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CIFA PART II SECTION 4

PORTFOLIO MANAGEMENT

MONDAY: 30 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)   In the context of pooled investment products, examine four differences between "conventional mutual funds" and "exchange traded funds (ETFs)".
(4 marks)

(b)   Joel Mundia, an investment products analyst, has gathered the following information about three stocks:

State of economy	Probability of State of economy	Rate of return if state of economy occurs		
		Stock A	Stock B	Stock C
Boom	0.35	0.20	0.35	0.60
Normal	0.40	0.15	0.12	0.05
Bust	0.25	0.01	− 0.25	− 0.50

Additional information:
1.   Joel Mundia has invested 40% each in stock A and B and 20% in stock C.
2.   The expected Treasury bill rate is 3.80% and expected inflation rate is 3.50%.

Required:
Calculate the following:

(i)   Portfolio expected return.   (4 marks)

(ii)   Portfolio standard deviation.   (2 marks)

(iii)   Expected risk premium on the portfolio.   (2 marks)

(iv)   Expected real risk premium on the portfolio.   (2 marks)

(c)   Benson Mwahima is a risk manager for a large multinational agribusiness firm. The firm grows its own maize, wheat and soya beans but pays large sums of money to third parties for pesticides, fertilizer and other supplies. For these payments, the company borrows heavily to finance its purchases. Customers typically purchases from them on credit. Moreover, the company buys and sells its products and raw materials worldwide, often transacting the domestic currency of its customers and suppliers. This year, the firm intends to finance its expansion through issue of equity.

Required:
Recommend and justify six risk exposures that should be reported as part of an enterprise risk management (ERP) system for this firm.
(6 marks)
(Total: 20 marks)

QUESTION TWO
(a)   In the context of behavioural finance, discuss four information processing biases.   (8 marks)

(b)   Susan Opiyo, an investor estimates that her annual living expenses will average Sh.132,500 before taking into account her daughter's educational costs. Susan believes that if necessary, she can reduce her spending by Sh.32,500. She plans to meet her living expenses with the proceeds from her motivational speaking amounting to Sh.50,000 annually and her investment portfolio amounting to sh.82,500. Because of the uncertainty of her motivational speaking fees, Susan plans to establish an emergency reserve equal to one year's living expenses.

She has recently received an inheritance of Sh.1,020,000. She also holds Sh.75,000 in a balanced mutual fund and Sh.25,000 in a money market fund.

Susan intends to re-evaluate her investment policy statement and asset allocation guidelines every three years.

Required:

(i)   Discuss the investor's liquidity requirements.   (4 marks)

(ii)   Determine the investor's return requirement.   (3 marks)

(iii)   Evaluate whether the investor's portfolio can be expected to satisfy that requirement assuming inflation averages 3% annually and she reduces her annual living expenses to Sh.100,000.   (2 marks)

(iv)   Explain why an analysis of the investor's investment policy statement might become necessary before the next three-year review.   (3 marks)

         (Total: 20 marks)

QUESTION THREE

(a)   Explain three functions of a private wealth manager.   (6 marks)

(b)   Grace Wanjohi and Colnerius Korir both have Sh.100,000 each split equally between a tax deferred account and a taxable account. Grace chooses to put stock with an expected return of 7% in the tax deferred account and bonds yielding 4% in the taxable account. Colnerius chooses to put stock with an expected return of 7% in the taxable account and bonds yielding 4% in the tax deferred account. When held in taxable account, equity returns will be taxed entirely as capital gains at a 5% rate, while interest income is taxed annually at a rate of 15%. The tax rate applicable to withdrawals from the tax deferred account will be 30%.

Required:

Calculate for Grace Wanjohi and Colnerius Korir, the after tax accumulation after 20 years.   (4 marks)

(c)   The investment committee of Matrix investment Ltd. used reports from various security analysts to develop inputs for the single-index model.

