929 | .8772 | .8696 | .8621 | .8475 | .8333 | .8065 | .7813 | .7576 | .7353 |
| 2 | .9803 | .9612 | .9426 | .9246 | .9070 | .8900 | .8734 | .8573 | .8417 | .8264 | .7972 | .7695 | .7561 | .7432 | .7182 | .6944 | .6504 | .6104 | .5739 | .5407 |
| 3 | .9706 | .9423 | .9151 | .8890 | .8638 | .8396 | .8163 | .7938 | .7722 | .7513 | .7118 | .6750 | .6575 | .6407 | .6086 | .5787 | .5245 | .4768 | .4348 | .3975 |
| 4 | .9610 | .9238 | .8885 | .8548 | .8227 | .7921 | .7629 | .7350 | .7084 | .6830 | .6355 | .5921 | .5718 | .5523 | .5158 | .4823 | .4230 | .3725 | .3294 | .2923 |
| 5 | .9515 | .9057 | .8626 | .8219 | .7835 | .7473 | .7130 | .6806 | .6499 | .6209 | .5674 | .5194 | .4972 | .4761 | .4371 | .4019 | .3411 | .2910 | .2495 | .2149 |
| 6 | .9420 | .8880 | .8375 | .7903 | .7462 | .7050 | .6663 | .6302 | .5963 | .5645 | .5066 | .4556 | .4323 | .4104 | .3704 | .3349 | .2751 | .2274 | .1890 | .1580 |
| 7 | .9327 | .8706 | .8131 | .7599 | .7107 | .6651 | .6227 | .5835 | .5470 | .5132 | .4523 | .3996 | .3759 | .3538 | .3139 | .2791 | .2218 | .1776 | .1432 | .1162 |
| 8 | .9235 | .8535 | .7894 | .7307 | .6768 | .6274 | .5820 | .5403 | .5019 | .4665 | .4039 | .3506 | .3269 | .3050 | .2660 | .2326 | .1789 | .1388 | .1085 | .0854 |
| 9 | .9143 | .8368 | .7664 | .7026 | .6446 | .5919 | .5439 | .5002 | .4604 | .4241 | .3606 | .3075 | .2843 | .2630 | .2255 | .1938 | .1443 | .1084 | .0822 | .0628 |
| 10 | .9053 | .8203 | .7441 | .6756 | .6139 | .5584 | .5083 | .4632 | .4224 | .3855 | .3220 | .2697 | .2472 | .2267 | .1911 | .1615 | .1164 | .0847 | .0623 | 0462 |
| 11 | .8963 | .8043 | .7224 | .6496 | .5847 | .5268 | .4751 | .4289 | .3875 | .3505 | .2875 | .2366 | 2149 | .1954 | .1619 | .1346 | .0938 | .0662 | .0472 | .0340 |
| 12 | .8874 | .7885 | .7014 | .6246 | .5568 | .4970 | .4440 | .3971 | .3555 | .3186 | .2567 | .2076 | .1869 | 1685 | .1372 | .1122 | .0757 | .0517 | .0357 | .0250 |
| 13 | .8787 | .7730 | .6810 | .6006 | .5303 | .4688 | .4150 | .3677 | .3262 | .2897 | .2292 | .1821 | .1625 | .1452 | .1163 | .0935 | .0610 | .0404 | .0271 | .0184 |
| 14 | .8700 | .7579 | .6611 | .5775 | .5051 | .4423 | .3878 | .3405 | .2992 | .2633 | .2046 | .1597 | .1413 | .1252 | .0985 | .0779 | .0492 | .0316 | .0205 | .0135 |
| 15 | .8613 | .7430 | .6419 | .5553 | .4810 | .4173 | .3624 | 3152 | .2745 | .2394 | .1827 | 1401 | .1229 | .1079 | .0835 | .0649 | .0397 | .0247 | .0155 | .0099 |
| 16 | .8528 | .7284 | .6232 | .5339 | .4581 | .3936 | .3387 | .2919 | .2519 | .2176 | .1631 | .1229 | .1069 | .0930 | .0708 | .0541 | .0320 | .0193 | .0118 | .0073 |
| 17 | .8444 | .7142 | .6050 | .5134 | .4363 | .3714 | .3166 | .2703 | .2311 | .1978 | .1456 | .1078 | .0929 | .0802 | .0600 | .0451 | .0258 | .0150 | .0089 | .0054 |
| 18 | 8360 | .7002 | .5874 | .4936 | .4155 | .3503 | .2959 | .2502 | .2120 | .1799 | .1300 | .0946 | .0808 | .0691 | .0508 | .0376 | .0208 | .0118 | .0068 | .0039 |
| 19 | .8277 | .6864 | .5703 | .4746 | .3957 | .3305 | .2765 | .2317 | .1945 | .1635 | .1161 | .0829 | .0703 | .0596 | .0431 | .0313 | .0168 | .0092 | .0051 | .0029 |
| 20 | .8195 | .6730 | .5537 | .4564 | .3769 | .3118 | .2584 | .2145 | .1784 | 1486 | 1037 | .0728 | .0611 | .0514 | .0365 | .0261 | .0135 | .0072 | .0039 | .0021 |
| 25 | .7798 | .6095 | .4776 | .3751 | .2953 | .2330 | .1842 | .1460 | .1160 | .0923 | .0588 | .0378 | .0304 | .0245 | .0160 | .0105 | .0046 | .0021 | .0010 | 0005 |
| 30 | .7419 | .5521 | .4120 | .3083 | .2314 | .1741 | .1314 | .0994 | .0754 | .0573 | .0334 | .0196 | .0151 | .0116 | .0070 | .0042 | .0016 | .0006 | .0002 | .0001 |
| 40 | .6717 | .4529 | .3066 | .2083 | .1420 | .0972 | .0668 | 0460 | .0318 | .0221 | .0107 | 0053 | .0037 | .0026 | .0013 | .0007 | .0002 | .0001 | | |
| 50 | .6080 | .3715 | .2281 | .1407 | .0872 | .0543 | .0339 | .0213 | 0134 | 0085 | .0035 | .0014 | .0009 | .0006 | .0003 | .0001 | | | | |
| 60 | .5504 | .3048 | .1697 | .0951 | .0535 | .0303 | .0173 | .0099 | .0057 | .0033 | .0011 | .0004 | 0002 | .0001 | | | | | | |

* The factor is zero to four decimal places



## Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{i=1}^{n} \frac{1}{(1+r)^i} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

| Number of payments | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 12% | 14% | 15% | 16% | 18% | 20% | 24% | 28% | 32% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.9901 | 0.9804 | 0.9709 | 0.9615 | 0.9524 | 0.9434 | 0.9346 | 0.9259 | 0.9174 | 0.9091 | 0.8929 | 0.8772 | 0.8696 | 0.8621 | 0.8475 | 0.8333 | 0.8065 | 0.7813 | 0.7576 |
| 2 | 1.9704 | 1.9416 | 1.9135 | 1.8861 | 1.8594 | 1.8334 | 1.8080 | 1.7833 | 1.7591 | 1.7355 | 1.6901 | 1.6467 | 1.6257 | 1.6052 | 1.5656 | 1.5278 | 1.4568 | 1.3916 | 1.3315 |
| 3 | 2.9410 | 2.8839 | 2.8286 | 2.7751 | 2.7232 | 2.6730 | 2.6243 | 2.5771 | 2.5313 | 2.4869 | 2.4018 | 2.3216 | 2.2832 | 2.2459 | 2.1743 | 2.1065 | 1.9813 | 1.8684 | 1.7663 |
| 4 | 3.9020 | 3.8077 | 3.7171 | 3.6299 | 3.5460 | 3.4651 | 3.3872 | 3.3121 | 3.2397 | 3.1699 | 3.0373 | 2.9137 | 2.8550 | 2.7982 | 2.6901 | 2.5887 | 2.4043 | 2.2410 | 2.0957 |
| 5 | 4.8534 | 4.7135 | 4.5797 | 4.4518 | 4.3295 | 4.2124 | 4.1002 | 3.9927 | 3.8897 | 3.7908 | 3.6048 | 3.4331 | 3.3522 | 3.2743 | 3.1272 | 2.9906 | 2.7454 | 2.5320 | 2.3452 |
| 6 | 5.7955 | 5.6014 | 5.4172 | 5.2421 | 5.0757 | 4.9173 | 4.7665 | 4.6229 | 4.4859 | 4.3553 | 4.1114 | 3.8887 | 3.7845 | 3.6847 | 3.4976 | 3.3255 | 3.0205 | 2.7594 | 2.5342 |
| 7 | 6.7282 | 6.4720 | 6.2303 | 6.0021 | 5.7864 | 5.5824 | 5.3893 | 5.2064 | 5.0330 | 4.8684 | 4.5638 | 4.2883 | 4.1604 | 4.0386 | 3.8115 | 3.6046 | 3.2423 | 2.9370 | 2.6775 |
| 8 | 7.6517 | 7.3255 | 7.0197 | 6.7327 | 6.4632 | 6.2098 | 5.9713 | 5.7466 | 5.5348 | 5.3349 | 4.9676 | 4.6389 | 4.4873 | 4.3436 | 4.0776 | 3.8372 | 3.4212 | 3.0758 | 2.7860 |
| 9 | 8.5660 | 8.1622 | 7.7861 | 7.4353 | 7.1078 | 6.8017 | 6.5152 | 6.2469 | 5.9952 | 5.7590 | 5.3282 | 4.9464 | 4.7716 | 4.6065 | 4.3030 | 4.0310 | 3.5655 | 3.1842 | 2.8681 |
| 10 | 9.4713 | 8.9826 | 8.5302 | 8.1109 | 7.7217 | 7.3601 | 7.0236 | 6.7101 | 6.4177 | 6.1446 | 5.6502 | 5.2161 | 5.0188 | 4.8332 | 4.4941 | 4.1925 | 3.6819 | 3.2689 | 2.9304 |
| 11 | 10.3676 | 9.7868 | 9.2526 | 8.7605 | 8.3064 | 7.8869 | 7.4987 | 7.1390 | 6.8052 | 6.4951 | 5.9377 | 5.4527 | 5.2337 | 5.0286 | 4.6560 | 4.3271 | 3.7757 | 3.3351 | 2.9776 |
| 12 | 11.2551 | 10.5753 | 9.9540 | 9.3851 | 8.8633 | 8.3838 | 7.9427 | 7.5361 | 7.1607 | 6.8137 | 6.1944 | 5.6603 | 5.4206 | 5.1971 | 4.7932 | 4.4392 | 3.8514 | 3.3868 | 3.0133 |
| 13 | 12.1337 | 11.3484 | 10.6350 | 9.9856 | 9.3936 | 8.8527 | 8.3577 | 7.9038 | 7.4869 | 7.1034 | 6.4235 | 5.8424 | 5.5831 | 5.3423 | 4.9095 | 4.5327 | 3.9124 | 3.4272 | 3.0404 |
| 14 | 13.0037 | 12.1062 | 11.2961 | 10.5631 | 9.8986 | 9.2950 | 8.7455 | 8.2442 | 7.7862 | 7.3667 | 6.6282 | 6.0021 | 5.7245 | 5.4675 | 5.0081 | 4.6106 | 3.9616 | 3.4587 | 3.0609 |
| 15 | 13.8651 | 12.8493 | 11.9379 | 11.1184 | 10.3797 | 9.7122 | 9.1079 | 8.5595 | 8.0607 | 7.6061 | 6.8109 | 6.1422 | 5.8474 | 5.5755 | 5.0916 | 4.6755 | 4.0013 | 3.4834 | 3.0764 |
| 16 | 14.7179 | 13.5777 | 12.5611 | 11.6523 | 10.8378 | 10.1059 | 9.4466 | 8.8514 | 8.3126 | 7.8237 | 6.9740 | 6.2651 | 5.9542 | 5.6685 | 5.1624 | 4.7296 | 4.0333 | 3.5026 | 3.0882 |
| 17 | 15.5623 | 14.2919 | 13.1661 | 12.1657 | 11.2741 | 10.4773 | 9.7632 | 9.1216 | 8.5436 | 8.0216 | 7.1196 | 6.3729 | 6.0472 | 5.7487 | 5.2223 | 4.7746 | 4.0591 | 3.5177 | 3.0971 |
| 18 | 16.3983 | 14.9920 | 13.7535 | 12.6593 | 11.6896 | 10.8276 | 10.0591 | 9.3719 | 8.7556 | 8.2014 | 7.2497 | 6.4674 | 6.1280 | 5.8178 | 5.2732 | 4.8122 | 4.0799 | 3.5294 | 3.1039 |
| 19 | 17.2260 | 15.6785 | 14.3238 | 13.1339 | 12.0853 | 11.1581 | 10.3356 | 9.6036 | 8.9501 | 8.3649 | 7.3658 | 6.5504 | 6.1982 | 5.8775 | 5.3162 | 4.8435 | 4.0967 | 3.5386 | 3.1090 |
| 20 | 18.0456 | 16.3514 | 14.8775 | 13.5903 | 12.4622 | 11.4699 | 10.5940 | 9.8181 | 9.1285 | 8.5136 | 7.4694 | 6.6231 | 6.2593 | 5.9288 | 5.3527 | 4.8696 | 4.1103 | 3.5458 | 3.1129 |
| 25 | 22.0232 | 19.5235 | 17.4131 | 15.6221 | 14.0939 | 12.7834 | 11.6536 | 10.6748 | 9.8226 | 9.0770 | 7.8431 | 6.8729 | 6.4641 | 6.0971 | 5.4669 | 4.9476 | 4.1474 | 3.5640 | 3.1220 |
| 30 | 25.8077 | 22.3965 | 19.6004 | 17.2920 | 15.3725 | 13.7648 | 12.4090 | 11.2578 | 10.2737 | 9.4269 | 8.0552 | 7.0027 | 6.5660 | 6.1772 | 5.5168 | 4.9789 | 4.1601 | 3.5693 | 3.1242 |
| 40 | 32.8347 | 27.3555 | 23.1148 | 19.7928 | 17.1591 | 15.0463 | 13.3317 | 11.9246 | 10.7574 | 9.7791 | 8.2438 | 7.1050 | 6.6418 | 6.2335 | 5.5482 | 4.9966 | 4.1659 | 3.5712 | 3.1250 |
| 50 | 39.1961 | 31.4236 | 25.7298 | 21.4822 | 18.2559 | 15.7619 | 13.8007 | 12.2335 | 10.9617 | 9.9148 | 8.3045 | 7.1327 | 6.6605 | 6.2463 | 5.5541 | 4.9995 | 4.1666 | 3.5714 | 3.1250 |
| 60 | 44.9550 | 34.7609 | 27.6756 | 22.6235 | 18.9293 | 16.1614 | 14.0392 | 12.3766 | 11.0480 | 9.9672 | 8.3240 | 7.1401 | 6.6651 | 6.2402 | 5.5553 | 4.9999 | 4.1667 | 3.5714 | 3.1250 |

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**CIFA PART III SECTION 6**

**ADVANCED PORTFOLIO MANAGEMENT**

**THURSDAY: 2 September 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) The best execution rule requires that firms, when executing orders, take all reasonable steps to obtain the best possible result for their clients.

In the context of the above statement, highlight four factors that a market intermediary should consider in order to achieve the best execution for their clients. (4 marks)

(b) A portfolio manager concerned with trade execution decisions decides to use the volume weighted average price (VWAP) as his benchmark.

He receives the following information from his broker on a series of trade for Sigma Limited's shares:

- 10 million shares at Sh.5 per share.
- 7 million shares at Sh.5.50 per share.
- 4 million shares at Sh.6 per share.

Sell order for the company's shares was executed at Sh.5.60 per share.

**Required:**

(i) The volume weighted average price for Sigma Limited shares. (3 marks)

(ii) Determine whether the manager outperformed the benchmark. (2 marks)

(c) Ryan Benson has started a foundation to support green energy causes in his country and intends the foundation to make contribution to these causes in perpetuity. The foundation will be a tax-exempt entity. Benson made an initial gift to the foundation of Sh.200 million on 1 January of year 1. In addition, Benson intends to make ongoing annual contributions to the foundation of Sh.3 million on 1 January of each subsequent year. The foundation will make a one-time distribution of Sh.7 million at the beginning of year 1 to fund projects deserving immediate attention.

Beginning of year 2, the foundation will have an annual spending requirement of 4% of the market value of its portfolio at the end of the preceding year. The annual contributions from the foundation will be used to cover a portion of the operating expenses. The expected inflation rate is 6.5% per year.

The foundation goal is to preserve the real value of its investment portfolio and any future contributions while also meeting its spending requirements. A consultant hired to be the foundation advisor will be paid a management fee of 0.30% per year and the fee is calculated based on the year end value of the portfolio and paid in arrears on the first day of the following year.

The consultant is tasked with preparation of an investment policy statement (IPS) for the foundation and the consultant concludes that the foundation has an above average risk tolerance.

In the first year of the foundation's operations, the return on the benchmark was 10.8% and the return on the foundations portfolio was 10.0%. The foundation received the planned Sh.3 million contribution on 1 January of year 2.

Three years have lapsed and Benson is not able to make additional contributions to the foundations and the IPS has been revised to reflect the foundation's changed circumstances.

**Required:**

(i) Identify three factors that supports the above average risk tolerance of the foundation. (3 marks)

(ii) Determine the nominal required rate of return for the foundation in year 2. (2 marks)

(iii) Calculate the liquidity requirement of the foundation in year 2. (4 marks)

(iv) Explain the effect of the foundation's changed circumstances on the foundation's return objective and liquidity requirement. (2 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Explain the following value and growth substyles in actively managed equity portfolios:

(i) Contrarian. (2 marks)

(ii) High yield. (2 marks)

(iii) Consistent growth. (2 marks)

(iv) Earnings momentum. (2 marks)

(b) Wema employees' pension plan (WEPP) is the pension fund of a composite company. WEPP is fully funded with Sh.800 million in assets and has the following investment policy objectives:

1. Earn a 10.3% annual portfolio return.
2. Have a maximum Roy's safety first ratio with a minimum return threshold of 8%.
3. Maintain a cash balance sufficient to meet liquidity requirements.
4. Maintain a maximum of 10% of assets in a passively managed sub portfolio that is indexed to the stock market index (SMI).



**Additional information:**

1. WEPP expects to pay Sh.32 million in pension benefits this year.
2. At an investment committee meeting regarding possible changes to WEPP's strategic asset allocation policy, the investment committee reviewed five alternative portfolio allocations that met WEPP's return objectives. These alternatives are shown below:

| | WEPP | | | | |
|---|---|---|---|---|---|
| **Asset class** | **Alternative portfolio allocation (%)** | | | | |
| | **V** | **W** | **X** | **Y** | **Z** |
| Cash equivalents | 3 | 5 | 6 | 5 | 6 |
| Stock market index (SMI) | 10 | 12 | 8 | 7 | 9 |
| Global bonds | 40 | 40 | 47 | 45 | 41 |
| Global equities | 47 | 43 | 39 | 43 | 44 |
| Total | 100 | 100 | 100 | 100 | 100 |
| Expected total annual returns | 11.26 | 11.19 | 10.44 | 10.60 | 10.87 |
| Expected standard deviation | 14.90 | 14.82 | 13.93 | 14.15 | 14.52 |

**Required:**

Citing four reasons, determine the most appropriate portfolio for WEPP. (8 marks)

(c) Examine four roles of equity indices in relation to passive equity investing. (4 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Explain four factors that could influence the return on a fixed income portfolio. (4 marks)

(b) A fixed income portfolio manager was hired to manage an investment portfolio for Kimbo Ltd. The investment portfolio has a total market value of Sh.400 million and a modified duration of 7.2. Kimbo Ltd.'s liabilities amount to Sh. 180 million and has a modified duration of 6.

**Required:**
Calculate the effect on Kimbo Ltd's assets and liabilities assuming interest rates decline by 100 basis points.
(4 marks)

(c) Capricon Investment Advisors manages indexed bond portfolios that are constructed using two different methods. The Investment Advisors have stated that the source of tracking error is different for each method.

**Required:**
Discuss how an indexed portfolio is constructed under stratified sampling method and optimisation method.
(4 marks)

(d) Explain the meaning of the term "active return" with respect to equity portfolio management. (2 marks)

(e) Solomon Naitu is a portfolio manager of Wise Investment Fund. In the year 2020, he managed a portfolio of five stocks namely; A, B, C, D and E. The following table shows the portfolio weights and actual returns:

| Stock | Portfolio weight (%) | Portfolio return (%) |
|---|---|---|
| A | 20 | 15 |
| B | 25 | 10 |
| C | 15 | – 8 |
| D | 25 | – 2 |
| E | 15 | 4 |

**Required:**

(i) Assuming that the stocks are equally weighted in the benchmark, calculate the active return. (3 marks)

(ii) Assuming that the active return in the previous 6 years was 2%, – 1%, 0.5%, 0.75%, – 3% and 0.6%, calculate the active risk and information ratio. (3 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Describe four factors to consider when selecting active managers of alternative investment scheme. (4 marks)

(b) The following information relates to the performance of three portfolios namely; X, Y and Z during the year ended 31 December 2020:

| Portfolio | Average return (%) | Standard deviation (%) | Co-variance of portfolio returns with market returns |
|---|---|---|---|
| X | 16.5 | 29 | 0.0081 |
| Y | 13.7 | 31 | 0.0799 |
| Z | 9.6 | 27 | 0.0026 |

**Additional information:**

1. During the year ended 31 December 2020, the market return and the risk free rate of return averaged 12% and 5% respectively.
2. The standard deviation on the market return is 10%.

**Required:**
Evaluate the performance of the three portfolios using:

(i) Sharpe's performance measure. (3 marks)

(ii) Treynor's performance measure. (3 marks)

(c) A portfolio manager has Sh.500 million worth of portfolio with Sh.300 million comprising of equities and the rest in cash and cash equivalents. The constant mix (CM) and Buy and Hold (BH) portfolio rebalancing strategies at inception both allocate Sh.300 million to equities and the constant proportion portfolio insurance (CPPI) strategy has the floor value set at Sh.250 million with a multiple of 1.2 to equities.

