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CIFA PART II SECTION 4

PORTFOLIO MANAGEMENT

FRIDAY: 25 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)   Your national government has recently embraced devolution and established county governments. As an experienced Certified Investment and Financial Analyst (CIFA), you have received an invitation to address an investment conference that will be taking place in your home county.

Required:
(i)   In your presentation, enumerate four emerging investment products that you would recommend to the county government to enable it to be more independent from the central government funding.   (4 marks)

(ii)   Propose three constraints that the county government is likely to encounter while executing the recommendations identified in (a)(i) above.   (3 marks)

(b)   The following information relates to the expected returns of shares of two companies held by Jemima Sheri in the securities exchange:

Market return (%)	Aggressive company shares (%)	Defensive company shares (%)
6	2	8
20	30	16

Additional information:
1.   The risk-free rate is 7%.
2.   The 6% and 20% market returns have an equal chance of occurrence.

Required:
(i)   Beta for each company's shares.   (2 marks)

(ii)   Expected return on each company's shares.   (2 marks)

(iii) The security market line (SML).   (3 marks)

(iv)   Alpha for each company's shares.   (4 marks)

(c)   With respect to Harry Markowitz's modern portfolio theory (MPT), explain the following terms:

(i)   Tangent line.   (1 mark)

(ii)   Efficient frontier.   (1 mark)
          (Total: 20 marks)

QUESTION TWO
(a)   Summarise three benefits of a well written investment policy statement (IPS).   (3 marks)

(b)   Explain two applications of the capital asset pricing model (CAPM).   (4 marks)

(c)   Zuhura Limited is a small company operating in a highly cyclical industry and all of its revenues are generated from its domestic country. The company has rising earnings and a strong (low debt) balance sheet. Zuhura Limited's defined benefit (DB) pension plan is divided into two parts; the active-lives portion (current employees) and the retired-lives portion (retired employees). The active-lives portion of Zuhura Limited's plan is Sh.100 million in assets and a Sh.5 million surplus. The portion of the plan is structured as shown below:

Original asset allocation for the active-lives portfolio:

Asset Class:	Allocation (%)
Large-capitalisation domestic shares	50
Small-capitalisation domestic shares	10
30-day treasury bills	10
Intermediate-term bonds	20
Long-term bonds	10

Notes:

Risk-free rate	5.0%
Expected return of total portfolio	9.0%
Standard deviation	13.0%
Sharpe ratio	0.31

Additional information:
1.   The duration of the active-lives portion of the plan's liabilities is 20 years.
2.   The discount rate applied to these liabilities is 7.5%.
3.   The workforce with an average age of 39, is relatively young.
4.   The return objective for the active-lives portion of the pension plan is 9%.

Required:
Create and justify, using the above information, the following three elements of the investment policy statement (IPS) for the active-lives portion of Zuhura Limited pension plan.

(i)   Return objective.   (3 marks)

(ii)   Risk tolerance.   (3 marks)

(iii)   Time horizon.   (3 marks)

(d)   Philomena Mwaboza intends to invest in Blue Star Limited shares. The value of the company's shares depends on various parameters as illustrated below:

Factor	Beta	Expected value (%)	Actual value (%)
Gross National Product (GNP)	1.20	7.70	7.70
Inflation	1.75	5.50	7.00
Interest rate	1.30	7.75	9.00
Share market index	1.70	10.00	12.00
Industrial production	1.00	7.00	7.50

The risk-free rate of interest is 9.25%.

Required:
Determine the return of the company's share using the Arbitrage Pricing Theory (APT).   (4 marks)
(Total: 20 marks)

QUESTION THREE
(a)   In the context of portfolio management, describe the following terms:

(i)   Risk tolerance.   (2 marks)

(ii)   Indifference curve.   (2 marks)

(iii)   The two fund separation theorem.   (2 marks)

(iv)   Risk parity strategy.   (2 marks)

(b)   Discuss two limitations of the fundamental law of active management.   (2 marks)

(c)   Joyce Cheptoo makes monthly allocation decisions between agricultural sector and industrial sector based on proprietary model. The historical correlation between the returns of the two sectors is 0.30. Cheptoo's bets have been 60% correct. Further information is provided below:

Sector	Expected return E(R) (%)	Standard deviation (σ) (%)	Benchmark weights (%)
Agricultural	10.8	3.0	65
Industrial	13.2	5.0	35

Required:

(i)   The annualised active risk of Joyce Cheptoo's sector rotation strategy.   (2 marks)

(ii)   The expected annualised active return of Joyce Cheptoo's sector rotation strategy.   (2 marks)

(iii)   The allocation to the agricultural sector assuming that Joyce Cheptoo feels that industrial sector will outperform the agricultural sector over the next month and assuming that the active risk is limited to 5.20%.   (2 marks)

(d)   Omega fund has information ratio of 0.2 and active risk of 9%. The benchmark portfolio has a sharpe ratio of 0.4 and a total risk of 12%. A portfolio (P) with an optimal level of active risk, can be constructed by combining Omega fund and the benchmark portfolio.

Required:

(i)   Calculate portfolio P's Sharpe ratio.   (2 marks)

(ii)   Determine the proportion of benchmark and Omega fund in portfolio (P).   (2 marks)
            (Total: 20 marks)

QUESTION FOUR

(a)   You are the chief financial analyst for investments at Peakcock Pension Plan, and you have been trying to invest efficiently on the asset-side so that the pension fund achieves its expected rate of return. However, having seen a convincing argument that pension fund management should consider not only the asset-side but also the liability-side, you decide to incorporate the liability of the pension plan into your analysis. The table below contains current information about asset and liability-sides:

	Initial value Sh. "million"	Expected Return (%)	Risk Standard deviation (%)	Correlation against bonds	Correlation against equity
Equity	60	8	15	0.3	1
Bonds	90	3	4	1	0.3
Liability	100	3.5	6	0.8	0.2

Required:

(i)   Peakcock Pension Plan's funding ratio.   (1 mark)

(ii)   Identify three actions that could be taken by the pension plan in the light of the funding ratio obtained in (a)(i) above.   (3 marks)

(iii)   Peakcock Pension Plan's overall expected return and risk (standard deviation).   (4 marks)

(iv)   The correlation between asset and liability for the Pension Plan.   (2 marks)

(b)   Explain six types of risks that could affect a portfolio.   (6 marks)

(c)   Evaluate two advantages and two limitations of value at risk (VaR) as a risk management technique.   (4 marks)
            (Total: 20 marks)

QUESTION FIVE

(a) Describe three systematic trading biases that could impact investment decisions. (6 marks)

(b) Ndonye and his wife Lilian are planning for retirement and want to compare the past performance of a few mutual funds they are considering for investment. They believe that a comparison over a five-year period would be appropriate. They are provided with the following information about the LowBridge fund that they are considering:

Year	Asset under management at the beginning of the year (Sh. "million")	Net Return (%)
1	30	15
2	45	- 5
3	20	10
4	25	15
5	35	3

The couple is concerned that the effect of both tax and inflation might reduce their return. Based on the current tax code, they expect to pay 30% tax on the return they earn from investment, inflation has been around 2% and they expect the same rate of inflation to be maintained.

Required:

(i) The holding period return for the five-year period. (2 marks)

(ii) The geometric mean annual return. (2 marks)

(iii) The anticipated after tax real return that an investor would have earned in the fifth year. (2 marks)

(c) Cynthia Nyamai has estimated the covariance between Ugandan equities and Kenyan equities as 230 using historical data. Using a factor model approach based on proxy for the world market portfolio, she estimates the covariance as 190. Cynthia takes a shrinkage estimator approach when estimating covariances and determines that the optimal weight on the historical estimate is 0.30.

Required:

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

(ii) Describe the theoretical advantage of a shrinkage estimate of covariance compared to a raw historical estimate. (2 marks)

(d) An equity financial manager has created the following data to illustrate the application of utility theory to portfolio selection:

Investment	Expected return $[E(r)]$ (%)	Expected standard deviation (σ) (%)
P	18	2
Q	19	8
R	20	15
S	18	30

The utility function is expressed as: $U = E(r) - \frac{1}{2} A\sigma^2$

Required:
Using suitable computations:

(i) Identify the investment suitable for a risk-neutral investor. (1 mark)

(ii) Identify suitable investment for a risk-seeking investor assuming that the measure for risk aversion (**A**) has a value of **-2**. (1 mark)

(iii) Identify the suitable investment for a risk-averse investor assuming that the measure for risk aversion has a value of **2**. (1 mark)

(iv) Assuming that the measure for risk aversion has a value of **4**, identify the suitable investment for a risk-averse investor. (1 mark)

(Total: 20 marks)

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