The output derived from the single model consisted of the following efficient portfolios:

Portfolio	Expected return (%)	Standard deviation (%)
A	8	3
B	10	6
C	13	8
D	17	13
E	20	18

Required:

(i)   Assuming that the prevailing risk free rate is 6%, determine the optimal portfolio.   (5 marks)

(ii)   Assuming that the standard deviation of 12% were acceptable, determine the expected portfolio return and demonstrate how Matrix Investment Ltd. would finance it.   (3 marks)

(iii)   The investment committee would like to earn an expected return of 10% with a standard deviation of 4%.

Using suitable computation, explain whether this is possible.   (2 marks)

         (Total: 20 marks)

QUESTION FOUR

(a)   Explain the following terms as used in investment management:

(i)   Fintech.   (2 marks)

(ii)   Robo-Advisory services.   (2 marks)

(iii)   Distributed ledger technology (DLT).   (2 marks)

(b) John Omurundo has gathered the following information about four individual securities whose active returns are uncorrelated with each other and forecasts are independent from year to year.

The active return forecasts, active risks and the active weights for each security are shown below:

Security	Expected active Return (%)	Active return Volatility (%)	Active weight (%)
1	5	25	18
2	10	50	9
3	−5	25	−18
4	10	50	−9

Required:

(i) The portfolio weights and the total expected returns for each of the four securities given that the benchmark portfolio for these four securities is equally weighted and that the forecasted return on the benchmark is 10%. (3 marks)

(ii) The forecasted total return and active return of the managed portfolio. (2 marks)

(iii) The active risk of the managed portfolio. (2 marks)

(iv) Verify the basic fundamental law of active management using the expected active return and active risk of the managed portfolio. The individual security active return forecasts and active weights were sized using an information coefficient of 0.20, breadth of 4 and active risk. (3 marks)

(c) With an aid of a well labelled diagram, differentiate between an "efficient portfolio" and an "optimal portfolio". (4 marks)

(Total: 20 marks)

QUESTION FIVE

(a) (i) Explain the term "ethical investor". (2 marks)

(ii) Propose two challenges that could be encountered by ethical investors while undertaking their portfolio management assignments. (2 marks)

(b) As a young Certified Investment and Financial Analyst (CIFA) graduate, you recently landed a job as a financial analyst trainee with Boma Capital.

You have been presented with the following information relating to portfolio of your company's shares trading at the Securities Exchange:

Equity stock	1 January 2019 (Sh.)	31 December 2019 (Sh.)
P	225,000	248,000
Q	86,000	75,000
R	152,500	167,500
S	105,000	90,000

Required:
Based on the holding period return (HPR), calculate the following:

(i) Arithmetic mean. (2 marks)

(ii) Geometric mean. (2 marks)

(iii) The value of the new index using the results obtained in (b) (i) and (b) (ii) above. Assume an initial index of 102. (2 marks)

(c)   You recently got a job as a financial analyst with Aspen Consultants.

The following information have been availed to you relating to a client's portfolio return and the bond index return:

Period	Portfolio return (%)	Bond index return (%)
1	− 0.62	− 0.93
2	2.47	1.89
3	1.12	0.63
4	0.74	− 0.15
5	1.19	0.67
6	2.05	1.37

Required:

(i)   The annualised tracking error in basis points.   (5 marks)

(ii)   Comment on whether the portfolio return is succeeding or not based on your answer in (c) (i) above.
                                                                                          (2 marks)

(d)   Describe three major challenges in application of risk-adjusted performance measures in portfolio management.
                                                                                          (3 marks)
                                                                                   (Total: 20 marks)

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CIFA PART II SECTION 4

PORTFOLIO MANAGEMENT

THURSDAY: 28 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)   Highlight five steps involved in the portfolio management process.   (5 marks)

(b)   Explain three forms of investment strategies that could be adopted by a portfolio manager in the management of a client portfolio.   (6 marks)

(c)   The following financial data relates to the performance of company's X shares against the market share index over the last three year period:

| Year	Market index return (%)	Returns on company's shares (%)
1	8	10
2	10	11
3	12	12

The Treasury bill rate has been stable at 6% per annum over the last three years.