**Required:**

(i) Assuming that the first period, equity value decreases to Sh.250 million, compute the portfolio composition values after rebalancing with each of the three rebalancing strategies stated above. (3 marks)

(ii) Assuming that in the second period equity values decline further by 10%, compute the portfolio composition percentages under each of the three rebalancing strategies mentioned in the question. (3 marks)

(iii) Assuming that instead, equity composition increases by 20% in the second period as opposed to the decline in (c) (ii) above, compute the portfolio composition percentages under each of the portfolio rebalancing strategies mentioned. (3 marks)

(iv) Comment on the observation of the performance of the three rebalancing strategies based on your answer in part (c) (i) above. (1 mark)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Joseph Mutiso is a portfolio manager responsible for a large pension fund in his country and is interested in determining the sources of the fund's returns. The results of his macroattribution analysis are presented below:

| **Decision making levels** | **Returns (%)** |
|---|---|
| Aggregate manager investment style benchmarks | 3.65 |
| Aggregate asset category benchmarks | 3.76 |
| Aggregate actual return of the managers | 3.81 |
| Allocation effects | 0.00 |

The results of his microattribution analysis are presented below:

| **Economic sectors** | **Portfolio weights (%)** | **Sector benchmark weights (%)** | **Portfolio return (%)** | **Sector benchmark return (%)** |
|---|---|---|---|---|
| Banking | 49.75 | 39.00 | 6.50 | 4.25 |
| Agricultural | 6.40 | 7.50 | 8.90 | 6.45 |
| Energy | 12.50 | 24.80 | 2.50 | 3.25 |
| Telecommunication | 31.35 | 28.70 | 6.80 | 5.50 |



**Required:**

(i) For macroattribution analysis, determine the return to style bias and return to active management. (2 marks)

(ii) For macroattribution analysis, determine which sector has the highest within-sector allocation return. (3 marks)

(iii) For microattribution analysis, determine which sector has the highest allocation/selection interaction return. (3 marks)

(b) Stephen Macharia is a portfolio manager for a large bank which has written a guaranteed liability due in four years. The liability is for Sh.93.5 million at the end of the period and guarantees a bond equivalent yield of 2.75% over the period. Stephen calculates the present value of the liability at Sh.83,884,996.

He currently holds two bonds in a portfolio and would like to add a third bond to immunise the portfolio for the liability. The current portfolio and three possible choices for immunisation are as shown below:

| | **Bonds in the portfolio** | | |
|---|---|---|---|
| **Bond** | **Market value (Sh.)** | **Total market value (Sh.)** | **Total money duration (Sh.)** |
| Bond A | 101.75 | 22,500,000 | 525,000 |
| Bond B | 95.6 | 31,250,750 | 2,253,750 |
| | **Bonds available to complete portfolio** | | |
| **Bond** | **Market value (Sh.)** | **Yield to maturity (YTM)** | **Modified duration** |
| Bond C | 99.97 | 3.25% | 1.45 |
| Bond D | 99.36 | 3.50% | 1.91 |
| Bond E | 99.35 | 2.50% | 1.89 |

**Required:**
Determine the bond that is most suitable to complete the immunised portfolio using:

(i) Modified duration approach. (4 marks)

(ii) Money duration approach. (4 marks)

(c) A global fund based in Kenya has determined that a Sh.39,550,000 investment in an equity portfolio of South African stock with a beta of 1.27 would be appropriate. The fund will make this investment for a year starting from 31 January 2022. The fund is uncertain about future movements of the South African Rand and Kenya Shilling exchange rate and wants to fully hedge the currency risk associated with the investment. The fund has approached a currency dealer who has given the following quotes.

- A stock index future contract on a Rand-denominated index trades at ZAR 10,000 and has a beta of 1.10.
- A currency forward contract based on ZAR/KES exchange rate has a price of Sh.7.52/ZAR.

The fund has determined Kenya risk free rate is 4.67% and South Africa risk free rate is 2.95%. Both rates are annually compounded. The current spot exchange rate is Sh.8.50/ZAR.

**Required:**
Determine the hedging strategy that should be implemented to fully hedge currency risk. (4 marks)

**(Total: 20 marks)**

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**CIFA PART III SECTION 6**

**ADVANCED PORTFOLIO MANAGEMENT**

**THURSDAY: 20 May 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) Describe five qualities of a valid benchmark as used in evaluating portfolio performance. (5 marks)

(b) BlackBrick Limited (BBL) offers a defined benefit pension plan to its employees. Joshua Mutiso, a portfolio manager has collected the following details about BBL:

1. The plan is fully funded.
2. The average age of the participants is 38 years.
3. The active to retired participant's ratio is 3:1.
4. The company has reported strong financial results in the current financial year.
5. The discount rate used to determine the present value of future obligations is 8%.
6. The duration of plan liabilities is 22 years.
7. The sponsor has proposed a return objective of 8.5%.
8. BBL offers a one-for-one inflation indexation through a cost of living allowance.
9. Future benefits are twice as high relative to accrued benefits and are attributable to future real wage growth.
10. BBL is considering the inclusion of an early retirement provision.



**Required:**

(i) State BBL's return objective. (2 marks)

(ii) Identify two purposes which the sponsor may have in stating a return objective of 8.5%. (2 marks)

(iii) Formulate the risk tolerance, liquidity and time horizon components for BBL's investment policy statement (IPS). (6 marks)

(c) Gibson Kipsang has recently inherited Sh.5 million and wishes to invest in equities.

He identifies and allocates the funds to a set of four managers each with their distinct investment styles as follows:

| Manager | Funds allocated Sh."million" | Expected active return (%) | Tracking risk relative to asset class benchmark (%) | Expected tracking risk (%) |
|---|---|---|---|---|
| A | 0.5 | 0.0 | 0.0 | 0.0 |
| B | 1.5 | 2.0 | 1.5 | 2.5 |
| C | 2.2 | 4.0 | 4.0 | 5.8 |
| D | 0.8 | 5.7 | 6.3 | 7.2 |

**Required:**

(i) The portfolio's active return with respect to the equities allocation. (2 marks)

(ii) Determine the manager with the highest true active risk. (3 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Explain how each of the following behavioural factors could affect asset allocation:

(i) Illusion of control. (2 marks)

(ii) Mental accounting. (2 marks)

(iii) Availability bias. (2 marks)

(b) Rose Ambani is analysing the trading costs of her most recent purchase of 1,000 shares of Tambun Ltd.

She accumulates the following facts for her evaluation:

1. The benchmark price was Sh.60 per share.
2. The order was placed last Tuesday, when the shares of Tambun Ltd. closed at Sh.59.90 per share. 500 shares were purchased at a price of Sh.61.05 per share. Commission and fees were Sh.50.
3. On Wednesday, 200 more shares were purchased at Sh.62.05 per share. Commission and fees were Sh.20. Shares of Tambun Ltd. closed at Sh.61.03 during the same day.
4. On Thursday, no more shares were purchased and the order was cancelled. The market closed at Sh.62.00 per share.

Rose meant to use this data to calculate the implementation shortfall of her trade.

**Required:**

(i) The total implementation shortfall for the trade in the shares of Tambun Ltd. (4 marks)

(ii) Determine the contribution of the various cost components to the total implementation shortfall. (4 marks)

(c) Sospeter Obonyo has gathered the following data to evaluate the performance of a portfolio manager:

| Date | Contribution/(withdrawal) Sh."000" | Market value after cash flows Sh."000" |
|---|---|---|
| 31 March 2021 | - | 121,000 |
| 8 April 2021 | 13,000 | 135,000 |
| 23 April 2021 | (8,000) | 127,000 |
| 30 April 2021 | - | 123,000 |

**Required:**

The time weighted rate of return for the manager for the month of April 2021. (6 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Highlight three reasons why commodity returns are weakly correlated with stock and bonds returns. (3 marks)

(b) Ruth Wangu is a high net worth (HNW) investor who invests with an equity manager with a quoted base fee rate of 0.50% of beginning asset under management (AUM) plus 30% of performance in excess of the NSE Index.

Four years later, Wangu evaluates the performance of the equity manager relative to the NSE index as a benchmark index.

The equity manager fund is subject to a high water mark (HWM).

| Year | Beginning net asset value (Sh."million") | Ending net* asset value (Sh."million") | NSE index value (Sh."million") |
|---|---|---|---|
| 1 | 10 | 13 | 12 |
| 2 | 13 | 9.5 | 11.5 |
| 3 | 9.5 | 11 | 11.7 |
| 4 | 11 | 11.9 | 11.2 |

* Gross of investment management fees.

**Required:**

(i) Calculate the value of the high watermark, gross of investment management fees at the end of the third year. (2 marks)

(ii) Determine the amount of fees which will be received by the equity manager in the fourth year. (2 marks)

(iii) Discuss two relative strengths of adopting a performance fee based structure. (2 marks)

(iv) Discuss two relative weaknesses of adopting a performance-fee based structure. (2 marks)

(c) Moses Abongo is a financial analyst who has recently joined the graduate trainee scheme of a large buyside multi-asset investment manager. The scheme will involve Abongo spending time in all of the major divisions of the firm, first of which is the fixed income division.

Abongo initially works alongside Roberto James, a bond fund manager who specialises in dedication strategies designed to ensure that portfolios meet the future liabilities of investors. One of Roberto's clients is Abdi Ali, a high net worth individual who is aiming to meet a personal liability due in 10 years' time, the present value of which is equal to Sh.2,951,100.

Abdi Ali's current portfolio consists of three bonds, details of which are displayed below. Each holding is of Sh.1 million.

**Abdi Ali's fixed income portfolio**

| Security | Price (Sh.) | Macaulay Duration | Modified duration |
|---|---|---|---|
| Bond 1 | 102.36 | 3.7 | 3.6 |
| Bond 2 | 97.61 | 9.9 | 9.7 |
| Bond 3 | 95.14 | 16.9 | 16.6 |

Roberto James also runs a portfolio for John Muturi. This portfolio is engaged in a dedication strategy known as contingent immunisation.



Details of the strategy are given below:

| **John Muturi contingent immunisation strategy** | |
|---|---|
| Current portfolio value | Sh.30 million |
| Portfolio modified duration | 5.5 |
| Liability to be repaid in 8 years | Sh.40 million |
| Effective annual discount rate applied to liabilities | 5% |

Roberto James demonstrates to Moses Abongo how a derivatives overlay could be used to close the current duration gap on the portfolio run for John Muturi. He collects information on a relevant futures contract which is displayed below:

**Futures Contract Information**

| | |
|---|---|
| National principal | Sh.100,000 |
| Coupon | 6% |
| Range of maturities of deliverable bonds | 8 years to 12 years |
| Basis point value (BVP) for one futures contract | Sh.76.22 |

**Required:**

(i) The current money duration of the Abdi Ali fixed income portfolio. (4 marks)

(ii) Determine whether or not Abdi Ali's fixed income portfolio is immunised. (3 marks)

(iii) The number of futures contract required to close the duration gap. (2 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Explain three advantages of using futures instead of cash market instruments to alter portfolio risk. (3 marks)

(b) You have been provided with the following information relating to a portfolio manager's performance for the period ended 31 March 2021:

| Asset class | Investment weight | | | Returns | | |
|---|---|---|---|---|---|---|
| | Actual | Benchmark | Excess | Actual | Benchmark | Excess % |
| Stock | 0.50 | 0.60 | −0.10 | 9.70 | 8.60 | 1.10 |
| Bonds | 0.38 | 0.30 | 0.08 | 9.10 | 9.20 | −0.10 |
| Cash | 0.12 | 0.10 | 0.02 | 5.60 | 5.40 | 0.20 |

**Required:**

(i) Compute the value added by the manager and comment on the performance. (4 marks)

(ii) Using attribution analysis, break down the value added computed in (b) (i) above into allocation effect and selection effect. (6 marks)

(c) Brian Kingi, a private investor has a total market value of an initial portfolio of Sh.30 million of which Sh.9 million is invested in the money market fund, a risk free asset. The remaining Sh.21 million is invested in risky securities, that is, Sh.11.34 million in equity (E) and Sh.9.66 million in long-term bond (B). The bond and equity holdings comprise the risky portfolio.

**Required:**

(i) The weight of the risky and risk free investments in the complete portfolio. (1 mark)

(ii) The weights of equity and debt holdings in the risky portfolio. (1 mark)

(iii) The weights of equity and debt holdings in the complete portfolio. (1 mark)

(iv) Assuming that Brian Kingi wishes to decrease risk by reducing the allocation to the risky portfolio to 0.56, calculate the amount of the equity and bond holdings that must be sold to achieve this objective. (4 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Portfolio revision is the process of selling certain investments in portfolio and purchasing new ones to replace them.

Highlight three reasons for portfolio revision. (3 marks)

(b) In relation to global credit bond portfolio management:

(i) Explain the dominant type of structure in the investment-grade credit market. (2 marks)

(ii) Determine three strategies portfolio implication of the dominant structure identified in (b) (i) above. (3 marks)

(c) Discuss three characteristics of best execution of a portfolio decision. (6 marks)

(d) The spot exchange rate between the Brazilian real (BRL) and United States Dollar (USD) is 2.41. The interest rate in the two countries are 6% and 1% respectively.

**Required:**

(i) Estimate the one year forward exchange rate for the Brazilian real. (2 marks)

(ii) State the steps to initiate a carry trade. (2 marks)

(iii) Calculate the profit on the trade if the spot exchange rate is unchanged and the trade is initiated by borrowing 100 currency units. (2 marks)

**(Total: 20 marks)**

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**CIFA PART III SECTION 6**

**ADVANCED PORTFOLIO MANAGEMENT**

**FRIDAY: 27 November 2020.** **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) Explain three sources of generating income from an equity investment portfolio. (3 marks)

(b) On Wednesday, the share price of Takuzi Ltd. closed at Sh.50 per share. On Thursday morning before the market open, a portfolio manager decides to buy Takuzi Ltd.'s shares and transfers a limit order for 1,000 shares at Sh.49.95 per share. The order expires unfilled. The share closes at Sh.50.05. On Friday, the order is revised to a limit of Sh.50.07. The order is partially filled that day as 700 shares are bought at Sh.50.07. The commission is Sh.23. The share closes at 50.09 and the order is cancelled.

**Required:**
The implementation shortfall in percentage. (4 marks)



(c) (i) An analyst gathers the following data about asset allocation by a portfolio manager of ABC Capital:

| Market | Actual weight in market | Benchmark weight in market | Market return (%) |
|---|---|---|---|
| Equity | 0.70 | 0.70 | 5.81 |
| Fixed income | 0.07 | 0.25 | 1.45 |
| Cash | 0.23 | 0.05 | 0.48 |

**Required:**
The contribution of asset allocation to performance. (3 marks)

(ii) Another analyst gathers the following data on a different allocation:

| Market | Portfolio performance (%) | Index performance (%) | Portfolio weight |
|---|---|---|---|
| Equity | 7.28 | 5.00 | 0.70 |
| Fixed income | 1.89 | 1.45 | 0.07 |

**Required:**
The contribution of selection to total performance. (2 marks)

(d) A portfolio manager is analysing a University Endowment Fund with three years financial projections as shown in the table below:

| Year | Market value of the portfolio | Additional capital injection (donations) |
|---|---|---|
| | Sh."million" | Sh."million" |
| 2017 | 100 | – |
| 2018 | 130 | 40 |
| 2019 | 140 | – |

**Additional information:**
1. The market value of the portfolio is quoted at the end of the financial year.
2. The additional capital donations was at the beginning of the financial year.
3. The Sh.40 million donation was from alumni association.

**Required:**

(i) Money-weighted rate of return (MWRR). (3 marks)

(ii) Time-weighted rate of return (TWRR). (3 marks)

(iii) Advise on the most appropriate performance measure between the MWRR in (d) (i) above and TWRR in (d) (ii) above given that the donation is unrelated to the manager's market view. (2 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) William and his wife Kazoo recently inherited Sh.6,000,000 from their father and have approached Gerland Kisaka, a portfolio investment specialist for investment advice. Both William and Kazoo are 30 years old. William is employed in a steel manufacturing company earning a monthly salary of Sh.80,000 whereas Kazoo is a nurse earning a monthly salary of Sh.36,000. Their four children are aged 6, 5, 4 and 3 years. They currently have no other investments but have credit card with a debt of Sh.300,000.

During their interview with Gerland Kisaka, William made the following statements:

- I love being on top of the latest trends in investing.
- My friend Kahunyo told me that the really smart investors holds shares for no more than a month. After that if you haven't made a profit, you probably won't.
- Can you believe that my mother still have the same portfolio she had a year ago? How boring.
- Technology shares are hot, everyone is buying them.

**Required:**

(i) Giving reasons, determine the couple's ability and willingness to take on risk. (3 marks)

(ii) Determine the couple's time horizon constraints. (3 marks)

(iii) Determine the couple's liquidity and legal/regulatory constraints. (2 marks)

(b) Philip Ndavi's Sh.25 million investment portfolio is invested in domestic equities and Treasury bills in the proportion of 65% and 35% respectively. Philip decides to implement a constant mix rebalancing strategy by setting the multiplier equal to a value of 0.5. He also determines that domestic equities are expected to generate a return of 12% in the coming month.

**Required:**

Determine the value of equities to be sold to rebalance the portfolio should Ndavi's forecast concerning domestic equities materialise. (3 marks)

(c) Grace Nyambura's investment portfolio is allocated to equities and bonds in the proportion of 30/70. She is exploring the potential for allocating a further Sh.3 million to the fund of funds (FOF) offered by a local hedge fund. She collects the monthly return on the hedge fund and its benchmark the Hedge Fund Composite Index for the previous year, 2019. She will use the data to forecast future fund performance. She plans to invest in the fund for a period of eight months.

**Monthly return for local hedge fund Fund of funds (2019)**

| Month | Hedge Fund (%) |
|---|---|
| January | 15.7 |
| February | 18.8 |
| March | –5.7 |
| April | 12.7 |
| May | 2.7 |
| June | 9.8 |
| July | 15.0 |
| August | –14.0 |
| September | –2.0 |
| October | 14.3 |
| November | 18.7 |
| December | 22.1 |

Further, Grace evaluates whether the investment will improve the portfolio's annualised risk-adjusted performance. She compiles expected performance on the portfolio and hedge fund for the current year 2020.

**Current performance of portfolio and Hedge Fund Investment (2020)**

| | Existing Portfolio* | FoFs Investment |
|---|---|---|
| Annualised return (%) | 9.7 | 14.8 |
| Annualised risk free rate (%) | 2.2 | 2.2 |
| Annualised standard deviation (%) | 15.0 | 28.9 |

Correlation between portfolio's return and hedge fund investment return is – 0.5

* Performance before the inclusion of the FoFs investment

**Required:**

(i) The value of Grace's investment at the end of her investment horizon using the eight month average rolling return. (6 marks)

(ii) Justify whether Grace should allocate Sh.3 million to the FoF. (3 marks)

**(Total: 20 marks)**

**QUESTION THREE**

Ken's family charitable foundation (KFCF) plans to fund projects in perpetuity that will provide clean water in the country. The current portfolio is worth Sh.250 million and is invested equally in equities and fixed income. The portfolio's equity holding are in a fund tracking a broad index of stocks and the fixed income are in a fund tracking on all maturity index of government bonds. The portfolio of the foundation is rebalanced every six months. An analyst is hired to advise on KFCF's asset allocation and investments.



The foundation seeks to achieve the following objectives:

1. Spend at least 3% of the fund's beginning value on projects each year in order to satisfy a legal requirement.
2. As part of this annual distribution, spend at least Sh.5 million (inflation adjusted each year on projects in its county).
3. Minimise the likelihood of a decline in the portfolio's value of more than 10% in any single year.

The analyst recommends that KFCF establish an investment policy statement (IPS) and globally diversify its portfolio. The analyst discusses the asset only (AO) and asset liability management (ALM) approaches to setting KFCF's policy asset allocation.

To better diversify the policy asset allocation, the analyst specifically recommends that the foundation consider adding the following four asset classes:

- Non domestic developed equities.
- Emerging market equities.
- Broad domestic fixed income including government and credit.
- Alternative investments, including real estate, commodities and private equity.

The analyst evaluates whether adding an additional asset class to KFCF's portfolio will improve its risk-return characteristics.

**Additional information:**

1. The inflations rate is 0.5%.
2. The risk free rate is 1%.
3. The correlation between current portfolio and emerging market equities is 0.79.
4. Long-term capital market expectations:

| | Return (%) | Standard deviation (%) |
|---|---|---|
| Current KFCF portfolio | 4.5 | 6.5 |
| Emerging market equities | 7.5 | 13.5 |

5. The analyst also evaluates available methods for determining the target asset class weights in the IPS. The analyst decides to use a Monte Carlo simulation rather than a single period mean variance optimisation (MVO) to establish these target weights. The KFCF has an above average risk tolerance.

**Required:**

(a) Discuss why each of the following approaches could be appropriate in setting KFCF's policy asset allocation:

(i) Asset only (AO) approach. (3 marks)

(ii) Asset liability management (ALM) approach. (2 marks)

(b) Giving three reasons, explain why the set of six asset classes (current portfolio plus the analyst's recommendation) for the KFCF policy asset allocation are not appropriately specified. (6 marks)

(c) Determine, based on mean-variance analysis, whether emerging market equities should be added to the current KFCF portfolio. (5 marks)

(d) Support with two reasons, the analyst's choice of Monte Carlo simulation rather than mean variance optimisation (MVO), to determine KFCF's target asset class weights. (4 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Elucidate three factors that should be considered while selecting a fixed-income manager in portfolio management. (6 marks)

(b) Distinguish between "macro attribution" and "micro attribution" as used in evaluating portfolio performance. (4 marks)

(c) Omogi Ltd. has presented the following data relating to its portfolio account and the benchmark portfolio for the year 2019:

| | Omogi Ltd. account | Benchmark portfolio | Market index |
|---|---|---|---|
| Return (%) | 2.0 | 2.1 | 2.5 |
| Beta (β) | 0.8 | 0.8 | 1.0 |
| Standard deviation (%) | 1.1 | 1.3 | 1.4 |
| One year Treasury Bill rate (%) | 0.2 | 0.2 | 0.2 |

**Required:**

Calculate the following performance measures for Omogi Ltd.'s portfolio and the benchmark portfolio:

(i) Sharpe ratio. (2 marks)

(ii) Treynor's measure. (2 marks)

(iii) Explain the results obtained in (c) (i) and (c) (ii) above. (2 marks)

(d) A manager has collected the following data on a bullet (no embedded options), a callable and putable bond of the same issuer:

| Bond | A | B | C |
|---|---|---|---|
| G-Spread (basis points) | 425 | 423 | 426 |
| 1-Spread (basis points) | 429 | 426 | 429 |
| Z-Spread (basis points) | 435 | 434 | 434 |
| Option adjusted spread OAS (basis points) | 351 | 503 | 434 |
| Price | 95.00 | 97.00 | 99.00 |
| Accrued interest per 100 par | 0.60 | 1.10 | 0.75 |

The bonds are similar in all other regards.