Required:
(i)   Using the capital asset pricing model (CAPM), determine the expected return for year 4 assuming that the market index return for the fourth year is forecasted at 14%.   (6 marks)

(ii)   Advise a Kenyan fund manager who is planning to use CAPM on its practicability both in Kenya and in other African countries.   (3 marks)
                                                                                    (Total: 20 marks)

QUESTION TWO
(a)   Propose four investments constrains considered by a portfolio manager while developing an investment policy statement (IPS) for a client.   (4 marks)

(b)   Lewis Mulwa, a financial analyst at Kiwa Capital is analysing two investors, X and Y, whose portfolio performance is illustrated in the diagram below:
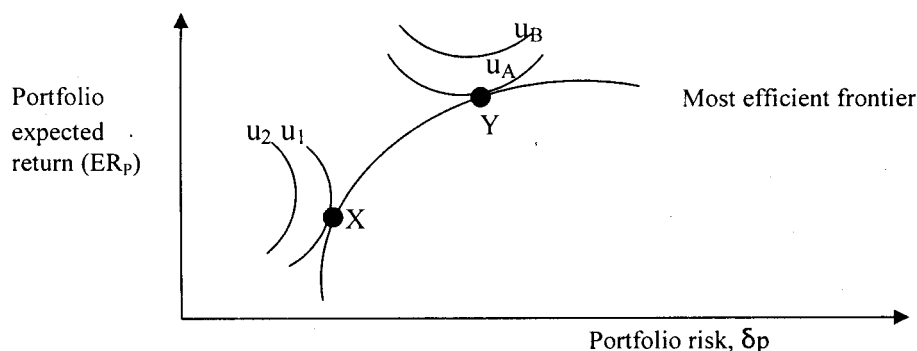
Where: u_1, u_2 and u_A, u_B are the utility curves for investor X and Y respectively.
Required:
Describe investor X and investor Y in terms of their utility and investment decisions.   (4 marks)

(c)   An investment manager has time-weighted returns for the first six months of the year as follows:

Month	Monthly returns (%)
January	1.25
February	3.47
March	-2.36
April	1.89
May	-2.67
June	2.57

Required:

(i)   A time-weighted rate of return for the investment manager by chain-linking the monthly time-weighted returns.   (2 marks)

(ii)   Compare and contrast the time-weighted rate of return with a calculation involving adding the monthly rates of return.   (4 marks)

(d)   The table below provides information on two securities assumed to constitute the market portfolio:

Security	Expected return	Standard deviation	Proportion
A	10%	20%	0.40
B	15%	28%	0.60

The correlation between the two securities is 0.3 and the risk-free rate is 5%.

Required:
Predict the capital market line (CML) equation for the portfolio.   (6 marks)
                                                                                                  (Total: 20 marks)

QUESTION THREE
(a)   Examine three major risks associated with managing a portfolio against a liability structure.   (6 marks)

(b)   Phan Limited wishes to buy Sh.1,000,000 worth of shares in each of two companies from a choice of three companies; X Ltd., Y Ltd. and Z Ltd. that it might wish to acquire at some future date. The three companies are in different industries. Historical data for 5 years on the risk and return of the three companies are provided below:

Company	Annual average returns (%)	Standard deviation of returns (%)
X	11	17
Y	20	29
Z	14	21

Correlation coefficient between returns

Company	
X and Y	0.00
X and Z	0.62
Y and Z	0.40

Required:

(i)   Using suitable computations, advise Phan Limited on the most efficient portfolio to select for investment.
                                                                                                        (7 marks)

(ii)   Explain whether the company's strategy should be to purchase the most efficient portfolio identified in (b) (i) above.   (3 marks)

(c)   The following table shows the portfolio estimated factor sensitivity of Nella Limited to the Fama-French three-factor model and the risk premiums associated with each factor:

	Factor sensitivity	Risk premium (%)
Market factor	1.25	9.0
Size factor	-0.60	5.4
Value factor	-0.25	8.6

The risk-free rate is 9.4%.

Required:

(i)   The required rate of return for the company using the Fama-French three factor model.   (2 marks)

(ii)   Comment on the expected style characteristics of the company based on its factor sensitivities.   (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a)   In relation to behavioural finance, discuss four challenges that portfolio managers could face while classifying and understanding individual investor behaviour.   (8 marks)

(b)   During the annual evaluation of fund managers, an asset management firm collected the following data on the performance of its two fund managers, A and B:

	Fund manager A		Fund manager B		Market index	
Asset	Weight (%)	Return (%)	Weight (%)	Return (%)	Weight (%)	Return (%)
1	60	18	40	12	33.3	12
2	20	15	30	10.5	33.3	9
3	20	5	30	8.4	33.3	6

Required:
Determine the best performing manager in terms of the following criterion:

(i)   Value added (VA).   (4 marks)

(ii)   Asset selection skills.   (4 marks)

(iii)   Asset allocation skills.   (4 marks)

(Total: 20 marks)

QUESTION FIVE

(a)   (i)   Explain the term "estate planning" as used in portfolio management.   (2 marks)

(ii)   Assess three estate planning tools that could be used to manage private wealth.   (6 marks)

(b)   An analyst develops the assumptions below which will be used for estimating the portfolio value at risk (VaR) for a Sh.260 million portfolio:

Method	Average return assumption (%)	Standard deviation assumption (%)
Monte Carlo simulation	0.026	0.501
Parametric approach	0.026	0.501
Historical simulation	0.023	0.490

The analyst decides to apply annual 1% VaR limit of Sh.260 million in his portfolio. The number of standard deviations to attain 1% VaR is 2.33.

Assume the year has 250 days.

Required:
The portfolio's annual 1% parametric VaR.   (4 marks)

(c)   A financial advisory firm is considering subscribing to the investment newsletters of two independent equity analysts; Jack and Elizabeth. Their alphas, residual risk and correlation between forecasted and realised alpha are provided in the table below:

	Jack	Elizabeth
Alpha	4%	7%
Residual risk (σ^2)	0.30	0.40
Correlation between forecasted and realised alpha	0.85	0.60

A regression of forecast alpha on realised alphas $\alpha^f = \alpha_0 + \alpha_1 \alpha^r + \varepsilon$ indicated that Jack and Elizabeth's forecast were not biased. There are two stocks in the active portfolio, one recommended by Jack and the other by Elizabeth.

Required:

Using the Treynor-Black Model and alphas adjusted for each analyst's forecast accuracy, determine the optimal allocation of the stock recommended by Jack to the active portfolio.   (4 marks)

(d)   Titus Makanda, an active portfolio manager, has on an annual basis a 5% portfolio return with a standard deviation of 10% and a tracking error of 5%.

Assume that the benchmark return is 2.5% per annum and a risk-free rate is 0.1% per annum.

Required:
(i)   The Sharpe ratio of the portfolio manager.   (2 marks)

(ii)   The information ratio of the portfolio manager.   (2 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	.5674	.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:

$$PVIF_{r,t} = \sum_{i=1}^{n} \frac{1}{(1+r)^i} = \frac{1 - \dfrac{1}{(1+r)^t}}{r}$$

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	30609
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	31129
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	31220
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	31242
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	31250
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	31250
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	31250

CIFA PART II SECTION 4

PORTFOLIO MANAGEMENT

FRIDAY: 24 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)   Describe three investment processes in relation to the investment policy statement (IPS).   (6 marks)

(b)   A study by Celtic mutual fund has revealed the following data in respect of three securities:

Security	Standard deviation, σ (%)	Correlation with market index, p
A	20	0.60
B	18	0.95
C	12	0.75

The standard deviation of market portfolio is observed to be 15%.

Required:
Calculate the following:

(i)   Beta of the portfolio consisting of equal investment in each security.   (3 marks)

(ii)   The systematic risk of the portfolio.   (2 marks)

(iii)   The unsystematic risk of the portfolio.   (4 marks)

(c)   The following information relates to five portfolios managed by Saraya Mutual Fund Ltd.:

Portfolio	Expected return (ER) (%)	Variance (σ^2)
1	10.0	0.0256
2	14.0	0.0484
3	11.20	0.0169
4	16.80	0.0625
5	19.30	0.0289

Additional information:
1.   The expected return of the market is 13%.
2.   The standard deviation of the market return is 16%.
3.   The risk-free rate of return is 6%.