The manager purchases Sh.3 million and Sh.2 million par of bond A and bond C respectively.

**Required:**

Calculate the most relevant measure of portfolio spread. (4 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Highlight four sources of excess return for an international bond portfolio. (4 marks)

(b) A fixed income consultant reviews the bonds held by an insurance company. He wants to rebalance the portfolio's money duration to Sh.240,000 while maintaining the existing security weights.

| Security | Price (Sh.) | Market value in (Sh.) | Duration |
|---|---|---|---|
| Government bond | 96.42 | 771,360 | 11.2 |
| Company K corporate bond | 95.00 | 855,000 | 9.4 |
| Company L corporate bond | 104.00 | 728,000 | 9.1 |
| **Total** | - | 2,354,360 | - |

**Required:**

Calculate the amount (in shillings) of cash required to rebalance the portfolio's money duration. (6 marks)

(c) With respect to currency portfolio management, explain four active currency trading strategies. (4 marks)

(d) Davis Chirchir is currently based in the United States (US) and oversees the global equity fund offered by Triple A Ltd., a portfolio management firm. The fund holds global (Canadian, Mexican and British) and domestic US equities. Foreign currency exposures are currently unhedged.

The table below shows the value of the fund assets, spot exchange rates and correlations between movements in foreign currency asset returns and foreign currency returns:

**Fund asset values, spot rates and correlations**

| | Year | |
|---|---|---|
| | **2018** | **2019** |
| CAD-denominated asset value (in CAD millions) | 100 | 150 |
| MXN-denominated asset value (in MXN millions) | 80 | 70 |
| GBP-denominated asset value (in GBP millions) | 230 | 300 |
| USD-denominated asset value (in USD millions) | 500 | 450 |
| CAD/USD spot rate | 0.7900 | 0.8100 |
| USD/MXN spot rate | 15.2420 | 15.0050 |
| GBP/USD spot rate | 1.4754 | 1.5000 |

**Correlation between the currencies:**

- (RCAD, RCAD/USD) +0.7
- (RMXN, RMXN/USD) – 0.3
- (RGBP, RGBP/USD) +0.2



Naomi has her portfolio held in the fund and her allocation to CAD, MXN, GBP and USD denominated equities is 30%, 40%, 25% and 5% respectively. Naomi is yet to establish the degree to which currency risk exposures should be hedged.

Where: CAD → Canadian Dollars
MXN → Mexican Pesso
GBP → Great Britain Pound
USD → United States Dollar

**Required:**

(i) Calculate the domestic currency return on Naomi portfolio. (3 marks)

(ii) Describe three potential considerations which Naomi will need to account for when determining the degree of currency risk exposure to undertake.

Your answer should focus on the information provided above.

(3 marks)
**(Total: 20 marks)**

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**CIFA PART III SECTION 6**

**ADVANCED PORTFOLIO MANAGEMENT**

**WEDNESDAY: 27 November 2019.** **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) Uchaguzi Foundation has endowed Uwazi Limited Fund for monitoring electoral integrity, supervise elections and political campaigns in a country implementing a new constitution and undergoing a political transition.

The Fund is headquartered in your country and it has received an initial grant of Sh.200 million with an additional Sh.400 million expected to be received over the next three years. The Fund's charter expressly decrees that the Fund should spend itself out of existence within 10 years of its founding rather than trying to become a permanent institution.

**Required:**

(i) Recommend an appropriate risk objective and return objective for the Fund. (4 marks)

(ii) Analyse five investment constraints for the Fund. (5 marks)

(b) (i) With an aid of a well labelled diagram, explain the term "corner portfolio" as used in portfolio construction. (2 marks)

(ii) Identify three characteristics of an efficient portfolio in the context of strategic asset allocation. (3 marks)

(c) Samuel Kimanzi and his wife Ruth, both aged 54 years are Kenyan residents. The couple is planning to retire next year at age 55. They have approached Cabel Mutua, an investment advisor, to help them analyse their investment strategy and retirement choices.

Once the couple retires, Ruth will receive annual payments from her company's defined contribution (DC) pension plan and both of them will receive payments from the National Social Security Fund (NSSF). Samuel Kimanzi does not participate in any company or individual retirement plan.

The investment advisor has compiled financial data and market expectations for the couple's retirement as shown below:

**Financial Data and Market Expectations**

| | | |
|---|---|---|
| Expected annual expenses | | Sh.1,000,000 |
| Annual pension income from Ruth's DC pension plan | Sh.320,000 | |
| Combined NSSF receipts | Sh.320,000 | |
| Total annual pension income | Sh.640,000 | |
| Expected annual inflation | 5.0% | |

Currently, Cabel Mutua estimates that the couple's investment portfolio will grow to Sh.10 million by the retirement date next year. The investment advisor recommends that they plan to pay off their mortgage by withdrawing Sh.1.5 million from their portfolio upon retirement.

**Required:**

Geometric nominal return to be included in the couple's investment policy statement (IPS). (6 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Explain the following terms as used in fixed income portfolio management:

(i) Ladder portfolio. (1 mark)

(ii) Barbell portfolio. (1 mark)

(iii) Bullet portfolio. (1 mark)

(iv) Contingent immunisation. (1 mark)

(b) Examine three conditions that must be satisfied to immunise a portfolio. (6 marks)

(c) A client has asked you as his investment manager to match the absolute price sensitivity of its government bond portfolio to the absolute price sensitivity of its liability benchmark.

Due to the nature of the liabilities, the duration of the liability benchmark remains constant.

At the beginning of the current financial year, the bond portfolio absolute price sensitivity was equal to the absolute price sensitivity of the liability benchmark. At the end of the financial year, the manager is required to balance the portfolio so that the absolute price sensitivity of the assets again matches the absolute price sensitivity of the liability benchmark, while keeping the portfolio proportions of each bond unchanged.

The data required for rebalancing is provided below:

**Government bond portfolio**

| | Beginning of Year | | End of Year | |
|---|---|---|---|---|
| | **Price** | **Duration** | **Price** | **Duration** |
| **Bond 1** | 94.50 | 4.9 | 94.00 | 4.3 |
| **Bond 2** | 90.00 | 7.0 | 93.00 | 6.3 |
| **Bond 3** | 103.50 | 5.5 | 102.00 | 5.0 |



**Note:** Each bond has a total par value of Sh.100,000
Bond prices are shown as a percentage of par.

**Required:**
The amount of cash required for rebalancing the government bond portfolio. (7 marks)

(d) Catherine Messo is a portfolio manager with Zedmac Investments Limited, a regional Fund managers. She is considering investments in alternative assets and decides to buy one August 5,000 bushel corn futures contract at Sh.250 per bushel.

The initial margin deposit is Sh.100,000 and the maintenance margin is Sh.75,000. At the end of the following day, the spot price of corn is Sh.245 and the price of August corn has fallen to Sh.240 per bushel.

**Required:**
The deposit required to bring the account back to the required level. (3 marks)
**(Total: 20 marks)**

**QUESTION THREE**

(a) Propose two approaches that could be used by a portfolio manager in constructing a passive equity portfolio. (4 marks)

(b) Describe four limitations of the mean-variance optimisation (MVO) technique used in asset allocation. (4 marks)

(c) Kabaka Musa has approached his investment adviser for help to determine an appropriate asset allocation. During conversations with Kabaka, the advisor finds that his risk-tolerance is average ($\lambda = 4$) and that he would also like to minimise the chance of earning less than 3%.

The following asset allocations are available:

| Allocation | Expected return (ER) | Variance ($\sigma^2$) |
|---|---|---|
| 1 | 8% | 0.0225 |
| 2 | 6% | 0.0144 |
| 3 | 4% | 0.0025 |

**Required:**
Advise Kabaka on the appropriate asset allocation. (5 marks)

(d) A client uses three long only portfolio managers for its equity investments. Details of those investments including expected performance relative to client's equity benchmark are provided below:

| Clients equity portfolio managers | Investment size (Sh.millions) | Expected alpha | Expected tracking error |
|---|---|---|---|
| Manager D | 100 | 0% | 0% |
| Manager E | 20 | 1.5% | 2.5% |
| Manager F | 10 | 2.0% | 4.0% |

**Required:**
(i) Describe the approach used in constructing the portfolio for the client. (2 marks)

(ii) The expected alpha for the portfolio. (2 marks)

(iii) The expected tracking error for the portfolio. (3 marks)
**(Total: 20 marks)**

**QUESTION FOUR**
(a) Evaluate five key determinants of the optimal corridor width of an asset class in a percentage of portfolio rebalancing program. (5 marks)

(b) Assess four types of benchmarks which could be used in performance evaluation of a portfolio. (4 marks)

(c) (i) Highlight three benefits of performance attribution analysis in portfolio management. (3 marks)

(ii) The following information relates to John Meja, a portfolio manager responsible for managing Sh.100 million equity portfolios:

| Sector | Portfolio's actual weight in sector at beginning of the period (%) | Benchmark weight in sector at beginning of the period (%) | Sector return (%) |
|---|---|---|---|
| Financials | 35.00 | 30.00 | 6.50 |
| Agriculture | 20.00 | 30.00 | 3.20 |
| Industrial | 45.00 | 40.00 | 8.98 |

**Additional information:**
1. The Portfolio manager invests at the local Securities Exchange and is currently using the equity index as the benchmark.
2. The equity index return is 6.5%.

**Required:**
Sector selection attribute for the portfolio. (5 marks)

(d) A Euro-based investor has a 75% position in a Great Britain Pound (GBP) denominated assets and a 25% position in United States Dollar (USD) denominated assets. The results for the past one year are as follows:

| | |
|---|---|
| Return for the GBP assets | 12% |
| Return for the USD assets | 5% |
| Beginning EUR/GBP exchange rate | 1.1666 |
| Ending EUR/GBP exchange rate | 1.1437 |
| Beginning USD/EUR exchange rate | 1.332 |
| Ending USD/EUR exchange rate | 1.324 |

**Required:**
Calculate the investor's return over the period in domestic (EUR) currency terms. (3 marks)
**(Total: 20 marks)**

**QUESTION FIVE**

(a) Distinguish between "top down approach" and "bottom up approach" in relation to global credit bond portfolio management. (2 marks)

(b) An investor has a Sh.10 million portfolio of bonds in a long position. Suppose the confidence interval is 95% and that the actual daily standard deviation of the portfolio over one trading year is 3.67%. The investor prefers to use risk metrics approach to calculate value at risk (VaR).

**Note:** Risk metrics uses 1.645 as the Z-score for 95% confidence level.

**Required:**

(i) The value at risk (VaR) of the portfolio. (2 marks)

(ii) The value at risk (VaR) for a 1-month horizon (30 days). (2 marks)

(c) Nancy Nderitu, an investor at the Securities Exchange has realised that the bid-ask prices for Orion Group Limited's shares are Sh.11.25 and Sh.11.30 respectively. A commission of Sh.2,500 is charged on purchase or sale of shares.

**Required:**

The transaction cost assuming that Nancy decides to purchase 10,000 shares and sell them immediately. (2 marks)

(d) Frankline Wafula is considering to purchase 10,000 additional shares of Safariland Limited. He is not certain whether to use a market order or a limit order. The current limit order for the company's shares at the Securities Exchange is provided below:

| Bid | | | Ask | | |
|---|---|---|---|---|---|
| **Price Sh.** | **Size** | **Time** | **Price Sh.** | **Size** | **Time** |
| 27.96 | 100 | 11 a.m. | 28.10 | 500 | 11 a.m. |
| 27.95 | 500 | 11 a.m. | 28.12 | 300 | 11 a.m. |
| 27.91 | 1,000 | 11 a.m. | 28.13 | 1,500 | 11 a.m. |
| 27.90 | 5,000 | 11 a.m. | 28.16 | 3,000 | 11 a.m. |
| 27.89 | 2,600 | 11 a.m. | 28.18 | 5,000 | 11 a.m. |
| 27.87 | 3,000 | 11 a.m. | 28.25 | 4,500 | 11 a.m. |
| 27.86 | 400 | 11 a.m. | 28.27 | 4,700 | 11 a.m. |



**Required:**

(i) The average price per share assuming that Frankline entered a market order to purchase 10,000 shares of the company. (3 marks)

(ii) The number of shares and average price per share assuming that Frankline entered a limit order of Sh.28.15. (3 marks)

(e) Both direct and indirect investors in private equity need to understand the basics of direct private equity investment in order to have a grasp of its return and risk characteristics.

In light of the above statement, suggest three issues that must be addressed by a portfolio manager in formulating a strategy for private equity investments. (6 marks)

**(Total: 20 marks)**

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**CIFA PART III SECTION 6**

**ADVANCED PORTFOLIO MANAGEMENT**

**THURSDAY: 23 May 2019.** **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) Explain the term "sector rotation" as used in portfolio asset allocation. (2 marks)

(b) Explain the following terms as used in portfolio performance evaluation:

(i) Performance attribution. (1 mark)

(ii) Allocation effect. (1 mark)

(iii) Selection effect. (1 mark)

(iv) Interaction effect. (1 mark)

(c) Discuss three reasons why an indexed bond portfolio is more expensive than an indexed equity portfolio. (6 marks)

(d) A portfolio manager of Zuhura Investments Group, manages a Sh.280 million investment portfolio. Zuhura's investment committee has recently become risk averse in anticipation of a major announcement regarding monetary policy to be issued by the Central Bank. To reflect this view, the portfolio manager, wishes to temporarily make the following changes in the portfolio:

1. Decrease the equity portfolio allocation and decrease its equity beta.
2. Increase the bond portfolio allocation and decrease its modified duration.

The portfolio manager plans to use the following futures contract to achieve the over mentioned portfolio targets.

**Equity futures**
Currently priced at Sh.129,000 per contract (after accounting for the multiplier) with an equity beta of 0.97.

**Bond futures**
Currently priced at Sh.103,000 per contract, with a modified duration of 7.70 and a yield beta of 1.00.

The portfolio's current and target characteristics are as shown below:

**Investment portfolio characteristics**

**Current portfolio**

| Asset class | Modified duration | Equity beta | Allocation Sh."million" |
|---|---|---|---|
| Equities | - | 1.08 | 182 |
| Bonds | 7.2 | - | 98 |

**Target portfolio**

| Asset class | Modified duration | Equity beta | Allocation Sh."million" |
|---|---|---|---|
| Equities | - | 0.90 | 154 |
| Bonds | 6.0 | - | 126 |

**Required:**
Determine the action (buy or sell) and the number of futures contract required to achieve the following:

(i) Equity targets. (4 marks)

(ii) Bond targets. (4 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) James Kivuva, a recent graduate of the Certified Investment and Financial Analyst examinations, has been employed at his county's social provident fund as an assistant portfolio manager responsible for monitoring the fund portfolio.

**Required:**
In light of the above statement, discuss three areas that James Kivuva should cover in his portfolio monitoring assignment. (6 marks)

(b) Evaluate three risks that are associated with active investment management of equity portfolio. (6 marks)

(c) A United States (U.S) portfolio manager holds a portfolio of Spain equities currently worth 10 million Euros (€). He is concerned that austerity measures being put in place by the newly elected government will lead to a potential depreciation of the Euro. The portfolio manager decides to hedge by selling September futures contract on the Euro that currently trade at $1/€ and expire in two months.

The spot exchange rate is $1/€. A month later, the value of the Spain portfolio is worth €10,050,000 and the spot exchange rate is $1.05€ while the futures exchange rate is $0.95/€.

**Required:**
The return on the hedged portfolio in dollar terms. (4 marks)

(d) An investor has approached you for advice on where to invest his savings. He is considering to invest in a collective investment scheme (CIS). The following information relates to three mutual funds and their required rates of returns for the last three years:

| **Period** | **Annual returns (%)** | | |
|---|---|---|---|
| | **Mutual fund** | | |
| **Year** | **A** | **B** | **C** |
| 1 | 2 | 5 | –8.3 |
| 2 | 9.5 | 8.2 | 7.5 |
| 3 | –4.7 | –6.4 | 7.6 |

**Required:**

(i) The annualised rate of return of the three mutual funds for the period under review. (3 marks)

(ii) Advise the investor based on your results in (d) (i) above. (1 mark)

**(Total: 20 marks)**



**QUESTION THREE**

(a) Kopa Fund generated a return of 11.2% over the past 12 months, while the benchmark portfolio return was 11.8% for the same period. The following information is provided:

| | **Factor sensitivity (betas)** | | **Factor** |
|---|---|---|---|
| **Factor** | **Portfolio** | **Benchmark** | **Risk premium (λ)** |
| Price-earnings (P/E) | 1.10 | 1.00 | –5.00% |
| Size | 0.69 | 1.02 | 2.00% |

**Required:**

(i) Attribute the cause of difference in returns using a fundamental factor model with the two factors provided above. (4 marks)

(ii) Describe the manager's apparent skill in factor betas. (2 marks)

(b) Discuss three phases of an individual's investment life cycle. (3 marks)

(c) A portfolio is composed of domestic equity portfolio and international equity portfolio. The expected return for domestic equity portfolio is 11.8% and has a standard deviation of 20.3% while the expected return for international equity portfolio is 9.2% and has a standard deviation of 18.4%. The correlation between domestic equity portfolio and international equity portfolio is 0.66.

**Required:**

(i) Determine the allocation for the global minimum-variance portfolio. (3 marks)

(ii) The standard deviation of the combined portfolio. (3 marks)

(iii) The expected return of the combined portfolio. (1 mark)

(d) A portfolio statistics for the company's liabilities and three proposed portfolios; A, B and C are shown in the following table:

| Statistics | Company liabilities | Proposed portfolios | | |
|---|---|---|---|---|
| | | A | B | C |
| Market value (Sh.) | 457,780,900 | 460,000,000 | 460,000,000 | 460,000,000 |
| Modified duration | 7.52 | 7.51 | 7.53 | 7.37 |
| Convexity | 45.12 | 35.14 | 46.29 | 65.97 |
| Basis point value (BPV) | 344,250 | 343,100 | 345,400 | 339,120 |

**Additional information:**

1. All calculations are annualised and based on aggregate portfolio cash flows.
2. Each portfolio is considered sufficient to pay the liabilities.
3. The company also expects high volatility and potential for very large parallel shift in the yield curve.

**Required:**

(i) Determine with reasons the most appropriate portfolio to immunise the liabilities. (2 marks)

(ii) Assuming that the company's expectations are correct, select with reasons the other portfolio most likely to be considered. (2 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Evan Walibora, aged 35 years , just retired from a successful career as a professional football player. He is meeting with his financial advisor to update his investment policy statement (IPS).

The following information is provided:

1. **Income**
   Evan receives pension from the professional football association during retirement. This annual payment will total Sh.375,000 pre-tax in the coming year. In future years, this amount will be indexed for inflation, which is expected to be 1.25% per annum. The pension is taxed at the rate of 30%.
2. **Expenses**
   Evan living expenses over the previous twelve months were Sh.400,000. He anticipates these expenses will grow at the expected rate of inflation this year and in each future year.
3. **Assets**
   In addition to his pension payments, Evan has an advisor managed investment portfolio currently valued at Sh.5,200,000. Next week, he intends to make a direct equity real estate investment of Sh.450,000 in a sports training facility. The real estate holding will be excluded from his advisor managed investment portfolio.
   Further, in the coming days, he will receive a performance cash bonus of Sh.1,100,000 and it will be immediately invested in his portfolio. This bonus is subject to a tax at a rate of 30%.
4. **Goals**
   Evan expects his portfolio to fund any expenses not covered by his pension, while maintaining its real value over time. He is eager to consider investments in more risky asset classes. He is not concerned about volatility in the value of his portfolio as long as it continues to support his living expenses. He does not intend to seek further employment in retirement.

   The advisor concludes Evan's risk tolerance is above average. It is assumed that pension payments and ongoing expenses are end of year cash flows.

**Required:**

(i) Determine Evan's nominal after tax required rate of return for the coming year. (6 marks)

(ii) Identify two factors that indicate Evan has a high ability to take risk. (2 marks)

(iii) Formulate the time horizon and unique circumstances constraints section of Evan's investment policy statement (IPS). (4 marks)

(b) Hassan Ali, a junior financial analyst has been tasked by the portfolio manager to develop an investment strategy for private equity investment.

In light of the above statement, advise Hassan on three issues that must be addressed when formulating a strategy for private equity investment. (3 marks)

(c) An endowment fund has an annual return objective of 9% which is sufficient to cover its spending rate, expected inflation and cost of earning investment returns. Its risk objective is to minimise risk as measured by standard deviation of returns while meeting its minimum expected return objective. The table below provides the output from a mean-variance optimisation with a budget constraint and a non-negative constraint:

| | Expected return (%) | Standard deviation of returns (%) |
|---|---|---|
| Allocation AA | 15 | 24 |
| Allocation BB | 18 | 27 |
| Allocation CC | 12 | 20 |
| Allocation DD | 10 | 14 |

The risk-free rate is 3%. The fund believes a true risk-free asset exists and could be used to construct a strategic asset allocation (SAA).

**Required:**
The risk of the optimal allocation. (5 marks)
**(Total: 20 marks)**

**QUESTION FIVE**

(a) In the context of portfolio execution decision, analyse four types of traders based on motivation to trade. (4 marks)

(b) An investor executed the following series of trade on 10 May 2019:

| Number of shares | Market price per share (Sh.) |
|---|---|
| 500 | 10.00 |
| 300 | 10.05 |
| 200 | 10.10 |

**Required:**

(i) The average price of the three trades. (1 mark)

(ii) The volume weighted average price (VWAP) of the trade. (2 marks)

(c) Explain three types of costs associated with portfolio rebalancing decision. (3 marks)

(d) The following information was obtained from the records of George Hesabu, a professional investment manager at Inubuka Investment Fund Manager (IIFM):



- Strategic portfolio allocations

| Asset class | Target allocation (%) | Average returns (%) | Portfolio rebalancing costs as a % change in mix Sh."000" |
|---|---|---|---|
| Kenyan Equities | 30 | 15 | 500 |
| Non Kenyan Equities | 20 | 18 | 600 |
| Kenyan Government Bonds | 20 | 11 | 200 |
| Non Kenyan Government Bonds | 20 | 12.5 | 250 |
| Commodities | 10 | 10 | 100 |

- George Hesabu is considering rebalancing the asset mix of his portfolio and the following two cases have been proposed which are all within the rebalancing threshold as per the investment policy document:

| | Rebalanced target (%) | Allocations (%) |
|---|---|---|
| Asset class | Case A | Case B |
| Kenyan Equities | 20 | 35 |
| Non Kenyan Equities | 25 | 30 |
| Kenyan Government bonds | 15 | 10 |
| Non Kenyan Government bonds | 25 | 15 |
| Commodities | 15 | 10 |

**Required:**

(i) Expected average return on the portfolio of the current asset allocation. (2 marks)

(ii) Expected average return on the portfolio after rebalancing for both Case A and Case B. (4 marks)

(iii) Assuming that the investor's objective is to minimise costs and maximise returns. Advise George Hesabu on the rebalancing option that he should consider. (4 marks)
**(Total: 20 marks)**

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**CIFA PART III SECTION 6**

**ADVANCED PORTFOLIO MANAGEMENT**

**THURSDAY: 29 November 2018.** **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) Evaluate three principles underlying tactical asset allocation. (6 marks)

(b) AMN Ltd. is considering freezing its defined benefit plan (DB) and migrating to a defined contribution (DC) plan. The DC plan would be funded by a combination of company and employee contributions, with immediate vesting for all employees.