Required:
(i)   Using the capital asset pricing model (CAPM), determine which of the above portfolios are over-valued or under-valued.   (4 marks)

(ii)   Based on the result in (c) (i) above, advise an investor who is considering buying or selling a security.   (1 mark)

(Total: 20 marks)

QUESTION TWO

(a) (i) Examine three ways in which value at risk (VaR) and stress-testing techniques could be applied in assessing capital adequancy in growth firms. (3 marks)

(ii) Elizabeth Mutesi works in the risk management department of a mutual fund and uses the variance-covariance method to estimate the weekly value at risk (VaR) for a fund. She assumes returns are normally distributed and uses a Z-value of 1.65 for a 5% probability.

Summary statistics and capital market expectations are provided below:

	Developed market bonds	Developed market equities
	(%)	(%)
Target portfolio weight	60	40
Expected annual return	8	14
Expected annual standard deviation	10	16

Expected correlation between the developed market bonds and developed market equities 0.50

Portfolio beta	0.78
Portfolio size	Sh.100 million

Assume one year has 52 weeks

Required:
The 5% weekly VaR in shillings using the variance-covariance method. (6 marks)

(b) The universe of available risky securities consists of a large number of shares, identically distributed with expected return of 15%, standard deviation of 60% and a common correlation coefficient of 0.5. The Treasury bill yield is at 10%.

Hint:
$$\sigma p = \left[\sigma^2/n + p \times \sigma^2 (n-1)/n \right]^{\frac{1}{2}}$$

Where: n is number of shares
p is correlation coefficient
σ is standard deviation

Required:
(i) Determine the smallest number of shares necessary to generate an efficient portfolio with a standard deviation equal to or smaller than 43%. (2 marks)

(ii) The slope of the capital market line (CML). (3 marks)

(c) A financial analyst gathered the following data relating to Zeldic fund:

Information ratio (IR)	0.25
Benchmark Sharpe ratio	0.30
Benchmark total risk	20%

Required:
(i) The optimal level of active risk for an investor in Zeldic fund. (3 marks)

(ii) The total excess return for the investor in Zeldic fund. (3 marks)
(Total: 20 marks)

QUESTION THREE

(a) Explain how the following biases could affect investors in the context of behavioural finance:

(i) The narrative fallacy. (2 marks)

(ii) Framing bias. (2 marks)

(iii) Self-serving bias. (2 marks)

(b)   (i)   Explain the term "tax alpha" as used in private wealth management.   (2 marks)

     (ii)   Johnson Masinde is advising two clients on matters relating to tax on their portfolios.

         Client 1:   The client lives in a tax jurisdiction with a flat tax rate of 30% which applies to all types of income and is taxed annually. The client expects to earn 10% per year on his investment over a 20 year time horizon and has an initial portfolio of Sh.1 million.

         Client 2:   The client expects to earn 10% per year on his investment over a 20 year time horizon and has an initial portfolio of Sh.1 million. The returns come in the form of deferred capital gain that are not taxed until the end of the 20 years. The capital gain tax is 5%.

     Required:
     For each client:
     (i)   Calculate the expected wealth at the end of 20 years.   (4 marks)

     (ii)   Determine the proportion of potential investment gains consumed by taxes.   (4 marks)

(c)   The following information relates to Bidii College Endowment fund:

Type of investor	:	Institutional endowment
Purpose	:	Provide annual scholarship totalling Sh.39.5 million.
Asset base	:	Sh.1 billion.
Stated return desire	:	6% calculated as a spending rate of 4% plus previously expected college tuition inflation of 2%.
Other return factors	:	Revised expectation of college tuition inflation is 3%.
Tax concerns	:	Tax exempt.