**Required:**

Assuming AMN Ltd. migrates from DB plan to DC plan:

(i) Propose three advantages that would accrue to AMN Ltd. (3 marks)

(ii) Explain three advantages that would accrue to the employees of AMN Ltd. (3 marks)

(c) An analyst has gathered the following data about a portfolio for the month of September 2018:

| | **Sh. Sh."000"** |
|---|---|
| Fair value, 31 August 2018 | 16,575 |
| Cash contribution, 12 September 2018 | 2,265 |
| Fair value, 12 September 2018* | 19,550 |
| Fair value, 30 September 2018 | 19,250 |

**Note:** * Includes cash contribution of Sh.2,265,000 received and available for investment on 12 September 2018.

**Required:**

(i) The approximate time weighted rate of return for the month of September 2018 using the modified Dietz formula. (3 marks)

(ii) The true time weighted rate of return for the month of September 2018. (3 marks)

(d) Latena Ltd. manages a broadly diversified portfolio of global investment grade and high yield corporate bonds for its client. Latena Ltd.'s fixed income research team consists of a portfolio manager and three credit analysts who review and manage the portfolio. The portfolio manager uses a top-down approach while the credit analysts use a bottom-up methodology.

**Required:**

Contrast the approach used by the portfolio manager and the approach used by the credit analysts. (2 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Assess four factors that could explain the sources of abnormal return in the performance evaluation of international portfolio managers. (4 marks)

(b) Benson Mogaka is a member of the investment committee of a local foundation with Sh.950 million in assets that supports medical research relating to malaria.

For the annual asset allocation review, Mogaka has prepared the following set of capital market expectations:

| Asset class | Expected return (%) | Standard deviation (%) | Correlation 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| Domestic equities | 8.6 | 20 | 1.00 | | | |
| Non domestic equities | 6.7 | 15 | 0.65 | 1.00 | | |
| Domestic bonds | 4.1 | 10 | 0.34 | 0.25 | 1.00 | |
| Real estate | 5.0 | 12 | 0.50 | 0.35 | 0.17 | 1.00 |

Based on these capital market expectations, Mogaka has developed the following analysis:

**Corner portfolios**

| Portfolio | Expected return (%) | Standard deviation (%) | Sharpe ratio | Asset class (Portfolio weight) 1 (%) | 2 (%) | 3 (%) | 4 (%) |
|---|---|---|---|---|---|---|---|
| 1 | 8.60 | 20.00 | 0.330 | 100.00 | 0.00 | 0.0 | 0.0 |
| 2 | 7.91 | 16.78 | 0.352 | 63.53 | 36.47 | 0.0 | 0.0 |
| 3 | 7.55 | 15.48 | 0.358 | 53.22 | 37.23 | 0.0 | 9.55 |
| 4 | 5.03 | 8.42 | 0.360 | 0.00 | 24.70 | 43.30 | 32.00 |
| 5 | 4.69 | 8.15 | 0.329 | 0.00 | 10.90 | 55.56 | 33.54 |

**Additional information:**

1. The local foundation's spending rate is 3.5%.
2. The expected long term inflation rate is 2.25%.
3. The cost of earnings investment returns has averaged 43.6 basis points annually.
4. The risk-free rate is 2.0%.

**Required:**

(i) Describe how corner portfolios arise. (2 marks)

(ii) Compute the local foundation's return requirement. (2 marks)

(iii) Recommend the strategic asset allocation that Mogaka should present for approval at the asset allocation review meeting. (6 marks)



(c) A summary of a portfolio manager's performance when compared to a benchmark is provided below:

| Country | Benchmark weight | Return on equity index (%) | Currency appreciation (%) | Manager's weight | Manager's return (%) |
|---|---|---|---|---|---|
| A | 0.30 | 10 | 10 | 0.35 | 8 |
| B | 0.10 | 5 | −10 | 0.10 | 7 |
| C | 0.60 | 15 | 30 | 0.55 | 18 |

**Required:**

Determine the contribution of the following selections to overall performance:

(i) Currency selection. (2 marks)

(ii) Country selection. (2 marks)

(iii) Stock selection. (2 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Analyse four changes in investors circumstances that could necessitate the need for portfolio revision by the fund manager. (4 marks)

(b) An investor is holding a portfolio in the following classes of assets: Equities, Bonds, Cash, Property and Commodities. Upon reading his investment policy document you find the following information:

| Asset | Allocation policy (%) Minimum | Maximum |
|---|---|---|
| Equities | 20 | 40 |
| Bonds | 10 | 30 |
| Cash | 10 | 20 |
| Property | 5 | 25 |
| Commodities | 5 | 25 |

The average yield on the asset investments is also provided below:

| Asset | Average yield (%) |
|---|---|
| Equities | 15 |
| Bonds | 8 |
| Cash | 5 |
| Property | 20 |
| Commodities | 10 |

Currently, the investor has allocated his capital in the following proportions: 35% in Equities, 25% in Bonds, 10% in cash, 25% in property and 5% in commodities. The investor is however not sure whether this allocation provides the optimal return on his portfolio and has sought your advice on whether or not he should consider revising his allocation. He has provided you with the following suggested asset allocation from different investment analysts:

| Investment Analyst | Asset Allocation Advice (%) | | | | |
|---|---|---|---|---|---|
| | Equities | Bonds | Cash | Property | Commodities |
| A | 40 | 10 | 15 | 25 | 10 |
| B | 38 | 20 | 12 | 20 | 10 |
| C | 30 | 25 | 10 | 25 | 10 |

**Required:**

(i) Expected return on the portfolio based on the current investment policy. (3 marks)

(ii) Evaluate the three pieces of investment advice provided to the investor and advise him whether to change the current asset allocation. (6 marks)

(c) The following performance attribution analysis is provided for three portfolio managers:

| | Manager A (%) | | Manager B (%) | | Manager C (%) | |
|---|---|---|---|---|---|---|
| Actual return | 19.1 | | 17.0 | | 12.6 | |
| Benchmark portfolio | 14.9 | | 15.2 | | 12.6 | |
| Active management return | ? | (99) | (?) | (53) | ? | (3) |
| **Component of returns:** | | | | | | |
| Market timing | –0.2 | (40) | –0.6 | (64) | –0.5 | (73) |
| Industry exposure | 0.2 | (20) | –2.0 | (89) | 0.3 | (34) |
| Sector emphasis | 2.2 | (99) | 3.9 | (99) | 0.3 | (51) |
| Security selection | 1.9 | (84) | 0.6 | (43) | 0.1 | (7) |
| Unreconciled return | 0.1 | | –0.1 | | –0.2 | |

**Note:** The values in bracket denotes the confidence level.

**Required:**

(i) Calculate the active management returns for each portfolio manager. (3 marks)

(ii) Comment on the performance of each of the portfolio managers. (3 marks)

(iii) With specific reference to Manager A, is the performance attributable to skill or luck? Explain. (1 mark)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Describe three criteria that could be used by an investor while selecting a fixed income manager. (3 marks)

(b) Examine three active currency management strategies in the context of currency portfolio management. (6 marks)

(c) An investment manager manages a Sh.500 million corporate bond portfolio with a weighted average duration of 5 years. Over the course of the year, the investment manager turns over the portfolio 80% and pays an average bid-ask spread of 3 basis points.

**Required:**

Calculate the portfolio trading costs. (2 marks)

(d) The following information is provided about three portfolios and the market portfolio:

| Portfolio | Expected return (%) | Standard deviation (%) | Beta factor |
|---|---|---|---|
| A | 13 | 13 | 0.90 |
| B | 17 | 22 | 1.05 |
| C | 16 | 23 | 1.20 |
| Market | 14 | 20 | – |

The risk-free rate is 8%.

**Required:**
Evaluate the performance of the above portfolios using the following performance measures:

(i) Jensen's measure. (3 marks)

(ii) Treynor's measure. (2 marks)

(iii) Sharpe's ratio. (2 marks)

(iv) Information ratio. (2 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Examine two approaches that a portfolio manager could employ to hedge currency risk in an international bond investment. (4 marks)

(b) A hedge fund consultant is approached by a hedge fund which is concerned with developing techniques to reduce negative skewness in a hedge fund investment return.

**Required:**
Analyse two techniques that could be used to reduce negative skewness in a hedge fund investment return. (4 marks)

(c) Outline three important characteristics of bond immunisation. (3 marks)

(d) A fund manager responsible for overseeing a Sh. 2 billion portfolio of government bonds expects the portfolio will earn a return of 8% over the next year. However, his client requires a one-year return of 10%. The manager believes he can enhance returns by leveraging the portfolio. He plans to borrow at an interest rate of 5% per annum and invest the proceeds in government bonds identical to those held in the portfolio. The duration of the bond portfolio is 10 and the duration of the borrowed funds is 1.

**Required:**
(i) The amount the manager needs to borrow to increase the one year return from 8% to 10%. (3 marks)

(ii) The duration of the leveraged portfolio. (3 marks)

(e) Hillary Langat, a stockbroker at Faida Stock brokerage services has the following quotation in his order management system:

| Stock ticker | Trade size | Average Daily volume | Price (Sh.) | Speed (%) | Urgency |
|---|---|---|---|---|---|
| A | 20,000 | 250,000 | 24.67 | 0.06 | Low |
| B | 50,000 | 125,000 | 12.18 | 0.45 | Low |
| C | 150,000 | 2,500,000 | 37.88 | 0.05 | High |

**Required:**
Discuss the appropriate trading strategy that should be used to place each order. (3 marks)

**(Total: 20 marks)**

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**CIFA PART III SECTION 6**

**ADVANCED PORTFOLIO MANAGEMENT**

**THURSDAY: 24 May 2018.** **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) Argue four cases against the use of volume-weighted average price (VWAP) when evaluating trade executions. (4 marks)

(b) The following information relates to trade executions of MIC Ltd. shares at Mesdaq Stock Exchange (MSE):

1. On Wednesday, 9 May 2018, MIC Ltd.'s shares closed at a market price per share (MPS) of Sh.50.00.
2. On Thursday, 10 May 2018 before the market opens, a trader places a limit order for 1,000 MIC Ltd. shares at Sh.49.95. The order expires unfilled. The company's shares close at a MPS of Sh.50.05.
3. On Friday, 11 May 2018, the order is revised to a limit of Sh.50.07. The order is partially filled that day as 700 shares are bought at Sh.50.07. The commission is Sh.23.00. The company shares close at Sh.50.09 and the order is cancelled.

**Required:**
The total implementation shortfall (IS). (8 marks)

(c) The board of trustees of the Western Koru Ltd. pension plan is considering adding direct real estate investments to its diversified, Sh.500 million pension fund portfolio. This would be accomplished by acquiring commercial office buildings, shopping centres, industrial warehouses and residential properties. A consultant advised the board as follows:

"Our mean-variance computer model uses statistical data to optimise all asset classes. Based on that model, I recommend an optimal portfolio for Western Koru Ltd. consisting of 40% allocation of the portfolio to direct real estate investments given the risk and return objectives set by the board for the fund".

**Required:**
Evaluate the consultant's statement by addressing the return and risk characteristics of the data and the resulting recommendation of the consultant. (4 marks)

(d) Mark Mutisya is an analyst for a fund sponsor in his country. The fund sponsor uses two equity managers (Manager A and Manager B) and each manager invests in developed and emerging markets. He prepares a performance attribution analysis for the total fund. He identifies the fund's sources of return and develops the macro attribution table below:

**Total fund level**
**Macroattribution for 1 January - 31 March 2018**

| Decision making level (investment alternative) | Fund value Sh. "000" | Incremental return Contribution (%) | Incremental value contribution/withdrawal Sh. "000" |
|---|---|---|---|
| Beginning value | 360,000 | - | - |
| Risk-free asset | 361,800 | 0.50 | 1,800 |
| Asset category | 388,872 | 7.52 | 27,072 |
| Benchmarks | 389,376 | 0.14 | 504 |
| Investment managers | 389,664 | 0.08 | 288 |
| Allocation effects | 389,304 | -0.10 | (360) |
| Total fund | 389,304 | 8.14 | 29,304 |

**Required:**

(i) Determine whether the total fund outperformed the pure indexing strategy. (2 marks)

(ii) Determine how much of the fund's return was due to style bias and active management. (2 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Jackson Maina is a portfolio manager managing a Sh.200 million portfolio for a client. His proprietary research has led him to believe that the share price of Athi Ltd. will increase substantially. Athi Ltd. is currently trading at Sh.9.75 per share. He wants to purchase 1,000,000 shares of Athi Ltd. for the client's portfolio as quickly as possible with minimal effect on the share price. Average daily trading volume in Athi Ltd. over the previous 10 days was 1,500,000 shares. Jackson decides to use "advertise-to-draw-liquidity" techniques for this trade execution.

Jackson also buys 3,000 shares of TwoStream Homes (TSH) Ltd. for the client's portfolio. TSH Ltd. trades on a quote driven dealer market and has an average daily trading volume of 25,000,000 shares. His order is executed in two trades as shown below. He analyses the trading costs of the entire transaction.

**TSH Ltd. trade data**

| | Bid price (Sh.) | Bid quantity (shares) | Ask price (Sh.) | Ask quantity (shares) | Trade price (Sh.) | Trade quantity (shares) |
|---|---|---|---|---|---|---|
| First trade | 21.07 | 3000 | 21.13 | 2500 | 21.13 | 2000 |
| Second trade | 21.05 | 3000 | 21.11 | 2500 | 21.09 | 1000 |

Six months later, Jackson discusses three potential rebalancing strategies with his client: buy and hold, constant mix and constant-proportion portfolio insurance (CPPI). To manage risk, Jackson rebalances the client's portfolio by adjusting the allocation between equities and money market instruments. The client is willing to invest a greater proportion of his wealth in risky assets as his portfolio value increases. Jackson believes the recent bull market has ended and the market will be flat but oscillating. His objective is to choose the rebalancing strategy with the highest expected return that is also consistent with the client's risk tolerance.

**Required:**

(i) Explain two disadvantages of Jackson's proposed technique for the Athi Ltd. trade execution. (2 marks)

(ii) Calculate the share-volume-weighted effective spread for the TSH Ltd. transaction. (3 marks)

(iii) Determine, given Jackson's objective, the most appropriate rebalancing strategy. (1 mark)

(iv) Explain why the two strategies not selected are less appropriate. (2 marks)



(b) Annitta Mwilu is an investment advisor for institutional clients. She advises the Welcare Endowment Fund (WEF) and is tasked to recommend an optimal asset allocation. The objective of the WEF is to achieve a nominal return of 8.0% per annum with the lowest possible level of risk. The WEF board of directors' risk management policies include a maximum standard deviation of 14.0% and prohibit the use of leverage. The table below provides the results of a mean-variance optimisation (MVO) based on an annual inflation rate of 1.5% and a risk-free rate of 0.5%.

**WEF corner portfolios**

| Corner portfolio | Expected return (%) | Expected standard deviation (%) | Expected Sharpe ratio | Asset class weights (%) | | | |
|---|---|---|---|---|---|---|---|
| | | | | Domestic equity | International equity | Corporate bonds | Government bonds |
| 1 | 9.00 | 18.0 | 0.47 | 100 | 0 | 0 | 0 |
| 2 | 8.90 | 16.2 | 0.52 | 90 | 10 | 0 | 0 |
| 3 | 8.60 | 13.8 | 0.59 | 75 | 20 | 5 | 0 |
| 4 | 7.65 | 11.2 | 0.64 | 60 | 15 | 15 | 10 |
| 5 | 7.00 | 10.5 | 0.62 | 50 | 10 | 25 | 15 |

Annitta advises the board to allow the use of leverage. She proposes a strategic asset allocation that combines the corner portfolio closest to the tangency portfolio in the above table with a risk-free borrowing rate. WEF's annual nominal return objective remains at 8.0%.

**Required:**

(i) Recommend two corner portfolios that Annitta Mwilu should use for the optimal asset allocation to achieve WEF's fund return requirement. (2 marks)

(ii) Determine the weights for each of the two corner portfolios recommended in (b) (i) above. (3 marks)

(iii) Calculate the optimal level of leverage necessary to achieve WEF's return objective. (4 marks)

(iv) Determine whether the unleveraged or leveraged strategic asset allocation offers lower expected volatility to achieve WEF's return objective. (3 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Outline two advantages and two disadvantages of using each of the following benchmarks when evaluating portfolio performance:

(i) Custom security-based benchmarks. (4 marks)

(ii) Factor-model-based benchmarks. (4 marks)

(b) Sospeter Onyango, a portfolio manager with Stanbix Asset Managers (SAM) was provided with the data in the table below to appraise the performance of four asset management firms:

| | Performance appraisal data | | | | |
|---|---|---|---|---|---|
| | **Fund W** | **Fund X** | **Fund Y** | **Fund Z** | **Market index** |
| Return (%) | 6.45 | 8.96 | 9.44 | 5.82 | 7.60 |
| Standard deviation (%) | 2.74 | 4.54 | 3.72 | 2.64 | 2.80 |
| Beta | 0.88 | 1.02 | 1.36 | 0.80 | 1.00 |

The risk-free rate of return for the relevant period was 3%.

**Required:**

Compute the following risk-adjusted performance measures for the four funds:

(i) Jensen's alpha measure. (3 marks)

(ii) Treynor's measure. (3 marks)

(iii) Sharpe ratio. (3 marks)

(iv) $M^2$ measure. (3 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Identify four challenges that you are likely to face when managing emerging markets' currency exposures. (4 marks)

(b) Argue four cases against the use of mean-variance optimisation (MVO) approach to asset allocation. (4 marks)

(c) A global investor has invested Sh.100,000 in a global equity portfolio made up of United States (US), Asian and European stocks. On 31 December 2017, the portfolio consists of 500 shares of IBM listed in New York, 200 Sony Corporation shares listed in Tokyo, Japan and 50 shares of BMW listed in Frankfurt, Germany. He intends to beat the world index used as a benchmark. This index has a 50% weight in the US stock index, a 25% weight in the Japanese stock index and a 25% weight in the European stock index. The country components of the portfolio have an average risk relative to their respective country indices. He uses the United States dollar (USD) as the base currency. On 31 March 2018, his portfolio had gained 4.065%, while the world index gained only 0.735% in USD. He wishes to understand why his portfolio had such a good performance over the quarter. All the necessary data is provided below. There were no cash flows in the portfolio and there were no dividends paid.

| **Global equity portfolio: Composition and market data** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Portfolio** | **Number of shares** | **Price in local currency** | | **Portfolio value on 31 December 2017** | | **Portfolio value on 31 March 2018** | |
| | | **31 December 2017** | **31 March 2018** | **Local currency** | **USD** | **Local currency** | **USD** |
| US stocks: IBM | 500 | 100 | 105 | 50,000 | 50,000 | 52,500 | 52,500 |
| Japanese stocks: Sony Corp. | 200 | 10,000 | 11,000 | 2,000,000 | 20,000 | 2,200,000 | 20,952 |
| European stocks: BMW | 50 | 600 | 600 | 30,000 | 30,000 | 30,000 | 30,612 |
| **Total** | | | | | **100,000** | | **104,065** |

| **Market data** | **31 December 2017** | **31 March 2018** |
|---|---|---|
| World index in USD | 100 | 100.735 |
| US Index in USD | 100 | 103 |
| Japanese index in Yen | 100 | 105 |
| European index in Euro | 100 | 95 |
| Yen/USD | 100 | 105 |
| Euro/USD | 1 | 0.98 |

**Required:**

(i) Decompose the total return on the portfolio paid into capital gains (in local currency) and currency contribution. (4 marks)

(ii) Determine the contribution of security selection. (4 marks)

(iii) Attribute the performance relative to the benchmark (world index) to the various investment decisions. (4 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Explain four international bond portfolio management styles. (4 marks)

(b) Global credit portfolio management presents a complex challenge. Each day, hundreds of credit portfolio managers face thousands of choices in the primary (new issue) and secondary markets. In addition to tracking primary and secondary flows, investors have to keep tabs on ever-varying issuer fundamentals, creditworthiness, acquisitions, earnings and credit ratings among others. The task of global credit portfolio management is to process all of this rapidly changing information about the credit markets (issuers, issues, dealers and competing managers) and to construct the portfolio with the best return for a given risk tolerance.

**Required:**

In relation to the above statement, discuss five methodologies for credit relative-value maximisation. (5 marks)

(c) The board of directors of Kenbrite Financial Services (KFS) are considering hiring a consultant to advise on fixed income portfolio management. They invite candidates for a presentation on the topic "bond portfolio immunisation".

The following are some of the statements that were made during the presentation:

1. A great thing about immunisation is that it is a set-and-forget strategy. That is, once you have immunised your portfolio, there is no subsequent work to be done.
2. The immunisation target rate of return is less than yield-to-maturity.
3. If a portfolio is immunised against a change in the market yield at a given horizon by matching portfolio duration to horizon, the portfolio faces no risk except for default risk.
4. The liquidity of securities used to construct an immunised portfolio is irrelevant.
5. In general, the entire portfolio does not have to be turned over to rebalance an immunised portfolio. Furthermore, rebalancing needs to be done on a daily basis.



**Required:**

Critique each of the above statements. (5 marks)

(d) Anthony Kipngetich, a trader in the options market, was provided with the following information:

| | |
|---|---|
| Market price per share (MPS) | Sh.46.00 |
| Exercise price of a call option | Sh.45.00 |
| Call premium | Sh.5.00 |
| The delta value | 0.5420 |
| Number of call options sold | 1000 |
| Value of delta at the end of the previous day | 0.6400 |
| Continuously compounded risk-free rate | 4.5% |

**Required:**

(i) The number of shares needed to delta-hedge the call position at the end of the previous day. (1 mark)

(ii) The market value of the portfolio today given that at the end of the previous day, there was a loan balance of Sh.3,000. (2 marks)

(iii) Assuming that the market price per share is Sh.45.50 and the call premium is Sh.4.71 the following day, calculate the market value of the delta-hedged portfolio and compare it with a benchmark based on the market value of the delta-hedged portfolio calculated in (d) (ii) above. (3 marks)

**(Total: 20 marks)**

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**CIFA PART III SECTION 6**

**ADVANCED PORTFOLIO MANAGEMENT**

**THURSDAY: 30 November 2017.** **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) In the context of asset allocation, explain the following terms:

(i) Strategic asset allocation. (1 mark)

(ii) Tactical asset allocation. (1 mark)

(iii) Asset/liability management (ALM) approach. (1 mark)

(iv) Asset only (AO) approach. (1 mark)

(v) Mean-variance approach. (1 mark)

(b) Apco Capital, an investment management firm has a client intending to temporarily reduce his exposure to equities by converting a Sh.25 million equity position to cash for a period of four months. The client would like this reduction to take place without liquidating his equity position. Apco Capital plans to create a synthetic cash position using an equity futures contract. The futures contract is priced at Sh.1,170.10, has a multiplier of Sh.250, and expires in four months. The dividend yield on the underlying index is 1.25% and the risk-free rate is 2.75%.

**Required:**

(i) The number of futures contracts required to create a synthetic cash. (2 marks)

(ii) The effective amount of money committed to this risk-free transaction and the effective number of units of the equity index that are converted to cash. (3 marks)

(iii) Assume that the equity index is at 1031 when the futures contract expires. Illustrate how this strategy is equivalent to investing the risk-free asset, cash. (3 marks)

(c) Kennedy Imanyara, a portfolio manager, believes that the market will be volatile in the near future, but he does not feel particularly strongly about the direction of the movement. With this expectation, he decides to buy both a call and a put with the same exercise price and the same expiration on the same underlying stock trading at Sh.28. He buys one call option and one put option on this stock, both with an exercise price of Sh.25. The premium on the call is Sh.4 and the premium on the put is Sh.1.

**Required:**

(i) Identify the term commonly used to refer to the position taken by Kennedy Imanyara. (1 mark)

(ii) Determine the value at expiration and the profit for Imanyara's strategy when the price of the stock at expiration is Sh.35, Sh.29 and Sh.25 respectively. (6 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) In relation to portfolio performance evaluation:

(i) Compare and contrast the terms "macro attribution" and "micro attribution". (2 marks)

(ii) Discuss three inputs that could be used under micro attribution approach. (3 marks)

(b) In practice, an acceptable benchmark is one that both the investment manager and the plan sponsor agree represents the manager's investment process. However, in order to function effectively in performance evaluation, a benchmark should possess certain basic properties.

**Required:**
In relation to the above statement, highlight five properties of a valid benchmark. (5 mark)

(c) Simon Ageyo, an international bond portfolio manager is considering two bonds for investment. The two bonds are comparable in terms of risk characteristics. The following information relates to the two bonds:

| Country | Nominal return (%) | Risk-free rate (%) | Exchange rate per domestic currency |
|---|---|---|---|
| A | 9.75 | 8.5 | 3.0 |
| B | 4.75 | 3.25 | 5.0 |
| Domestic | Not applicable | 5.75 | Not applicable |

**Additional information:**
1. Country A's currency is expected to depreciate against the domestic country's currency by 2.6%.
2. Country B's currency is expected to appreciate against the domestic country's currency by 2.6%.

**Required:**
(i) Determine the bond that Simon Ageyo should select on a fully hedged basis. Justify your answer. (3 marks)

(ii) Assuming that Simon Ageyo selects the bond identified in (c) (i) above, explain whether the bond's currency exposure should be hedged. (3 marks)

(d) David Mwanzia is evaluating an active manager, C Limited. The selected information for other active managers as well as their normal benchmark returns and investor benchmark returns are presented below:

**Active portfolio managers' characteristics and benchmark information**

| Portfolio manager | Manager's return (%) | Normal benchmark return (%) | Investor benchmark return (%) | Total active risk (%) | Misfit active risk (%) |
|---|---|---|---|---|---|
| A | 15.00 | 11.25 | 8.50 | 6.05 | 4.40 |
| B | 13.20 | 14.25 | 7.50 | 4.68 | 3.40 |
| C | 12.75 | 15.00 | 10.00 | 5.50 | 4.00 |



PM Ltd. follows a passive investment strategy that is implemented using exchange-traded funds.

David Mwanzia proposes to construct a core satellite portfolio with the following allocations: 45% in PM Ltd., 15% in A Ltd., 20% in B Ltd. and 20% in C Ltd. Mwanzia assumes that the manager's active returns are uncorrelated. Mwanzia assumes that active return and active risk for PM Ltd. are 0%.

**Required:**
(i) The portfolio's total active return. (2 marks)

(ii) The portfolio's total active risk. (2 marks)
**(Total: 20 marks)**

## QUESTION THREE

(a) In the context of execution of portfolio decisions:

(i) Explain the term "implementation shortfall". (1 mark)

(ii) Outline four advantages of implementation shortfall. (4 marks)

(b) The following sell orders were placed for a stock on Tuesday, 21 November 2017:

**Trade quotes during the trading hours of 21 November 2017**

| Time | Bid price (Sh.) | Bid size | Ask price (Sh.) | Ask size |
|---|---|---|---|---|
| 10.00 am | 121.00 | 300 | 121.60 | 400 |
| 1.00 pm | 120.00 | 300 | 120.70 | 400 |
| 2.00 pm | 118.00 | 300 | 118.80 | 400 |

**Additional information:**

1. At 10.00 am, the trader placed an order to sell 100 shares. The execution price was Sh.121.10.
2. At 1.00 pm, the trader placed an order to sell 300 shares. The execution price was Sh.120.00.
3. At 2.00 pm, the trader placed an order to sell 600 shares. The average execution price was Sh.117.50.

**Required:**

(i) Average quoted spread. (2 marks)

(ii) Average effective spread. (3 marks)

(iii) Weighted average effective spread. (2 marks)

(c) The board of Trustees of Mambo Ltd.'s Sh.50 million pension fund are meeting to discuss a presentation they recently received from their pension consultant. The consultant has recommended that they diversify their current 50/50 equity/bond asset allocation to include a 10% allocation to real asset. Although the trustees would like to reduce portfolio risks without sacrificing a significant amount of return, the trustees have previously been reluctant to change asset allocation since they are concerned about "making a mistake we can't easily fix" if the economic environment changes.

One trustee, Samson Wako, makes reference to Table I below and some notes that provide an overview of how the various indices are constructed. Wako states: "To address our stated risk and return objectives and given the superior historical benefits of direct investing in real estate, represented by the unsmoothed NCREIF index, I recommend that we reallocate 10% from our bond investments indexed to the Lehman aggregate to a direct real estate asset".

A second trustee, Samuel Mogaka, responds with a different recommendation: "I believe we should reallocate 10% from the 50% S & P 500 allocation to REITs to achieve our goals".

**Table I : Real estate performance**

| Measure | NAREIT Index | NAREIT Index hedged | NCREIF Index | NCREIF Index unsmoothed | S & P 500 | Lehman Aggregate Bond index |
|---|---|---|---|---|---|---|
| Annualised return | 12.71% | 8.96% | 6.14% | 7.27% | 10.94% | 7.70% |
| Annualised standard deviation | 12.74% | 11.93% | 3.37% | 8.95% | 14.65% | 3.91% |
| Sharpe ratio | 0.66 | 0.39 | 0.55 | 0.33 | 0.45 | 0.87 |
| Minimum quarterly return | –14.19% | –10.16% | –5.33% | –18.55% | –17.28% | –2.87% |
| Correlation with NAREIT | 1.00 | 0.94 | – 0.001 | 0.21 | 0.35 | 0.18 |
| Correlation with NAREIT hedged | 0.94 | 1.00 | 0.00 | 0.24 | 0.00 | 0.14 |
| Correlation with NCREIF | 0.00 | 0.00 | 1.00 | 0.71 | 0.01 | – 0.18 |
| Correlation with NCREIF unsmoothed | 0.21 | 0.24 | 0.71 | 1.00 | – 0.01 | – 0.27 |

**Required:**

(i) Critique Samson Wako's recommendation with reference to the return, risk, diversification and liquidity characteristics of the two asset classes that Wako is referring to. (4 marks)

(ii) Critique Samuel Mogaka's recommendation with reference to the return, risk, diversification and liquidity characteristics of the two asset classes that Mogaka is referring to. (4 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Discuss five factors that a portfolio manager should consider while establishing the band for an asset class under a percentage-of-portfolio rebalancing program. (5 marks)

(b) Describe three strategic portfolio implications of the bullet structure with an intermediate maturity. (3 marks)

(c) With reference to credit relative-value analysis, examine the following basic approaches used in global credit bond portfolio management:

(i) Top-down approach. (2 marks)

(ii) Bottom-up approach. (2 marks)

(iii) Classic relative-value analysis. (2 marks)

(d) Stephen Tarus is a portfolio manager at a global firm investing in emerging markets. He has collected the following data regarding equity portfolio and currency data:

**Mexican equity portfolio and currency data**

| | Now | In one month |
|---|---|---|
| Portfolio value in Mexican Pesos (MXN) | 20,000,000 | 21,000,000 |
| British Pound-Mexican Peso spot rate (GBP/MXN) | 0.0494 | 0.0490 |
| British Pound-Mexican Peso futures rate (GBP/MXN) | 0.0491 | 0.0486 |

British one-year interest rate 5.35%
Mexican one-year interest rate 7.50%

**Note:** The futures contract has three months to expiration.

**Required:**

(i) The one-month British Pound return on the unhedged portfolio. (3 marks)

(ii) The one-month British Pound return on the hedged portfolio. (3 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Evaluate two advantages of each of the following bond portfolio management strategies:

(i) Pure bond indexing (PBI) strategy. (2 marks)

(ii) Enhanced indexing by matching primary risk factors. (2 marks)

(iii) Enhanced indexing by small risk factor mismatches. (2 marks)

(iv) Active management by larger risk factor mismatches. (2 marks)

(v) Full-blown active management. (2 marks)



(b) Phillip Kyalo is evaluating several alternatives for the United States (US) equity portfolio of his company's pension plan, involving the following managers:

| Manager | Active return (%) | Active risk (with respect to normal benchmark (%) | Normal benchmark |
|---|---|---|---|
| Index | 0 | 0 | Russell 3000 |
| Semiactive | 1 | 1.5 | Russell 3000 |
| Active manager A (Value) | 3 | 5 | Russell 1000 Value |
| Active manager B (Growth) | 4 | 6 | Russell 1000 Growth |
| Long-short | 6 | 6 | Cash with Russell 1000 overlay |

Active manager A's misfit risk is 7.13%. The overall equity portfolio benchmark is Russell 3000.

Assume that the active returns are uncorrelated.

**Required:**

(i) Kyalo has taken the information in the table above and used a mean-variance optimiser to create an implementation efficient frontier. The highest risk point on the efficient frontier is a 100% allocation to the long-short manager with a 100% Russell 1000 overlay. The active risk of this portfolio is 6.1%.

Explain why the risk is greater than 6%. (2 marks)

(ii) Calculate the total active risk for Active manager A. (1 mark)

(iii) Kyalo's current equity manager allocation is 30% index and 70% semiactive.

Calculate this portfolio's current expected active return, active risk, and information ratio. (3 marks)

(iv) After determining the desired level of active risk, Kyalo selected the appropriate portfolio from the efficient frontier. The portfolio allocates 39% to the index manager, 34% to the semiactive manager, 7% to active manager A, 8% to active manager B, and 12% to the long-short manager. This portfolio has an expected active return of 1.59% and an expected active risk of 1.10%.

Explain whether this portfolio represents an improvement over the current allocation, and if so, by how much. (2 marks)

(v) Upon further investigation of long-short manager, Kyalo learns that approximately 20% of the active return generated comes from equity positions in non-US companies.

Giving reasons, explain whether this is a concern. (2 marks)

**(Total: 20 marks)**

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## CIFA PART III SECTION 6

## ADVANCED PORTFOLIO MANAGEMENT

**THURSDAY: 25 May 2017.** **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) In relation to options trading, describe the following risk management strategies:

(i) Bull spread. (1 mark)

(ii) Bear spread. (1 mark)

(iii) Butterfly spread. (1 mark)

(b) Kefa Omanga is a portfolio manager for Hisa domestic equity portfolio. Kefa intends to compare the return performance of the following portfolio rebalancing strategies:

1. A constant-mix strategy allocated 90% to domestic equities and 10% to risk-free securities.
2. A constant-proportion portfolio insurance (CPPI) strategy with a floor value of 10% of the current market value of the domestic equity portfolio.

Hisa's forecast for the domestic equity market is for flat returns in the long term with periods of significant market volatility.

**Required:**
Compare the expected performance of the constant-mix and CPPI strategies assuming Hisa's forecast proves correct. (4 marks)



(c) Cecilia Ogalo and Alberto Magala are discussing how to evaluate a hedge fund manager. Cecilia Ogalo suggests that the hedge fund performance should be evaluated by comparing the manager's performance with the median of a universe of hedge funds with similar mandates.

**Required:**
Citing three reasons, explain why Cecilia Ogalo's suggestion for evaluating hedge fund manager performance is inappropriate. (3 marks)

(d) Jackson Omondi, an investment analyst, is currently managing a portfolio with a 65 percent allocation in stocks and 35 percent in bonds. The market value of the portfolio is Sh.200 million.

**Additional information:**
1. The stock has a beta of 1.15.
2. The modified duration of the bond is 6.75.
3. Jackson Omondi intends to increase the stock allocation to 85 percent and decrease the bond allocation to 15 percent for a period of six months.
4. Jackson Omondi also contemplates to increase the beta on the stock position from 1.15 to 1.20 and increase the modified duration of the bonds to 8.25.
5. A stock index futures contract that expires in six months is priced at Sh.157,500 and has a beta of 0.95.
6. A bond futures contract that is expected to expire in six months is priced at Sh.109,000 and has an implied modified duration of 5.25.
7. The stock futures contract has a multiplier of one.

**Required:**

(i) The number of stock futures contracts and the number of bond futures contracts that Jackson Omondi should trade in order to synthetically take the desired position in stock and bonds today. (9 marks)

(ii) Determine whether Jackson Omondi should go short or long based on your answer in (d) (i) above. (1 mark)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Explain the following implicit costs in relation to securities trading:

(i) Slippage costs. (2 marks)

(ii) Market impact costs. (2 marks)

(iii) Missed trade opportunity costs. (2 marks)

(b) Simon Murumba, a portfolio manager responsible for a global government bond has been disappointed with the low returns on the current bond portfolio consisting of government bonds relative to the benchmark, which is a diversified global bond index. He is therefore exploring general strategies to generate excess returns on the portfolio. He has already researched on two strategies (duration management strategy and investing in market outside the benchmark index).

**Required:**
Explain three other strategies, excluding the two mentioned above, that Simon Murumba could use to generate excess returns on the current bond portfolio. (6 marks)

(c) Anthony Munyao is evaluating the performance of several asset management firms. A global firm states that its objective is to be a regional specialist in security selection and market allocation. The firm indicates that it seeks to outperform the MSCI Far East Index (MSCI - FEI), an index that captures large and mid-cap representation across three developed markets by:

1. Identifying substantial investment opportunities in under-valued and under-researched securities within the index's country components.
2. Overweighting/underweighting country versus the MSCI - FEI.
3. The global firm further states that it does not practice active currency management as part of its investment strategy.

The recent performance of the firm's growth equity composite is summarised below:

**Global firm growth equity composite**

| Country component | Country weights (%) | Rate of return in base currency (%) | Rate of return in local currency (%) | Currency contribution (%) | MSCI-FEI rate of return in local currency (%) |
|---|---|---|---|---|---|
| A | 30 | – 4.70 | – 8.70 | 4.00 | – 8.00 |
| B | 45 | 10.40 | 2.40 | 8.00 | 4.00 |
| C | 25 | 15.60 | 15.60 | 0.00 | 7.50 |
| **Composite** | **100** | **7.17** | **2.37** | **4.80** | **1.28** |

**MSCI Far East Index (MSCI - FEI)**

| Country component | Country weights (%) | Rate of return in base currency (%) | Rate of return in local currency (%) | Currency contribution (%) |
|---|---|---|---|---|
| A | 30 | – 4.00 | – 8.00 | 4.00 |
| B | 55 | 12.00 | 4.00 | 8.00 |
| C | 15 | 7.50 | 7.50 | 0.00 |
| **Composite** | **100** | **6.53** | **0.93** | **5.60** |

Note: The country components of the composite have average risk relative to their respective country indexes.

Anthony Munyao has evaluated the contribution of market allocation to the total return of the global firm growth equity composite. He wants to further evaluate the performance of the composite, especially with respect to the global firm's statements about security selection and active currency management.

**Required:**

(i) Determine the performance of the global firm's growth equity composite relative to the MSCI-FEI in terms of base currency and local currency. (2 marks)

(ii) Evaluate whether the contribution of security selection to the total return of the global firm's growth equity composite is consistent with the global firm's stated objective regarding security selection. (3 marks)

(iii) Determine whether the contribution of currency movements to the total return of the global firm's growth equity composite is consistent with the global firm's statement about active currency management. (3 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) In the context of portfolio management, distinguish between "performance measurement" and "performance evaluation". (2 marks)

(b) Describe the following portfolio performance measures:

(i) Total rate of return. (1 mark)

(ii) Time-weighted rate of return. (1 mark)

(iii) Money-weighted rate of return. (1 mark)

(iv) Linked internal rate of return (LIRR). (1 mark)

(c) Joseph Mvurya is a portfolio manager for a global hedge fund which focuses on precious metals, fixed income securities and derivatives. He has a strategy of rolling forward a long position in short dated platinum futures traded on New York Merchantile Exchange (NYMEX). Joseph's expectations are as follows:

1. Electricity supply disruptions in South Africa, the world's dominant platinum producer will cause platinum supply to fall and spot prices to rise.
2. Interest rates will rise.
3. The convenience yield on platinum will increase.



Joseph Mvurya observes that his expectations are not yet reflected in the platinum futures prices.

**Required:**

Assuming that Joseph Mvurya's market expectations are correct, explain the expected change on the following return components:

(i) Spot return (price return). (2 marks)

(ii) Collateral return (collateral yield). (2 marks)

(iii) Roll return (roll yield). (2 marks)

(d) Wananchi Bank has been tasked to finance the construction of a local hospital expansion. The cash flow requirements for the hospital expansion are Sh.20 million in 6 months and an additional Sh.40 million in one year. Wananchi Bank is offering to lend at a floating rate of 90-day Treasury bill plus 50 basis points reset after every six months with a maximum allowable increase of 300 basis points over the initial lending rate for the life of the loan. The entire principal of the Sh.60 million loan is to be repaid at the end of 5 years from today.

Wananchi Bank reviews its interest rate forecasts and decides to fund the hospital loan by issuing a 5-year fixed rate certificate of deposit (CD) when the cash flows will be required. The CD cannot be withdrawn prior to maturity. After six months, Wananchi Bank issues a 5-year fixed rate CD for Sh.20 million to fund the first drawdown. Later, after another six months, Wananchi Bank issues a 5-year fixed rate CD for Sh.40 million to fund the second drawdown. After the second issue, the market value of the assets related to the hospital transactions is Sh.60 million. There is an economic surplus of Sh.4 million related to the hospital transactions.

Immediately after the second drawdown, the assets and liabilities of Wananchi Bank related to the hospital transactions have the following characteristics:

| | Assets (loans) | Liabilities (CD) |
|---|---|---|
| Modified duration | 0.50 | 4.00 |
| Weighted average maturity (years) | 4.00 | 4.83 |

**Required:**

(i) The present value of the liabilities funding the hospital loan immediately after the second drawdown. (3 marks)

(ii) The change in economic surplus assuming that interest rates increase by 50 basis points for both assets and liabilities. (5 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) A portfolio manager responsible for monitoring a client's portfolio has been tasked to monitor the market and economic changes.

**Required:**

Discuss three areas of market and economic changes that the portfolio manager should monitor in his assignment. (3 marks)

(b) Silvia Chessetto, an investment analyst, is advising an endowment fund on adding non-domestic assets to its portfolio. The asset allocation of the fund is 60% domestic equities and 40% domestic fixed income. The current portfolio has an expected return of 6.25% with a standard deviation of 9.5%. Silvia is evaluating two new asset classes that might provide a mean-variance improvement for the endowment fund. Silvia provides the endowment trustees with the data shown below:

**Asset class expectations**

| Asset class | Expected return (%) | Standard deviation (%) | Correlation with the current portfolio |
|---|---|---|---|
| Non-domestic developed market equity | 8.0 | 14.0 | 0.70 |
| Emerging market equity | 9.0 | 18.0 | 0.50 |

The risk-free rate is 2.0%.

The correlations provided above reflect normal market conditions.

Silvia believes that the use of conditional return correlations is valuable in stress testing.