     Required:
     Discuss the following appropriate client objectives for the endowment fund:
     (i)   Risk.   (2 marks)

     (ii)   Return.   (2 marks)
                                   (Total: 20 marks)

QUESTION FOUR
(a)   In relation to active portfolio management, analyse three factors that could determine the information ratio (IR).   (3 marks)

(b)   Smoothline Fund invests in three asset classes namely; domestic equities, domestic bonds and international equities.

     The asset allocation weights of Smoothline Fund and the expected performance of each asset class and the benchmark are shown below:

Asset class	Portfolio weight (wp_1) (%)	Benchmark weight (WB_1) (%)	Portfolio return E(RR) (%)	Benchmark return (ERB_1) (%)
Domestic equities	45	40	11	12
Domestic bonds	30	30	6	5
International equities	25	30	14	12

     Required:
     The expected active return for the portfolio.   (4 marks)

(c)   Rosaline Awuor is a young ICIFA graduate who finalised her studies three years ago and started a small practice as an independent financial advisor. However, her firm does not handle client's money but only offers consultancy advisory services to her clients. Upon successful sourcing of a client, she proceeds to recommend and place the client with a fund manager or investment firm on which she earns structured agency commission on that account.

     One of Roseline's client, Douglas Kogi, is evaluating two investment managers who have the following characteristics:

     Manager X: Follows 100 stock index with annual forecast and information co-efficient (IC) of 0.076.

Manager Y: Follows 500 stock index with an annual forecast and IC of each forecast is half as much of Manager X's security forecast.

Required:

(i) The information ratio (IR) for Manager X and Manager Y. (2 marks)

(ii) Advise Roseline on the manager to recommend based on your answer in (c) (i) above. (1 mark)

(iii) Evaluate four ethical issues that Roseline is likely to encounter in the course of her duties as an independent financial adviser. (4 marks)

(d) An investor purchased Sh.10,000 of a mutual fund's shares.

The fund had the following total returns over a three year period; +5%, -8%, +12%.

Required:

(i) The fund's holding period return (HPR). (1 mark)

(ii) The fund's geometric mean. (1 mark)

(e) Alex Kùbasu intends to buy 1,000 shares of Vini Limited at a purchase price of Sh.100 each. The annual dividend per share (DPS) is Sh.2.00. The share price after one year is projected to be Sh.110 per share. The initial margin requirement is 40%, the call money rate is 4% and the commission per share is Sh.0.05.

Required:

The investor's return on the margin transaction. (4 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Evaluate four ways in which behavioural biases could affect portfolio construction. (8 marks)

(b) In relation to mutual funds:

(i) Distinguish between an "open-end mutual fund" and a "closed-end mutual fund". (2 marks)

(ii) Describe two types of fees charged by mutual funds. (2 marks)

(c) Philip Mwea, an investment analyst at Pritz Fund Management (PFM) is valuing two equity markets. Market A is a developed market while Market B is an emerging market.

Additional information:

1.	Sharpe ratio of the global investable portfolio	0.29
2.	Standard deviation of the global investable portfolio	9%
3.	Risk-free rate of return	5%
4.	Degree of market integration for Market A	80%
5.	Degree of market integration for Market B	65%
6.	Standard deviation of Market A	17%
7.	Standard deviation of Market B	28%
8.	Correlation of Market A with global investable portfolio	0.82
9.	Correlation of Market B with global investable portfolio	0.63
10.	Estimated illiquidity premium for Market A	0.0%
11.	Estimated illiquidity premium for Market B	2.3%

The investor's time horizon is five years.

Required:

(i) Assets expected returns. (4 marks)

(ii) Asset beta for each market. (2 marks)

(iii) Covariance of the two equity markets. (2 marks)

(Total: 20 marks)

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CIFA PART II SECTION 4

PORTFOLIO MANAGEMENT

FRIDAY: 30 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)   Portfolio managers are employed or contracted by a wide variety of investment clients.

In relation to the above statement, explain five categories of investment clients outlining their distinctive characteristics and needs in each case.   (5 marks)

(b)   Susan Maritim has been investing in Zawadi Limited's shares for the past two years. On 1 January 2016, she purchased a share of the company at Sh.50 and on 31 January 2016, she purchased another share of the company at Sh.65. Zawadi Limited paid a dividend of Sh.2 per share in each of the years 2016 and 2017. At the end of year 2017, Susan sold both shares for Sh.70 each.

Required:

(i)   The time-weighted rate of return on the investment.   (3 marks)

(ii)   The money-weighted rate of return on the investment.   (3 marks)

(c)   Joyce Kanini, a CIFA graduate working at Ramara Capital, is reviewing the performance of a client portfolio and has compiled the following information:

Average return over the last year	13.75%
Benchmark average return over the last year	12.36%
Standard deviation	16.90%
Beta	1.23
Tracking error	7.21%
Semi-standard deviation	13.72%
Risk-free rate	5.35%

Required:

(i)   The information ratio for the portfolio.   (2 marks)

(ii)   The Sharpe ratio.   (2 marks)

(iii)   The Sortino ratio.   (2 marks)

(d)   Fiona Chedzuga, an investor, believes there are three important factors that could determine the expected rate of return for Wema Limited's shares.

Fiona uses the following factor betas and factor risk premiums to analyse the shares' returns:

Factor	Factor Beta	Factor risk premium (%)
1	0.70	1.5
2	1.20	4.0
3	-0.10	5.0

The risk-free rate is 4%.

Required:
The expected return for Wema Limited's shares using the arbitrage pricing theory (APT) model.   (3 marks)
(Total: 20 marks)

QUESTION TWO

(a)   Describe the following biases which financial analysts might face while conducting research:

   (i)   Escalation bias.   (1 mark)

   (ii)   Confirmation bias.   (1 mark)

   (iii)   Illusion of knowledge bias.   (1 mark)

   (iv)   Disposition effect.   (1 mark)

   (v)   Availability bias.   (1 mark)

(b)   Suggest four remedial actions that a research analyst should take to overcome the biases identified in (a) (i) to (v) above.   (4 marks)

(c)   Examine four factors that could influence the extent of risk diversification in a portfolio.   (4 marks)

(d)   An investor gathers the following data relating to portfolios A, B and C:

Portfolio	Expected return (%)	Standard deviation of return (%)
A	11.5	18
B	8	14
C	6	10

The investor's level of risk aversion is 5.

Required:
Using the risk adjusted approach, recommend the portfolio that the investor should choose.   (3 marks)

(e)   A review of historical data and empirical studies provides strong support for the contention that asset allocation is a critical component of the portfolio management process.

   In view of the above statement, describe the four decisions involved in constructing an investment strategy. (4 marks)
                                                                                                  (Total: 20 marks)

QUESTION THREE

(a)   Explain three assumptions of the fundamental law of active management.   (6 marks)

(b)   Explain the following terms as used in active portfolio management:

   (i)   Information coefficient.   (2 marks)

   (ii)   Breadth.   (2 marks)

(c)   A portfolio manager gathers the following data and decides to calculate the alpha of a theoretical fund that has active holdings twice the size of those of the all the return (ALR) fund for each of the four sectors.

Stocks	Alpha (%)	Benchmark fund weighting (%)	ALR fund weighting (%)
Technology	1.8	25	35
Health care	-2.4	25	20
Retail	2.1	25	30
Mining	-1.5	25	15

Required:
The alpha of the theoretical fund.   (4 marks)

(d)   A financial analyst gathers the data below for portfolio managers A and B:

Portfolio manager	Residual return	Residual risk	Level of risk aversion
A	5.0%	5.5%	0.12
B	5.0%	7.5%	0.08

Required:

(i)   The optimal level of residual risk for portfolio manager B.   (3 marks)

(ii)   The value added by portfolio manager A.   (3 marks)

(Total: 20 marks)

QUESTION FOUR

(a)   A financial analyst has obtained the following information regarding two companies in different sectors namely, agriculture and manufacturing:

State of economy	Probability	Return of company in the agriculture sector (%)	Return of company in the manufacturing sector (%)
High economic growth	0.50	20	22
Average economic growth	0.30	14	16
Recession	0.20	10	12

Additional information:
1. The risk-free rate of return is 10%.
2. The market risk premium is 5%.
3. The market rate of return is 11%.