**Required:**

(i) Determine if adding non-domestic developed market equity would provide a mean-variance improvement for the current portfolio. (2 marks)

(ii) Citing two reasons, justify Silvia's belief that the use of conditional return correlations is valuable in stress testing. (2 marks)

(c) Patrick Mezo is reviewing the performance of the global equity managers of a local university endowment fund. AIK Capital is currently the endowment fund's large capitalisation global equity manager. Performance data for AIK Capital is shown below:

**AIK Capital performance data (2005–2016)**

| | |
|---|---|
| Average annual rate of return | 22.1% |
| Standard deviation of annual rate of return | 16.8% |
| Beta | 1.2 |

Patrick Mezo also presents the endowment investment committee with performance information for Exodus Asset Management which is another large capitalisation firm. Performance data for Exodus Asset Management is shown below:

**Exodus Asset Management performance data (2005-2016)**

| | |
|---|---|
| Average annual rate of return | 24.2% |
| Standard deviation of annual rate of return | 20.2% |
| Beta | 0.8 |

Performance data for the relevant risk free asset and market index are shown below:

**Relevant risk-free asset and market index performance data (2005-2016)**

| | |
|---|---|
| Risk free asset: Average annual rate of return | 5.0% |
| Market index: Average annual rate of return | 18.9% |
| Standard deviation of annual rate of return | 13.8% |

**Required:**
Calculate the Sharpe ratio and Treynor's performance measure for both AIK Capital and Exodus Asset Management. (4 marks)

(d) Using the information in (c) above, calculate the following components of investment performance for Exodus Asset Management:

(i) Overall performance. (1 mark)

(ii) Risk. (1 mark)

(iii) Selectivity. (1 mark)

(iv) Diversification. (1 mark)

(v) Net selectivity. (1 mark)

(e) Using the information in (c) above, explain why different rankings of AIK Capital and Exodus Asset Management could result from using:

(i) The Sharpe ratio versus the Treynor's measure. (2 marks)

(ii) Overall performance versus net selectivity. (2 marks)
**(Total: 20 marks)**

**QUESTION FIVE**

(a) Explain four reasons why a fixed income dealer might prefer to trade his bond portfolio in a secondary market. (4 marks)

(b) A portfolio manager decided to purchase corporate bonds with a market value of Sh.5 million. To finance 60 percent of the purchase, the portfolio manager entered into a 30-day repurchase agreement (repo) with a bond dealer. The 30-day term repo rate was 4.6 percent per annum. At the end of 30 days, the bonds purchased by the portfolio manager had increased in value by 0.5 percent and the portfolio manager decided to sell the bonds. No coupons were received during the 30-day period.



**Required:**

(i) Compute the 30-day rate of return on the equity and borrowed components of the portfolio. (3 marks)

(ii) Calculate the 30-day portfolio rate of return. (2 marks)

(iii) Compute the 30-day portfolio rate of return, if the increase in value of the bonds was 0.3 percent instead of 0.5 percent. (2 marks)

(c) Mark Mutiso works for a global investment firm. His client wishes to capture excess equity returns from small capitalisation United States (US) stocks while simultaneously establishing exposure to the large capitalisation US equity market. Mark has determined that the Rusell 2000 index and the standard and poor (S & P 500) index are the appropriate small capitalisation and large capitalisation benchmarks respectively. Mark proposes the following two strategies:

**Strategy one:**

- Hire an equity manager who has consistently outperformed the Rusell 2000 index.
- Buy the same dollar amount of Rusell 2000 futures exposure.
- Sell short the same dollar amount of S & P 500 index futures exposure.

**Strategy two:**

- Hire a market neutral (long/short) small capitalisation manager.
- Buy the same dollar amount of S & P 500 index futures exposure.

**Required:**
Explain whether each of the above strategies would achieve the client's objectives. (4 marks)

(d) Clement Kivuti is a portfolio manager at PM Hedge Fund (PMHF). PMHF holds a four-year Sh.120 million, 6% fixed rate bond that pays interest semi-annually. Clement expects four-year interest rates to rise. He intends to reduce the duration of the bond position. An analyst at PMHF suggests that Clement can reduce the modified duration of this position which is currently 3, to a more acceptable duration of 0.3 by using an interest rate swap. Clement estimates the notional principal on the swap to be as close as possible to the Sh.120 million principal of the original bond.

The analyst provides Clement with the following four possible swaps:

**Available swap position**

| Swap | Type of swap | Term of the swap | Frequency of payment |
|---|---|---|---|
| 1 | Pay fixed, receive floating | 2 years | Semi-annually |
| 2 | Pay floating, receive fixed | 4 years | Quarterly |
| 3 | Pay fixed, receive floating | 4 years | Quarterly |
| 4 | Pay floating, receive fixed | 2 years | Semi-annually |

Assume that the modified duration of the fixed-rate component of a swap is 75% of its maturity.

**Required:**
Advise Clement Kivuti on the swap that meets the stated goals. (5 marks)

**(Total: 20 marks)**

.....

## Present Value of 1 Received at the End of *n* Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

| Period | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 12% | 14% | 15% | 16% | 18% | 20% | 24% | 28% | 32% | 36% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .9901 | .9804 | .9709 | .9615 | .9524 | .9434 | .9346 | .9259 | .9174 | .9091 | .8929 | .8772 | .8696 | .8621 | .8475 | .8333 | .8065 | .7813 | .7576 | .7353 |
| 2 | .9803 | .9612 | .9426 | .9246 | .9070 | .8900 | .8734 | .8573 | .8417 | .8264 | .7972 | .7695 | .7561 | .7432 | .7182 | .6944 | .6504 | .6104 | .5739 | .5407 |
| 3 | .9706 | .9423 | .9151 | .8890 | .8638 | .8396 | .8163 | .7938 | .7722 | .7513 | .7118 | .6750 | .6575 | .6407 | .6086 | .5787 | .5245 | .4768 | .4348 | .3975 |
| 4 | .9610 | .9238 | .8885 | .8548 | .8227 | .7921 | .7629 | .7350 | .7084 | .6830 | .6355 | .5921 | .5718 | .5523 | .5158 | .4823 | .4230 | .3725 | .3294 | .2923 |
| 5 | .9515 | .9057 | .8626 | .8219 | .7835 | .7473 | .7130 | .6806 | .6499 | .6209 | .5674 | .5194 | .4972 | .4761 | .4371 | .4019 | .3411 | .2910 | .2495 | .2149 |
| 6 | .9420 | .8880 | .8375 | .7903 | .7462 | .7050 | .6663 | .6302 | .5963 | .5645 | .5066 | .4556 | .4323 | .4104 | .3704 | .3349 | .2751 | .2274 | .1890 | .1580 |
| 7 | .9327 | .8706 | .8131 | .7599 | .7107 | .6651 | .6227 | .5835 | .5470 | .5132 | .4523 | .3996 | .3759 | .3538 | .3139 | .2791 | .2218 | .1776 | .1432 | .1162 |
| 8 | .9235 | .8535 | .7894 | .7307 | .6768 | .6274 | .5820 | .5403 | .5019 | .4665 | .4039 | .3506 | .3269 | .3050 | .2660 | .2326 | .1789 | .1388 | .1085 | .0854 |
| 9 | .9143 | .8368 | .7664 | .7026 | .6446 | .5919 | .5439 | .5002 | .4604 | .4241 | .3606 | .3075 | .2843 | .2630 | .2255 | .1938 | .1443 | .1084 | .0822 | .0628 |
| 10 | .9053 | .8203 | .7441 | .6756 | .6139 | .5584 | .5083 | .4632 | .4224 | .3855 | .3220 | .2697 | .2472 | .2267 | .1911 | .1615 | .1164 | .0847 | .0623 | .0462 |
| 11 | .8963 | .8043 | .7224 | .6496 | .5847 | .5268 | .4751 | .4289 | .3875 | .3505 | .2875 | .2366 | .2149 | .1954 | .1619 | .1346 | .0938 | .0662 | .0472 | .0340 |
| 12 | .8874 | .7885 | .7014 | .6246 | .5568 | .4970 | .4440 | .3971 | .3555 | .3186 | .2567 | .2076 | .1869 | .1685 | .1372 | .1122 | .0757 | .0517 | .0357 | .0250 |
| 13 | .8787 | .7730 | .6810 | .6006 | .5303 | .4688 | .4150 | .3677 | .3262 | .2897 | .2292 | .1821 | .1625 | .1452 | .1163 | .0935 | .0610 | .0404 | .0271 | .0184 |
| 14 | .8700 | .7579 | .6611 | .5775 | .5051 | .4423 | .3878 | .3405 | .2992 | .2633 | .2046 | .1597 | .1413 | .1252 | .0985 | .0779 | .0492 | .0316 | .0205 | .0135 |
| 15 | .8613 | .7430 | .6419 | .5553 | .4810 | .4173 | .3624 | .3152 | .2745 | .2394 | .1827 | .1401 | .1229 | .1079 | .0835 | .0649 | .0397 | .0247 | .0155 | .0099 |
| 16 | .8528 | .7284 | .6232 | .5339 | .4581 | .3936 | .3387 | .2919 | .2519 | .2176 | .1631 | .1229 | .1069 | .0930 | .0708 | .0541 | .0320 | .0193 | .0118 | .0073 |
| 17 | .8444 | .7142 | .6050 | .5134 | .4363 | .3714 | .3166 | .2703 | .2311 | .1978 | .1456 | .1078 | .0929 | .0802 | .0600 | .0451 | .0258 | .0150 | .0089 | .0054 |
| 18 | .8360 | .7002 | .5874 | .4936 | .4155 | .3503 | .2959 | .2502 | .2120 | .1799 | .1300 | .0946 | .0808 | .0691 | .0508 | .0376 | .0208 | .0118 | .0068 | .0039 |
| 19 | .8277 | .6864 | .5703 | .4746 | .3957 | .3305 | .2765 | .2317 | .1945 | .1635 | .1161 | .0829 | .0703 | .0596 | .0431 | .0313 | .0168 | .0092 | .0051 | .0029 |
| 20 | .8195 | .6730 | .5537 | .4564 | .3769 | .3118 | .2584 | .2145 | .1784 | .1486 | .1037 | .0728 | .0611 | .0514 | .0365 | .0261 | .0135 | .0072 | .0039 | .0021 |
| 25 | .7798 | .6095 | .4776 | .3751 | .2953 | .2330 | .1842 | .1460 | .1160 | .0923 | .0588 | .0378 | .0304 | .0245 | .0160 | .0105 | .0046 | .0021 | .0010 | .0005 |
| 30 | .7419 | .5521 | .4120 | .3083 | .2314 | .1741 | .1314 | .0994 | .0754 | .0573 | .0334 | .0196 | .0151 | .0116 | .0070 | .0042 | .0016 | .0006 | .0002 | .0001 |
| 40 | .6717 | .4529 | .3066 | .2083 | .1420 | .0972 | .0668 | .0460 | .0318 | .0221 | .0107 | .0053 | .0037 | .0026 | .0013 | .0007 | .0002 | .0001 | | |
| 50 | .6080 | .3715 | .2281 | .1407 | .0872 | .0543 | .0339 | .0213 | .0134 | .0085 | .0035 | .0014 | .0009 | .0006 | .0003 | .0001 | | | | |
| 60 | .5504 | .3048 | .1697 | .0951 | .0535 | .0303 | .0173 | .0099 | .0057 | .0033 | .0011 | .0004 | .0002 | .0001 | | | | | | |

* The factor is zero to four decimal places



## Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

| Number of payments | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 12% | 14% | 15% | 16% | 18% | 20% | 24% | 28% | 32% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.9901 | 0.9804 | 0.9709 | 0.9615 | 0.9524 | 0.9434 | 0.9346 | 0.9259 | 0.9174 | 0.9091 | 0.8929 | 0.8772 | 0.8696 | 0.8621 | 0.8475 | 0.8333 | 0.8065 | 0.7813 | 0.7576 |
| 2 | 1.9704 | 1.9416 | 1.9135 | 1.8861 | 1.8594 | 1.8334 | 1.8080 | 1.7833 | 1.7591 | 1.7355 | 1.6901 | 1.6467 | 1.6257 | 1.6052 | 1.5656 | 1.5278 | 1.4568 | 1.3916 | 1.3315 |
| 3 | 2.9410 | 2.8839 | 2.8286 | 2.7751 | 2.7232 | 2.6730 | 2.6243 | 2.5771 | 2.5313 | 2.4869 | 2.4018 | 2.3216 | 2.2832 | 2.2459 | 2.1743 | 2.1065 | 1.9813 | 1.8684 | 1.7663 |
| 4 | 3.9020 | 3.8077 | 3.7171 | 3.6299 | 3.5460 | 3.4651 | 3.3872 | 3.3121 | 3.2397 | 3.1699 | 3.0373 | 2.9137 | 2.8550 | 2.7982 | 2.6901 | 2.5887 | 2.4043 | 2.2410 | 2.0957 |
| 5 | 4.8534 | 4.7135 | 4.5797 | 4.4518 | 4.3295 | 4.2124 | 4.1002 | 3.9927 | 3.8897 | 3.7908 | 3.6048 | 3.4331 | 3.3522 | 3.2743 | 3.1272 | 2.9906 | 2.7454 | 2.5320 | 2.3452 |
| 6 | 5.7955 | 5.6014 | 5.4172 | 5.2421 | 5.0757 | 4.9173 | 4.7665 | 4.6229 | 4.4859 | 4.3553 | 4.1114 | 3.8887 | 3.7845 | 3.6847 | 3.4976 | 3.3255 | 3.0205 | 2.7594 | 2.5342 |
| 7 | 6.7282 | 6.4720 | 6.2303 | 6.0021 | 5.7864 | 5.5824 | 5.3893 | 5.2064 | 5.0330 | 4.8684 | 4.5638 | 4.2883 | 4.1604 | 4.0386 | 3.8115 | 3.6046 | 3.2423 | 2.9370 | 2.6775 |
| 8 | 7.6517 | 7.3255 | 7.0197 | 6.7327 | 6.4632 | 6.2098 | 5.9713 | 5.7466 | 5.5348 | 5.3349 | 4.9676 | 4.6389 | 4.4873 | 4.3436 | 4.0776 | 3.8372 | 3.4212 | 3.0758 | 2.7860 |
| 9 | 8.5660 | 8.1622 | 7.7861 | 7.4353 | 7.1078 | 6.8017 | 6.5152 | 6.2469 | 5.9952 | 5.7590 | 5.3282 | 4.9464 | 4.7716 | 4.6065 | 4.3030 | 4.0310 | 3.5655 | 3.1642 | 2.8681 |
| 10 | 9.4713 | 8.9826 | 8.5302 | 8.1109 | 7.7217 | 7.3601 | 7.0236 | 6.7101 | 6.4177 | 6.1446 | 5.6502 | 5.2161 | 5.0188 | 4.8332 | 4.4941 | 4.1925 | 3.6819 | 3.2689 | 2.9304 |
| 11 | 10.3676 | 9.7868 | 9.2526 | 8.7605 | 8.3064 | 7.8869 | 7.4987 | 7.1390 | 6.8052 | 6.4951 | 5.9377 | 5.4527 | 5.2337 | 5.0286 | 4.6560 | 4.3271 | 3.7757 | 3.3351 | 2.9776 |
| 12 | 11.2551 | 10.5753 | 9.9540 | 9.3851 | 8.8633 | 8.3838 | 7.9427 | 7.5361 | 7.1607 | 6.8137 | 6.1944 | 5.6603 | 5.4206 | 5.1971 | 4.7932 | 4.4392 | 3.8514 | 3.3868 | 3.0133 |
| 13 | 12.1337 | 11.3484 | 10.6350 | 9.9856 | 9.3936 | 8.8527 | 8.3577 | 7.9038 | 7.4869 | 7.1034 | 6.4235 | 5.8424 | 5.5831 | 5.3423 | 4.9095 | 4.5327 | 3.9124 | 3.4272 | 3.0404 |
| 14 | 13.0037 | 12.1062 | 11.2961 | 10.5631 | 9.8986 | 9.2950 | 8.7455 | 8.2442 | 7.7862 | 7.3667 | 6.6282 | 6.0021 | 5.7245 | 5.4675 | 5.0081 | 4.6106 | 3.9616 | 3.4587 | 3.0609 |
| 15 | 13.8651 | 12.8493 | 11.9379 | 11.1184 | 10.3797 | 9.7122 | 9.1079 | 8.5595 | 8.0607 | 7.6061 | 6.8109 | 6.1422 | 5.8474 | 5.5755 | 5.0916 | 4.6755 | 4.0013 | 3.4834 | 3.0764 |
| 16 | 14.7179 | 13.5777 | 12.5611 | 11.6523 | 10.8378 | 10.1059 | 9.4466 | 8.8514 | 8.3126 | 7.8237 | 6.9740 | 6.2651 | 5.9542 | 5.6685 | 5.1624 | 4.7296 | 4.0333 | 3.5026 | 3.0882 |
| 17 | 15.5623 | 14.2919 | 13.1661 | 12.1657 | 11.2741 | 10.4773 | 9.7632 | 9.1216 | 8.5436 | 8.0216 | 7.1196 | 6.3729 | 6.0472 | 5.7487 | 5.2223 | 4.7746 | 4.0591 | 3.5177 | 3.0971 |
| 18 | 16.3983 | 14.9920 | 13.7535 | 12.6593 | 11.6896 | 10.8276 | 10.0591 | 9.3719 | 8.7556 | 8.2014 | 7.2497 | 6.4674 | 6.1280 | 5.8178 | 5.2732 | 4.8122 | 4.0799 | 3.5294 | 3.1039 |
| 19 | 17.2260 | 15.6785 | 14.3238 | 13.1339 | 12.0853 | 11.1581 | 10.3356 | 9.6036 | 8.9501 | 8.3649 | 7.3658 | 6.5504 | 6.1982 | 5.8775 | 5.3162 | 4.8435 | 4.0967 | 3.5386 | 3.1090 |
| 20 | 18.0456 | 16.3514 | 14.8775 | 13.5903 | 12.4622 | 11.4699 | 10.5940 | 9.8181 | 9.1285 | 8.5136 | 7.4694 | 6.6231 | 6.2593 | 5.9288 | 5.3527 | 4.8696 | 4.1103 | 3.5458 | 3.1129 |
| 25 | 22.0232 | 19.5235 | 17.4131 | 15.6221 | 14.0939 | 12.7834 | 11.6536 | 10.6748 | 9.8226 | 9.0770 | 7.8431 | 6.8729 | 6.4641 | 6.0971 | 5.4669 | 4.9476 | 4.1474 | 3.5640 | 3.1220 |
| 30 | 25.8077 | 22.3965 | 19.6004 | 17.2920 | 15.3725 | 13.7648 | 12.4090 | 11.2578 | 10.2737 | 9.4269 | 8.0552 | 7.0027 | 6.5660 | 6.1772 | 5.5168 | 4.9789 | 4.1601 | 3.5693 | 3.1242 |
| 40 | 32.8347 | 27.3555 | 23.1148 | 19.7928 | 17.1591 | 15.0463 | 13.3317 | 11.9246 | 10.7574 | 9.7791 | 8.2438 | 7.1050 | 6.6418 | 6.2335 | 5.5482 | 4.9966 | 4.1659 | 3.5712 | 3.1250 |
| 50 | 39.1961 | 31.4236 | 25.7298 | 21.4822 | 18.2559 | 15.7619 | 13.8007 | 12.2335 | 10.9617 | 9.9148 | 8.3045 | 7.1327 | 6.6605 | 6.2463 | 5.5541 | 4.9995 | 4.1666 | 3.5714 | 3.1250 |
| 60 | 44.9550 | 34.7609 | 27.6756 | 22.6235 | 18.9293 | 16.1614 | 14.0392 | 12.3766 | 11.0480 | 9.9672 | 8.3240 | 7.1401 | 6.6651 | 6.2402 | 5.5553 | 4.9999 | 4.1667 | 3.5714 | 3.1250 |

# KASNEB

## CIFA PART III SECTION 6

## ADVANCED PORTFOLIO MANAGEMENT

**THURSDAY: 24 November 2016.** **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) Enumerate three roles that could be played by brokers and dealers when executing portfolio decisions in the financial market. (3 marks)

(b) Financial markets are organised to provide liquidity, transparency, and assurance of completion, so that they might be judged by the degree to which they have these qualities in practice.

**Required:**
In the context of the above statement:

(i) Examine three characteristics of a liquid market. (3 marks)

(ii) Discuss two factors that could contribute to market illiquidity. (2 marks)

(c) Jambolee Ltd. is a listed company on MSE, a local securities exchange in your country. On Monday, 10 November 2016 at 11.42 a.m. James Munene, a trader, sold 150 shares of Jambolee Ltd. at a price of Sh.813.30 per share. The table below encompasses all trades for Jambolee Ltd.'s share for that day:

| Time | Trade price (Sh.) | Volume of shares traded |
|---|---|---|
| 8.30 AM | 807.30 | 450 |
| 8.48 AM | 808.08 | 300 |
| 11.28 AM | 815.42 | 900 |
| 11.42 AM | 813.30 | 150 |
| 11.58 AM | 815.16 | 450 |
| 12.58 PM | 818.76 | 750 |
| 2.59 PM | 809.01 | 450 |

James Munene is evaluating the implicit costs of the trade, putting his main focus on the bid-ask spread and market impact using specified price benchmarks.

**Required:**
The estimated implicit transaction costs using each of the following price benchmarks:

(i) Opening price. (2 marks)

(ii) Closing price. (2 marks)

(iii) Volume-weighted average price (VWAP). (5 marks)

(d) Assume that the spread between a Ugandan bond and a Tanzanian bond is 300 basis points. This spread provides Tanzanian investors who purchase Ugandan bonds with an additional yield income of 75 basis points per quarter. The duration of the Tanzanian bonds is 8.3.

**Required:**
Determine the decline in the interest rate that would be needed to completely wipe out the quarterly yield advantage for the Tanzanian investor assuming that the Tanzanian interest rate declines. (3 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) In the context of portfolio management, discuss the following portfolio rebalancing strategies:

(i) Calender rebalancing. (2 marks)

(ii) Percentage-of-portfolio rebalancing. (2 marks)

(b) Julius Poipoi, a self employed person who receives his income irregularly, has an investment account with Centrum Investment Firm. On 1 June 2016, he had a balance of Sh.150,000 in his account. On 13 June 2016, he deposited Sh.4,500 into his account. Further to that, on 20 June 2016, he deposited Sh.3,750.

His account was valued at Sh.157,500 and Sh.162,000 after the first and second contribution respectively. At the end of June 2016, his account was valued at Sh.165,000.

**Required:**
The time-weighted rate of return for the investment. (4 marks)

(c) Andrew Koech, a portfolio manager with Smith Capital, wishes to increase the beta for one of the portfolios he manages from 0.9405 to 1.188 for a three-month period. The current market value of the portfolio under consideration is Sh.173,250,000. Smith Capital contemplates to use a futures contract priced at Sh.104,732.10 so as to adjust the portfolio beta. The beta of the futures contract is 0.9702.

**Required:**
(i) The number of futures contracts that should be bought or sold to achieve an increase in the portfolio beta of 1.188. (2 marks)

(ii) The value of the overall position and the effective beta of the portfolio assuming that the overall equity market goes up by 5.445% at the end of three months, while the stock portfolio under management also rises by 5.049% and that the futures contract is priced at Sh.110,385. (4 marks)

(d) Ivy Kigen is considering an investment in distressed debt. She uses a 3-year horizon for evaluating the investment. Ivy Kigen analyses Jumia Capital, a newly distressed debt hedge fund and notes the following:

1. The annual management fee based on average net asset value (NAV) is 1%.
2. The performance fee paid monthly and calculated based on the monthly charge in NAV, subject to a high water mark provision is 15%.
3. The lock up period is 3 years.
4. 14% of NAV is invested in a distressed airline company that recently filed for bankruptcy protection.
5. Net asset value per unit at the end of May 2016 was a new all time high of Sh.3,100.



Jumia Capital's subsequent month end NAV per unit was Sh.3,260 in June 2016, Sh.2,900 in July 2016 and Sh.3,140 in August 2016. There were no interim cash flows from clients during this three-month period.

Ivy Kigen learns of a competing distressed debt hedge fund with a similar performance fee and expected return, but only 1-year lock up period. She contacts Jumia Capital and states that she is considering investing in the competitor's fund. A representative for Jumia Capital replies that its 3-year lock up period is likely to be more favourable to Ivy Kigen than the competitors 1-year lock up period.

**Required:**
(i) The performance fee (in Sh. per unit) for the three months from June 2016 to August 2016. (2 marks)

(ii) Explain why Jumia Capital is subject to J-factor risk. (2 marks)

(iii) Support the representative's reply about Jumia Capital's lock-up period. (2 marks)
**(Total: 20 marks)**

**QUESTION THREE**

(a) Explain three reasons why an investor would consider investing in an indexed portfolio. (3 marks)

(b) Examine three approaches that an investment analyst could use to hedge against currency risk. (3 marks)

(c) An investor decides to pursue a contingent immunisation strategy over a 3-year time horizon. The investor has Sh.20 million to invest. The available 3-year immunisation rate is 4% and the investor will accept a minimum safety net return of 3.2%.

**Required:**
The initial surplus amount for the investor. (3 marks)

(d) George Orengo is an investment analyst at an asset management firm. Each year, he provides his firm with a report that includes a series of market forecasts. As part of his report, he uses the Grinold-Kroner model to forecast the expected rate of return on equities for the next 10 years. He uses the data below to prepare his forecast:

| Factor | 10-year forecast (annualised) (%) |
|---|---|
| • Dividend yield | 1.80 |
| • Dividend growth rate | 4.00 |
| • Change in price to earnings (P/E) multiple | 0.50 |
| • Inflation rate | 1.20 |
| • Change in the number of shares outstanding | – 0.30 |
| • Real total earnings growth rate | 2.50 |

**Required:**
Using Grinold-Kroner model, calculate the following sources of return for equities:

(i) Expected nominal earnings growth return. (1 mark)

(ii) Expected repricing return. (1 mark)

(iii) Expected income return. (1 mark)

(e) Simon Mbatia, a fixed income portfolio manager, manages a domestic bond fund. He is contemplating whether to purchase a 5-year callable, BBB rated corporate bond for the fund. The corporate bond's current yield is 4.90%. Simon Mbatia intends to use the risk-premium approach to decide on whether to purchase the bond for the fund. The trailing 12-month inflation rate is 1.10% and it is expected to remain constant at 1.50% per annum for the next five years. It is assumed that the illiquidity discount and tax premium are both zero.

**The following information relates to the domestic bond market data:**

1. Real risk-free interest rate is 1.30%
2. 1-year BBB rated credit risk spread (Over Treasuries) is 30 basis points.
3. 5-year BBB rated credit risk spread (Over Treasuries) is 80 basis points.
4. Spread of 5-year Treasury over 1-year Treasury is 100 basis points.
5. 1-year call risk spread is 20 basis points.
6. 5-year call risk spread is 60 basis points.

**Required:**
Based on the risk-premium approach, advise whether Simon Mbatia should purchase the corporate bond. (4 marks)

(f) Anthony Wekesa, a fixed income portfolio manager intends to add another bond to his portfolio. He uses mean-reversion analysis to determine the bond to purchase among the three bonds identified below:

**Credit spread and standard deviation in basis points (bps)**

| Bond | Current Spread | Historical mean spread | Standard deviation of spread |
|---|---|---|---|
| A | 300 | 210 | 50 |
| B | 320 | 230 | 30 |
| C | 340 | 240 | 40 |

The three bonds proposed above have similar durations, their credit spreads are normally distributed, and no structural changes are expected in the market.

**Required:**
Advise the portfolio manager on the most appropriate bond to purchase using the mean-reversion analysis approach.
(4 marks)
**(Total: 20 marks)**

**QUESTION FOUR**

(a) Assess how the following behavioural factors could influence asset allocation policy:

(i) Loss aversion. (2 marks)

(ii) Mental accounting. (2 marks)

(b) The following information relates to micro attribution analysis for a portfolio manager:

| Sector | Portfolio weight (%) | Benchmark weight (%) | Portfolio return (%) | Benchmark return (%) |
|---|---|---|---|---|
| Agriculture | 21.53 | 28.70 | 9.47 | 4.16 |
| Energy | 34.91 | 45.44 | 8.21 | 5.43 |
| Financial | 31.35 | 11.79 | 6.82 | 4.98 |
| Technology | 12.21 | 14.07 | -9.02 | -1.71 |
| Total portfolio | 100.00 | 100.00 | 5.94 | 4.01 |

The manager's objective is to outperform the benchmark through superior security selection.

**Required:**
Calculate each of the following returns for the portfolio manager:

(i) Pure-sector allocation return for the financial sector. (2 marks)

(ii) Within-sector selection return for the technology sector. (2 marks)

(c) Anderson Mwadima is the portfolio manager for the Sh.200 million Natural Industries defined benefit pension fund. He is planning to make a presentation to the trustees of the pension plan. His firm has come up with long term capital market expectations as shown below:

| Asset class | Expected return (%) | Expected standard deviation (%) | Correlations 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| Domestic equity | 12.00 | 16.00 | 1.00 | | | | |
| Domestic bonds | 8.25 | 6.50 | 0.32 | 1.00 | | | |
| International equity | 14.00 | 18.00 | 0.46 | 0.22 | 1.00 | | |
| International bonds | 9.25 | 12.25 | 0.23 | 0.56 | 0.32 | 1.00 | |
| Alternative investments | 11.50 | 21.00 | 0.25 | 0.11 | 0.08 | 0.06 | 1.00 |



Using the capital market expectations, the portfolio manager identifies an efficient frontier with six corner portfolios with the characteristics shown below:

| Corner portfolio | Expected return (%) | Expected standard deviation (%) | Sharpe ratio | Asset class weights: Domestic equity (%) | Domestic bonds (%) | International equity (%) | International bonds (%) | Alternative investments (%) |
|---|---|---|---|---|---|---|---|---|
| 1 | 14.00 | 18.00 | 0.639 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 |
| 2 | 13.66 | 16.03 | 0.696 | 0.00 | 0.00 | 85.36 | 0.00 | 14.64 |
| 3 | 13.02 | 13.58 | 0.775 | 21.69 | 0.00 | 56.56 | 0.00 | 21.75 |
| 4 | 12.79 | 13.00 | 0.792 | 21.48 | 0.00 | 52.01 | 5.24 | 21.27 |
| 5 | 10.54 | 8.14 | 0.988 | 9.40 | 51.30 | 26.55 | 0.00 | 12.76 |
| 6 | 8.70 | 6.32 | 0.981 | 0.00 | 89.65 | 4.67 | 0.00 | 5.68 |

**Additional information:**
1. The trustees have established a spending rate of 8.50%. Inflation is expected to be 2% per annum and the cost of managing the fund is expected to be 0.40%. The trustees would like to preserve the purchasing power of the fund and are concerned with multi period compounding issues.
2. The majority of plan participants are young, therefore additional liquidity needs are minimal.
3. The trustees would like to limit risk as defined by standard deviation to not more than 10% per year.

**Required:**

(i) The fund's required rate of return. (2 marks)

(ii) The appropriate strategic asset allocation for each asset class. (4 marks)

(iii) The Sharpe ratio of the market and the risk-free rate. (4 marks)

(iv) Advise on whether a risk-free asset should be included as an asset. (2 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) In relation to equity portfolio management, evaluate five advantages of short-extension strategies. (5 marks)

(b) Anthony Kioko is a small-cap growth manager who invests in domestic equities. He was hired by a pension fund that benchmarks him against a broad domestic market index provided below:

- Manager's return 18.0%
- Broad market return 15.0%
- Normal portfolio return 20.0%
- Total active risk 5.0%
- Misfit active risk 3.5%

**Required:**

(i) The true active risk. (3 marks)

(ii) Determine the manager's information ratio. (2 marks)

(c) Sukuk is a hedge fund that uses derivatives in its portfolio. A financial analyst is reviewing Sukuk's credit risk exposure. The firm's policy is to use a different counterparty for each derivative holding to limit its credit exposure to any single counterparty. Its current derivative holdings are shown below:

| Holding | Description | Notional principal Sh. | Current value Sh. |
|---|---|---|---|
| • Interest rate swap | 1-year, quarterly payments; pay floating, receive fixed | 2,000,000 | 56,000 |
| • Forward contract | 2 years long natural gas | 5,000,000 | –225,000 |
| • Option | 6 months; long call option on domestic equity index | 5,000,000 | 487,000 |

All derivatives are traded over the counter (OTC) and are not subject to collateral requirements.

**Required:**

The hedge fund's total amount at risk of credit loss from its derivatives under its current policy. (4 marks)

(d) Paul Ng'ang'a, a portfolio manager for Arab Energy's European technology fund is concerned about currency fluctuations related to the equity portfolio. The portfolio is valued in United States Dollars (USD) but has exposure to multiple European currencies, primarily the Euro (EUR).

The portfolio manager formulates the following market expectations for the coming year:

- Expected return (in EUR) of the portfolio is 13.2%
- Standard deviation (in EUR) of the portfolio is 15%
- Expected USD/EUR spot rate in one year is 1 EUR = 1.2045 USD
- Standard deviation of the USD/EUR exchange rate is 5%
- Correlation between the USD/EUR exchange rate and the portfolio in (EUR) is –0.07

The market quotes indicated below are available from a currency dealer:

- USD/EUR spot rate 1.1930
- 1-year USD/EUR forward rate (bid-offer) 1.2065 – 1.2090

Paul Ng'ang'a is contemplating selling EUR and buying USD using a 1-year forward contract to fully hedge the EUR currency risk. He will execute the trade if he can achieve the following risk-return objectives:

**Objective 1:** Increase the portfolio's expected return (in USD) by at least 25 basis points (bps).
**Objective 2:** Reduce the portfolio's expected standard deviation in USD by at least 30 basis points (bps).

**Required:**

Based on Paul Ng'ang'a's market expectations, determine whether he should execute the formal trade with respect to each of the following risk-return objectives:

(i) Objective 1. (3 marks)

(ii) Objective 2. (3 marks)

**(Total: 20 marks)**

.....

## Present Value of 1 Received at the End of $n$ Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

| Period | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 12% | 14% | 15% | 16% | 18% | 20% | 24% | 28% | 32% | 36% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .9901 | .9804 | .9709 | .9615 | .9524 | .9434 | .9346 | .9259 | .9174 | .9091 | .8929 | .8772 | .8696 | .8621 | .8475 | .8333 | .8065 | .7813 | .7576 | .7353 |
| 2 | .9803 | .9612 | .9426 | .9246 | .9070 | .8900 | .8734 | .8573 | .8417 | .8264 | .7972 | .7695 | .7561 | .7432 | .7182 | .6944 | .6504 | .6104 | .5739 | .5407 |
| 3 | .9706 | .9423 | .9151 | .8890 | .8638 | .8396 | .8163 | .7938 | .7722 | .7513 | .7118 | .6750 | .6575 | .6407 | .6086 | .5787 | .5245 | .4768 | .4348 | .3975 |
| 4 | .9610 | .9238 | .8885 | .8548 | .8227 | .7921 | .7629 | .7350 | .7084 | .6830 | .6355 | .5921 | .5718 | .5523 | .5158 | .4823 | .4230 | .3725 | .3294 | .2923 |
| 5 | .9515 | .9057 | .8626 | .8219 | .7835 | .7473 | .7130 | .6806 | .6499 | .6209 | .5674 | .5194 | .4972 | .4761 | .4371 | .4019 | .3411 | .2910 | .2495 | .2149 |
| 6 | .9420 | .8880 | .8375 | .7903 | .7462 | .7050 | .6663 | .6302 | .5963 | .5645 | .5066 | .4556 | .4323 | .4104 | .3704 | .3349 | .2751 | .2274 | .1890 | .1580 |
| 7 | .9327 | .8706 | .8131 | .7599 | .7107 | .6651 | .6227 | .5835 | .5470 | .5132 | .4523 | .3996 | .3759 | .3538 | .3139 | .2791 | .2218 | .1776 | .1432 | .1162 |
| 8 | .9235 | .8535 | .7894 | .7307 | .6768 | .6274 | .5820 | .5403 | .5019 | .4665 | .4039 | .3506 | .3269 | .3050 | .2660 | .2326 | .1789 | .1388 | .1085 | .0854 |
| 9 | .9143 | .8368 | .7664 | .7026 | .6446 | .5919 | .5439 | .5002 | .4604 | .4241 | .3606 | .3075 | .2843 | .2630 | .2255 | .1938 | .1443 | .1084 | .0822 | .0628 |
| 10 | .9053 | .8203 | .7441 | .6756 | .6139 | .5584 | .5083 | .4632 | .4224 | .3855 | .3220 | .2697 | .2472 | .2267 | .1911 | .1615 | .1164 | .0847 | .0623 | .0462 |
| 11 | .8963 | .8043 | .7224 | .6496 | .5847 | .5268 | .4751 | .4289 | .3875 | .3505 | .2875 | .2366 | .2149 | .1954 | .1619 | .1346 | .0938 | .0662 | .0472 | .0340 |
| 12 | .8874 | .7885 | .7014 | .6246 | .5568 | .4970 | .4440 | .3971 | .3555 | .3186 | .2567 | .2076 | .1869 | .1685 | .1372 | .1122 | .0757 | .0517 | .0357 | .0250 |
| 13 | .8787 | .7730 | .6810 | .6006 | .5303 | .4688 | .4150 | .3677 | .3262 | .2897 | .2292 | .1821 | .1625 | .1452 | .1163 | .0935 | .0610 | .0404 | .0271 | .0184 |
| 14 | .8700 | .7579 | .6611 | .5775 | .5051 | .4423 | .3878 | .3405 | .2992 | .2633 | .2046 | .1597 | .1413 | .1252 | .0985 | .0779 | .0492 | .0316 | .0205 | .0135 |
| 15 | .8613 | .7430 | .6419 | .5553 | .4810 | .4173 | .3624 | .3152 | .2745 | .2394 | .1827 | .1401 | .1229 | .1079 | .0835 | .0649 | .0397 | .0247 | .0155 | .0099 |
| 16 | .8528 | .7284 | .6232 | .5339 | .4581 | .3936 | .3387 | .2919 | .2519 | .2176 | .1631 | .1229 | .1069 | .0930 | .0708 | .0541 | .0320 | .0193 | .0118 | .0073 |
| 17 | .8444 | .7142 | .6050 | .5134 | .4363 | .3714 | .3166 | .2703 | .2311 | .1978 | .1456 | .1078 | .0929 | .0802 | .0600 | .0451 | .0258 | .0150 | .0089 | .0054 |
| 18 | .8360 | .7002 | .5874 | .4936 | .4155 | .3503 | .2959 | .2502 | .2120 | .1799 | .1300 | .0946 | .0808 | .0691 | .0508 | .0376 | .0208 | .0118 | .0068 | .0039 |
| 19 | .8277 | .6864 | .5703 | .4746 | .3957 | .3305 | .2765 | .2317 | .1945 | .1635 | .1161 | .0829 | .0703 | .0596 | .0431 | .0313 | .0168 | .0092 | .0051 | .0029 |
| 20 | .8195 | .6730 | .5537 | .4564 | .3769 | .3118 | .2584 | .2145 | .1784 | .1486 | .1037 | .0728 | .0611 | .0514 | .0365 | .0261 | .0135 | .0072 | .0039 | .0021 |
| 25 | .7798 | .6095 | .4776 | .3751 | .2953 | .2330 | .1842 | .1460 | .1160 | .0923 | .0588 | .0378 | .0304 | .0245 | .0160 | .0105 | .0046 | .0021 | .0010 | .0005 |
| 30 | .7419 | .5521 | .4120 | .3083 | .2314 | .1741 | .1314 | .0994 | .0754 | .0573 | .0334 | .0196 | .0151 | .0116 | .0070 | .0042 | .0016 | .0006 | .0002 | .0001 |
| 40 | .6717 | .4529 | .3066 | .2083 | .1420 | .0972 | .0668 | .0460 | .0318 | .0221 | .0107 | .0053 | .0037 | .0026 | .0013 | .0007 | .0002 | .0001 | * | * |
| 50 | .6080 | .3715 | .2281 | .1407 | .0872 | .0543 | .0339 | .0213 | .0134 | .0085 | .0035 | .0014 | .0009 | .0006 | .0003 | .0001 | * | * | * | * |
| 60 | .5504 | .3048 | .1697 | .0951 | .0535 | .0303 | .0173 | .0099 | .0057 | .0033 | .0011 | .0004 | .0002 | .0001 | * | * | * | * | * | * |

* The factor is zero to four decimal places



## Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

| Number of payments | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 12% | 14% | 15% | 16% | 18% | 20% | 24% | 28% | 32% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.9901 | 0.9804 | 0.9709 | 0.9615 | 0.9524 | 0.9434 | 0.9346 | 0.9259 | 0.9174 | 0.9091 | 0.8929 | 0.8772 | 0.8696 | 0.8621 | 0.8475 | 0.8333 | 0.8065 | 0.7813 | 0.7576 |
| 2 | 1.9704 | 1.9416 | 1.9135 | 1.8861 | 1.8594 | 1.8334 | 1.8080 | 1.7833 | 1.7591 | 1.7355 | 1.6901 | 1.6467 | 1.6257 | 1.6052 | 1.5656 | 1.5278 | 1.4568 | 1.3916 | 1.3315 |
| 3 | 2.9410 | 2.8839 | 2.8286 | 2.7751 | 2.7232 | 2.6730 | 2.6243 | 2.5771 | 2.5313 | 2.4869 | 2.4018 | 2.3216 | 2.2832 | 2.2459 | 2.1743 | 2.1065 | 1.9813 | 1.8684 | 1.7663 |
| 4 | 3.9020 | 3.8077 | 3.7171 | 3.6299 | 3.5460 | 3.4651 | 3.3872 | 3.3121 | 3.2397 | 3.1699 | 3.0373 | 2.9137 | 2.8550 | 2.7982 | 2.6901 | 2.5887 | 2.4043 | 2.2410 | 2.0957 |
| 5 | 4.8534 | 4.7135 | 4.5797 | 4.4518 | 4.3295 | 4.2124 | 4.1002 | 3.9927 | 3.8897 | 3.7908 | 3.6048 | 3.4331 | 3.3522 | 3.2743 | 3.1272 | 2.9906 | 2.7454 | 2.5320 | 2.3452 |
| 6 | 5.7955 | 5.6014 | 5.4172 | 5.2421 | 5.0757 | 4.9173 | 4.7665 | 4.6229 | 4.4859 | 4.3553 | 4.1114 | 3.8887 | 3.7845 | 3.6847 | 3.4976 | 3.3255 | 3.0205 | 2.7594 | 2.5342 |
| 7 | 6.7282 | 6.4720 | 6.2303 | 6.0021 | 5.7864 | 5.5824 | 5.3893 | 5.2064 | 5.0330 | 4.8684 | 4.5638 | 4.2883 | 4.1604 | 4.0386 | 3.8115 | 3.6046 | 3.2423 | 2.9370 | 2.6775 |
| 8 | 7.6517 | 7.3255 | 7.0197 | 6.7327 | 6.4632 | 6.2098 | 5.9713 | 5.7466 | 5.5348 | 5.3349 | 4.9676 | 4.6389 | 4.4873 | 4.3436 | 4.0776 | 3.8372 | 3.4212 | 3.0758 | 2.7860 |
| 9 | 8.5660 | 8.1622 | 7.7861 | 7.4353 | 7.1078 | 6.8017 | 6.5152 | 6.2469 | 5.9952 | 5.7590 | 5.3282 | 4.9464 | 4.7716 | 4.6065 | 4.3030 | 4.0310 | 3.5655 | 3.1842 | 2.8681 |
| 10 | 9.4713 | 8.9826 | 8.5302 | 8.1109 | 7.7217 | 7.3601 | 7.0236 | 6.7101 | 6.4177 | 6.1446 | 5.6502 | 5.2161 | 5.0188 | 4.8332 | 4.4941 | 4.1925 | 3.6819 | 3.2689 | 2.9304 |
| 11 | 10.3676 | 9.7868 | 9.2526 | 8.7605 | 8.3064 | 7.8869 | 7.4987 | 7.1390 | 6.8052 | 6.4951 | 5.9377 | 5.4527 | 5.2337 | 5.0286 | 4.6560 | 4.3271 | 3.7757 | 3.3351 | 2.9776 |
| 12 | 11.2551 | 10.5753 | 9.9540 | 9.3851 | 8.8633 | 8.3838 | 7.9427 | 7.5361 | 7.1607 | 6.8137 | 6.1944 | 5.6603 | 5.4206 | 5.1971 | 4.7932 | 4.4392 | 3.8514 | 3.3868 | 3.0133 |
| 13 | 12.1337 | 11.3484 | 10.6350 | 9.9856 | 9.3936 | 8.8527 | 8.3577 | 7.9038 | 7.4869 | 7.1034 | 6.4235 | 5.8424 | 5.5831 | 5.3423 | 4.9095 | 4.5327 | 3.9124 | 3.4272 | 3.0404 |
| 14 | 13.0037 | 12.1062 | 11.2961 | 10.5631 | 9.8986 | 9.2950 | 8.7455 | 8.2442 | 7.7862 | 7.3667 | 6.6282 | 6.0021 | 5.7245 | 5.4675 | 5.0081 | 4.6106 | 3.9616 | 3.4587 | 3.0609 |
| 15 | 13.8651 | 12.8493 | 11.9379 | 11.1184 | 10.3797 | 9.7122 | 9.1079 | 8.5595 | 8.0607 | 7.6061 | 6.8109 | 6.1422 | 5.8474 | 5.5755 | 5.0916 | 4.6755 | 4.0013 | 3.4834 | 3.0764 |
| 16 | 14.7179 | 13.5777 | 12.5611 | 11.6523 | 10.8378 | 10.1059 | 9.4466 | 8.8514 | 8.3126 | 7.8237 | 6.9740 | 6.2651 | 5.9542 | 5.6685 | 5.1624 | 4.7296 | 4.0333 | 3.5026 | 3.0882 |
| 17 | 15.5623 | 14.2919 | 13.1661 | 12.1657 | 11.2741 | 10.4773 | 9.7632 | 9.1216 | 8.5436 | 8.0216 | 7.1196 | 6.3729 | 6.0472 | 5.7487 | 5.2223 | 4.7746 | 4.0591 | 3.5177 | 3.0971 |
| 18 | 16.3983 | 14.9920 | 13.7535 | 12.6593 | 11.6896 | 10.8276 | 10.0591 | 9.3719 | 8.7556 | 8.2014 | 7.2497 | 6.4674 | 6.1280 | 5.8178 | 5.2732 | 4.8122 | 4.0799 | 3.5294 | 3.1039 |
| 19 | 17.2260 | 15.6785 | 14.3238 | 13.1339 | 12.0853 | 11.1581 | 10.3356 | 9.6036 | 8.9501 | 8.3649 | 7.3658 | 6.5504 | 6.1982 | 5.8775 | 5.3162 | 4.8435 | 4.0967 | 3.5386 | 3.1090 |
| 20 | 18.0456 | 16.3514 | 14.8775 | 13.5903 | 12.4622 | 11.4699 | 10.5940 | 9.8181 | 9.1285 | 8.5136 | 7.4694 | 6.6231 | 6.2593 | 5.9288 | 5.3527 | 4.8696 | 4.1103 | 3.5458 | 3.1129 |
| 25 | 22.0232 | 19.5235 | 17.4131 | 15.6221 | 14.0939 | 12.7834 | 11.6536 | 10.6748 | 9.8226 | 9.0770 | 7.8431 | 6.8729 | 6.4641 | 6.0971 | 5.4669 | 4.9476 | 4.1474 | 3.5640 | 3.1220 |
| 30 | 25.8077 | 22.3965 | 19.6004 | 17.2920 | 15.3725 | 13.7648 | 12.4090 | 11.2578 | 10.2737 | 9.4269 | 8.0552 | 7.0027 | 6.5660 | 6.1772 | 5.5168 | 4.9789 | 4.1601 | 3.5693 | 3.1242 |
| 40 | 32.8347 | 27.3555 | 23.1148 | 19.7928 | 17.1591 | 15.0463 | 13.3317 | 11.9246 | 10.7574 | 9.7791 | 8.2438 | 7.1050 | 6.6418 | 6.2335 | 5.5482 | 4.9966 | 4.1659 | 3.5712 | 3.1250 |
| 50 | 39.1961 | 31.4236 | 25.7298 | 21.4822 | 18.2559 | 15.7619 | 13.8007 | 12.2335 | 10.9617 | 9.9148 | 8.3045 | 7.1327 | 6.6605 | 6.2463 | 5.5541 | 4.9995 | 4.1666 | 3.5714 | 3.1250 |
| 60 | 44.9550 | 34.7609 | 27.6756 | 22.6235 | 18.9293 | 16.1614 | 14.0392 | 12.3766 | 11.0480 | 9.9672 | 8.3240 | 7.1401 | 6.6651 | 6.2402 | 5.5553 | 4.9999 | 4.1667 | 3.5714 | 3.1250 |

# KASNEB

**CIFA PART III SECTION 6**

**ADVANCED PORTFOLIO MANAGEMENT**

**THURSDAY: 26 May 2016.** **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) Discuss the following enhanced bond indexing strategies as identified by Kenneth E. Volpert (2000):

(i) Lower cost enhancements. (1 mark)

(ii) Issue selection enhancements. (1 mark)

(iii) Yield curve positioning. (1 mark)

(iv) Sector and quality positioning. (1 mark)

(v) Call exposure positioning. (1 mark)

(b) Highlight three assumptions of classical bond immunisation theory. (3 marks)

(c) The investment committee of RBC Bank Ltd.'s pension scheme is not pleased with the recent performance of the fixed-income portion of their investment and have fired the fixed-income manager. The investment committee has hired a consultant from Alexandria Financial Services (AFS) to assess the portfolio's risks, submit recommendations to the committee, and manage the portfolio on its behalf on an interim basis. The current portfolio benchmarked against an index is shown in Table I below:

**Table I:** RBC Bank Ltd.'s pension scheme fixed-income portfolio information:

| | Portfolio | | Index | |
|---|---|---|---|---|
| **Sector** | **%** | **Duration** | **%** | **Duration** |
| Treasury | 47.74 | 5.50 | 49.67 | 5.96 |
| Agencies | 14.79 | 5.80 | 14.79 | 5.10 |
| Corporates | 12.35 | 4.50 | 16.54 | 5.61 |
| Mortgage-backed securities | 25.12 | 4.65 | 19.10 | 4.65 |

**Note:** Spread durations are the same as effective durations for all sectors with similar spread risk.

The consultant has noticed that the fired manager's portfolio did not constitute securities outside of the index universe. The investment committee has requested him to consider an indexing strategy including related benefits and logical problems.

The consultant has identified the undermentioned three factors that had limited the manager's ability to replicate a bond index:

1. Lack of availability of certain bond issues.
2. Limited market capitalisation of the bond universe.
3. Differences between the bond prices used by the manager and the index provider.

After conducting further analysis of the current treasury securities portion of the portfolio, the consultant discovers that there was a significant overweight in a 5-year treasury bond (Sh.10 million par value). He anticipates the yield curve to flatten and forecasts a six-month horizon price of the 5-year treasury bond to be Sh.99.50. Therefore, his strategy will be to sell 5-year treasury bonds and invest the proceeds in 10-year treasury bonds and cash while maintaining the dollar duration of the portfolio.

The Treasury bond information is shown in Table II below:

**Table II:** Treasury bond information:

| Tenor (Years) | Coupon (%) | Maturity date | Duration | Price (Sh.) | Yield (%) |
|---|---|---|---|---|---|
| 5-year | 4.125 | 15 May 2011 | 4.53 | 100.40625 | 4.03 |
| 10-year | 5.250 | 15 May 2016 | 8.22 | 109.09375 | 4.14 |

**Note:** Prices are shown per Sh.100 par value.

**Required:**

(i) The duration of the RBC Bank Ltd.'s pension scheme fixed income portfolio with reference to the information given in Table I above. (2 marks)

(ii) Using the information given in Table I, compute the spread duration of RBC Bank Ltd.'s fixed-income portfolio. (2 marks)

(iii) Based on the data in Table I, identify, giving an appropriate reason, the bond portfolio strategy used by the fired manager. (1 mark)

(iv) In relation to the three factors identified by the consultant, describe the factor that is least likely to limit a manager's ability to replicate a bond index. (1 mark)

(v) Using the consultant's forecasted price and the bond information given in Table II, calculate the expected 6-month total return of the 5-year, 4.125% treasury bond.
(Assume zero accrued interest at purchase).
(2 marks)

(vi) With reference to the information given in Table II, estimate the par value of the 10-year bonds to be purchased to execute the consultants' strategy. (4 marks)

**(Total: 20 marks)**



**QUESTION TWO**

(a) In relation to relative value analysis, evaluate the following tools used by fixed income portfolio managers when analysing yield spread levels:

(i) Mean-reversion analysis. (2 marks)

(ii) Quality spread analysis. (2 marks)

(iii) Per cent yield spread analysis. (2 marks)

(b) Peterson Orengo, a portfolio manager with Beta Asset Managers (BAM) decided to buy corporate bonds with a market value of Sh.5 million. To finance 60 per cent of this purchase, Peterson entered into a 30-day repurchase agreement (repo) with the bond dealer. The 30-day term repo rate was 4.6 per cent per annum. At the end of the 30 days, the bonds purchased by Peterson had increased in value by 0.5 per cent and Peterson decided to sell the bonds. No coupons were received during the 30-day period.

**Required:**

(i) The 30-day rate of return on the equity and the borrowed components of the portfolio. (3 marks)

(ii) The 30-day portfolio rate of return. (2 marks)

(iii) The 30-day portfolio rate of return assuming the increase in value of the bonds was 0.3% instead of 0.5 %. (2 marks)

(iv) Based on the result obtained in (b)(ii) and (b)(iii) above, comment on the effect of leverage on the portfolio rate of return. (2 marks)

(v) Explain the reason why the bond dealer faces credit risk even if he holds the collateral. (1 mark)

(c) Anthony Wanyagia, an equity portfolio manager, has reviewed the holdings of the existing large cap portfolio and has asked his trader to sell the four securities illustrated below:

**Trade order and market data**

| Security | Order size (shares) | Average daily volume (shares) | Bid-ask Spread | Share price (Sh.) | Urgency to complete trade |
|---|---|---|---|---|---|
| A | 15,000 | 812,000 | Wide | 15.50 | Low |
| B | 48,000 | 972,000 | Narrow | 12.50 | Low |
| C | 3,000 | 77,000 | Narrow | 9.80 | High |
| D | 19,000 | 59,000 | Narrow | 7.50 | High |

**Required:**
Using the data provided, justify the security for which each of the following trade execution tactics is most appropriate:

(i) Volume weighted average price (VWAP) algorithm. (2 marks)

(ii) Implementation shortfall algorithm. (2 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Highlight three limitations of holdings-based style analysis compared to returns-based style analysis. (3 marks)

(b) Giving four reasons, justify why some investors believe that more price inefficiency could be found on the short side of the market than on the long side of the market. (4 marks)

(c) Vincent Nderi is a pension consultant and is tasked to evaluate the following portfolios:

1. **Portfolio 1:** A highly concentrated portfolio with five stocks representing 75% of the total portfolio.
2. **Portfolio 2:** A highly diversified portfolio with over 400 stocks, none of which represent more than 1% of the total portfolio.
3. **Portfolio 3:** A diversified portfolio of 70 stocks, with the top ten names representing 30% of the total portfolio.

The following investment results were recorded in the year 2015:

| | Portfolio 1 | Portfolio 2 | Portfolio 3 | Market Index |
|---|---|---|---|---|
| Return (%) | 42.0 | 25.0 | 16.0 | 20.0 |
| Standard deviation | 1.20 | 0.40 | 0.20 | 0.50 |
| Beta | 1.80 | 1.20 | 0.50 | 1.00 |

The risk free rate is 6%.

**Required:**
For each portfolio, calculate and interpret the following:

(i) Treynor measure. (2 marks)

(ii) Modigliani-Modigliani ($M^2$) measure. (2 marks)

(iii) Jensen measure. (2 marks)

(d) Mike Mutivo, a portfolio manager at Kancom Capital, made the following transactions in CMS Limited shares for a portfolio that he manages:

Day 1: At market close, CMS Limited shares are priced at Sh.75.
Day 2: Before the market opens, he decides to buy 8,000 shares at Sh.74 per share by placing a limit order that would expire at the end of the day. The limit order does not fill and the CMS Limited shares close the day at Sh.75.75. After the market closes, the company announces that it has entered into a joint venture which would expand its international presence. Mike assumes that this announcement could make the price of the company move up or down by Sh.1.00.

Day 3: He places a new limit order to buy 8,000 shares of CMS Limited at a price of Sh.77. As the trading day nears to an end, 4,000 shares fill at Sh.77 per share plus Sh.1,500 in commission. CMS Limited shares close at Sh.79 that day and the remaining 4,000 shares are never purchased.

**Required:**
The total amount of implementation shortfall for CMS Limited's shares transaction. (3 marks)

(c) Elimu Foundation has received a Sh.20 million global government bond portfolio from a German donor. This bond will be denominated in Shillings and managed separately from Elimu Foundation's non-shilling denominated bonds. The bond portfolio is currently hedged and the Chief Finance Officer of Elimu Foundation is considering whether to hedge the currency risk of the portfolio.

The bond portfolio's current allocation and relevant country performance data are given below:

**Elimu Foundation**
**Current Allocation**
**Global Government Bond Portfolio**

| Country | Allocation (%) | Maturity (years) |
|---|---|---|
| Germany | 25 | 5 |
| A | 40 | 5 |
| B | 10 | 10 |
| C | 10 | 5 |
| D | 15 | 10 |

**Country Performance Data**
**(in local currency)**

| Country | Cash return (%) | 5-year excess bond return (%) | 10-year excess bond return (%) | Unhedged currency return (%) |
|---|---|---|---|---|
| Germany | 2.0 | 1.5 | 2.0 | - |
| A | 1.0 | 2.0 | 3.0 | -4.0 |
| B | 4.0 | 0.5 | 1.0 | 2.0 |
| C | 3.0 | 1.0 | 2.0 | -2.0 |
| D | 2.6 | 1.4 | 2.4 | -3.0 |



**Required:**
The expected total annual return of the current bond portfolio. (Assume that the Chief Executive Officer of the foundation decides to leave the currency risk unhedged). (4 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Describe how integrating the Black-Litterman approach into the asset allocation process would affect the following:

(i) Specification of expected return. (2 marks)

(ii) Level of market diversification of the resulting portfolio. (2 marks)

(b) James Kiptoo, a Portfolio Manager, intends to purchase 5,000 shares of EAP Ltd., which had an initial public offer (IPO) recently. However, James was not able to get any shares at the IPO price of Sh.30 per share. James would still like to purchase the 5,000 shares, but not at a price above Sh.45 per share.

**Required:**
(i) Giving an appropriate reason, explain whether James should place a market order or a limit order. (1 mark)

(ii) Evaluate one advantage and one disadvantage of the preferred order in (b)(i) above. (2 marks)

(c) Johnson Makau, a CFA graduate working as a Portfolio Manager with East Africa Financial Services (EAFS), expects to receive a cash inflow of Sh.50 million in three months time. Johnson intends to use futures contracts to take a Sh.17.5 million synthetic position in stocks and Sh.32.5 million in bonds today.

**Additional information:**

1. The stock would have a beta of 1.15.
2. The bonds would have a modified duration of 7.65.
3. A stock index futures contract with a beta of 0.93 is priced at Sh.175,210.
4. A bond futures contract with a modified duration of 5.65 is priced at Sh.95,750.
5. When the futures contract expires in three months, stocks and bonds will have declined by 5.4% and 3.06% respectively.

**Required:**

(i) The number of stock and bond futures contracts that Johnson Makau would have to trade in order to synthetically take the desired position in stocks and bonds today. (7 marks)

(ii) Show that profits on the futures positions are essentially the same as the change in the value of stocks and bonds during the three-month period. (6 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Evaluate three practical risk management benefits that might accrue to an investment manager who keeps rebalancing his clients' portfolios. (3 marks)

(b) Discuss four biases that could arise in the hedge fund benchmark selection. (4 marks)

(c) Jamal Shah holds an investment account with Fahali Financial Services (FFS), a local investment firm based in her country. Jamal makes contributions to her account based on availability of funds. Being a business person, Jamal receives money from her clients on an irregular basis. By 1 June 2015, her account had Sh.100,000. On 14 June 2015, Jamal received Sh.3,000 and deposited the amount to her account the same day. On 21 June 2015, she received Sh.2,500 and made another contribution to her account. The value of her account after the 14 June 2015 contribution was Sh.105,000, and her account value after the 21 June 2015 contribution was Sh.108,000. Jamal's account was valued at Sh.110,000 on 30 June 2015.

**Required:**

Jamal Shah's time-weighted rate of return. (6 marks)

(d) A Japanese company issues a corporate bond with a face value of ¥1.2 billion and a coupon rate of 5.25 per cent. The company decides to use a swap to convert this bond into a euro-denominated bond. The current exchange rate is ¥120 €. The fixed rate on euro-denominated swaps is 6 per cent, and the fixed rate on yen-denominated swaps is 5 per cent.

(**Note:** All payments will be made annually, so there is no adjustment such as Days/360).

**Required:**

(i) Describe the terms of the swap and identify the cash flows at the start. (3 marks)

(ii) Identify all interest cash flows at each interest payment date. (2 marks)

(iii) Identify all principal cash flows at the maturity of the bond. (2 marks)

**(Total: 20 marks)**

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# KASNEB

## CIFA PART III SECTION 6

## ADVANCED PORTFOLIO MANAGEMENT

## PILOT PAPER

**September 2015.** **Time Allowed: 3 hours.**

**Answer ALL questions. Marks allocated to each question are shown at the end of the question.**

**QUESTION ONE**

(a) Explain how asset allocation policy is influenced by the following:

(i) Loss aversion. (2 marks)

(ii) Mental accounting. (2 marks)

(iii) Fear of regret. (2 marks)

(b) A perpetual foundation needs a 5% current distribution, expenses of 0.5% and expected general inflation of 2%. However, inflation relating to the foundation's distribution is 3%.

**Required:**

(i) Additive required rate of return. (2 marks)

(ii) Compounded required return. (2 marks)

(c) Suppose an investor requires before-tax return of 8%, has risk aversion score of 7 and she can invest in one of two portfolio allocations A or B, which meet her required return and risk (standard deviation) objectives. The allocations are as follows:

- Allocation A (Portfolio A) has an expected return of 8.5% and a standard deviation of 9%.
- Allocation B (Portfolio B) has an expected return of 8.8% and a standard deviation of 10%.

**Required:**

Determine the investor's utility in each portfolio allocation and advise the investor on which allocation to choose. (4 marks)

(d) Explain the strengths and weaknesses of mean-variance optimisation as an asset allocation approach. (6 marks)

**(Total: 20 marks)**

**QUESTION TWO**

(a) Outline three advantages and three disadvantages of enhanced indexing by small risk factor mismatches as a bond portfolio strategy. (6 marks)

(b) Regardless of strategy employed, a bond portfolio manager should be judged against benchmark and the benchmark should match the characteristics of the portfolio.

Describe the following considerations when selecting a benchmark:

(i) Market value risk. (2 marks)

(ii) Credit risk. (2 marks)

(iii) Income risk. (2 marks)

(iv) Liability framework risk. (2 marks)

(c) Paul Kite's portfolio consists of the bonds shown below:

| Bond | Market value (Sh. '000') | Effective duration |
|---|---|---|
| I | 370 | 4.5 |
| II | 420 | 6.0 |
| III | 210 | 7.8 |
| Portfolio | 1000 | ? |

**Required:**

(i) The effective duration of Paul Kite's portfolio. (2 marks)

(ii) Interpret the significance of the above measure. (2 marks)

(d) An investor has Uganda shillings (USh.) 100 million and would like to institute a contingent immunisation strategy over the next six years. Current rates of return for immunisation strategies are 100% but the investor is willing to accept an 8.5% rate of return. This active strategy is to purchase KSh.100 million in 8% coupon semi-annually compounded 25-year bonds priced to yield 10%.

**Required:**

Determine the investor's cushion spread. (2 marks)

**(Total: 20 marks)**

**QUESTION THREE**

(a) Alex Otuoma, a portfolio manager at Beta Capital, has Sh.40 million of funds to invest. He borrows an additional Sh.100 million at 4% per annum in the hope of magnifying the rate of return on the portfolio.

Assume that the manager can invest all the funds at a rate of 4.5% per annum.

**Required:**

(i) The leveraged rate of return on the portfolio. (2 marks)

(ii) The rate of return on each component of the portfolio. (2 marks)

(b) Explain the following approaches to hedging the currency risk in an international bond investment:

(i) The forward hedge. (3 marks)

(ii) The proxy hedge. (3 marks)

(iii) The cross hedge. (3 marks)

(c) A portfolio manager is considering exchanging one bond issue for another that he believes is undervalued:

- The existing bond has a total market value of Sh.11 million with a price of Sh.160 and a duration of 8.
- The new bond has a duration of 10 and a price of Sh.180.

**Required:**

The par value of the new bond necessary to keep the duration of the portfolio constant. (3 marks)

(d) Two managers, Jerry and Tom, follow the stocks in a broad market index and have made independent forecasts. Jerry has made 400 independent forecasts and has an information co-efficient of 0.05. Tom has made 150 independent forecasts and has information co-efficient of 0.07.

**Required:**

(i) Each manager's information ratio. (2 marks)

(ii) The manager with the better performance. (2 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

(a) Evaluation of portfolio performance heavily relies on benchmarks. Explain any five characteristics which these benchmarks must possess for them to be relevant. (10 marks)

(b) Weru has a 10-year bond in an actively managed portfolio. The bond has a market value of Sh.50 million and a duration of 4.7. The portfolio has a total value of Sh.200 million and a duration of 6.8. The basis point change is 100.

**Required:**

The percentage contribution of the bond's shilling duration to the portfolio's shilling duration. (4 marks)

(c) A portfolio manager must be aware of the risks that relate to market interest rates and the structure of the bonds in the portfolio.

Describe the following types of risks:

(i) Interest rate risk. (2 marks)

(ii) Contingent claim risk. (2 marks)

(iii) Cap risk. (2 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) With regard to international fixed income portfolio management, describe any three sources of excess return that a portfolio manager may use instead of passively overseeing the portfolio. (6 marks)

(b) Monsura, an investor uses a core-satellite approach to allocate funds amongst equity managers. The equity managers' active risk, active return and allocations are shown as follows:

| | Active risk | Active return | Allocation |
|---|---|---|---|
| Enhanced indexing | 1.7% | 2.5% | 45% |
| Active Manager X | 1.9% | 3.00% | 25% |
| Active Manager Y | 3.3% | 5.5% | 10% |
| Active Manager Z | 3.9% | 7.2% | 5% |
| Passive index | 0.00% | 0.000% | 15% |



Assume that the correlation between the managers' active returns is zero.

**Required:**

(i) Describe the investor's core. (2 marks)

(ii) Determine the investor's active return. (2 marks)

(iii) Determine the investor's active risk. (2 marks)

(iv) Determine the investor's information ratio. (2 marks)

(c) Maryanne Ngeno plans to buy crude oil in one month to produce gasoline and heating oil for sale in two months. The 1-month futures price for crude oil is currently selling for Sh.18,000. The 2-month futures price for gasoline and heating oil per barrel are Sh.20,000 and Sh.23,000 respectively.

**Required:**

The 5-3-2 track (commodity) spread. (3 marks)

(d) Kamongo foundation entered into a 2-year credit default swap on a notional principal of Sh.100,000,000 of a 5-year bond issued by the matrix corporation. The swap specifies an annual premium of 55 basis points and cash settlement.

Assume that the matrix corporation defaults at the end of the first year, and the bonds are trading at 60 cents to the shilling.

**Required:**

Describe the cash flows associated with the credit default swap. (3 marks)

**(Total: 20 marks)**

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