Required:

(i)   The expected return and standard deviation for each company.   (6 marks)

(ii)   The correlation coefficient of the portfolio.   (2 marks)

(iii)   The portfolio risk and return.   (2 marks)

(iv)   The minimum return that should be considered acceptable for the portfolio.   (2 marks)

(v)   Determine whether the portfolio is efficient.   (2 marks)

(b)   Johnson Mulwa is aged 54 and is anticipating retirement. Approximately 60% of his total investments are currently held in a tax exempt account and 40% in a taxable account. Contributions to both accounts are made with after tax income. In the tax exempt account, withdrawals are entirely tax free and without penalty.

In the taxable account, Johnson incurs a 5% tax on both income and realised capital gains. Realised losses can be used to offset current or future income and capital gains. He has experienced substantial losses in both of his investment accounts over the past year. He estimates that he will need to postpone retirement and questions whether his investments were optimally structured.

Johnson meets with his advisor to discuss the effect of the tax regime on his portfolios. The advisor suggests that over the last year, both Johnson's after tax return and investment risk would have been higher if a large proportion of assets had been held in the taxable account.

Required:
By justifying each response with one reason, determine, based only on tax consideration whether the advisor is correct or incorrect with respect to Johnson's:

(i)   After tax return.   (3 marks)

(ii)   Investment risk.   (3 marks)

(Total: 20 marks)

QUESTION FIVE

(a)   Assess three challenges of forecasting in relation to capital market expectations.   (6 marks)

(b)   A portfolio manager gathers the following information relating to a bank's holding of government bonds:

1.   Portfolio value   Sh.1,400 million.
2.   Expected annualised return   6%
3.   Standard deviation of annualised return   7%
4.   Standard normal Z - values for the 0.05 and 0.01 probability levels are 1.65 and 2.33 respectively.

Required:
Calculate the 1% monthly value at risk (VaR) for the portfolio.   (4 marks)

(c)   Kevin Opati recently inherited Sh.7.5 million in cash from his father's estate and has approached you for investment advice. Both Kevin and his wife are 30 years old. Kevin is employed as a factory worker and has an annual salary of Sh.500,000. Although he receives total health care coverage for himself and his family, he makes no contributions to his firm's defined benefit pension plan and is not yet vested in any of the company's other retirement benefits. Kevin's wife is a teacher with an annual salary of Sh.380,000. She has only recently opened a retirement savings account. Their four children are aged six, five, four and three years. They have a small savings account, no investments other than the wife's meagre retirement account and credit card debt of Sh.200,000.

Required:
(i)   Evaluate Kevin's situational profile according to the source of wealth and stage of life.   (2 marks)

(ii)   Formulate the investment constraint for Kevin's family.   (8 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	.5674	.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:

$$PVIF_{r,t} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \dfrac{1}{(1+r)^n}}{r}$$

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 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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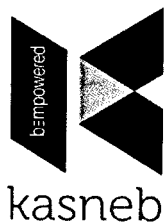
CIFA PART II SECTION 4

PORTFOLIO MANAGEMENT

FRIDAY: 1 December 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)   You have recently been appointed as the Chief Investment Officer (CIO) of a major investment advisory firm in your country. Martin Kibet, a high net worth client has approached your firm seeking to invest Sh.100 million.

Required:
Evaluate the four steps in the portfolio management process that you are expected to follow while investing the client's money.   (4 marks)

(b)   The investment policy statement (IPS) serves as a governing document for most investment decisions. It should identify the objectives and operational constraints on the investment portfolio.

In light of the above statement, discuss five categories of portfolio constraints.   (5 marks)

(c)   Amos Mambo has invested 30% of his funds in risk-free assets and the remaining 70% in an index fund that represents the market. The risk-free rate is 8%. The index fund is expected to generate a return of 21% with a standard deviation of 9.8%. Amos Mambo is considering the following three options:

Option 1 – Maintain the portfolio as it is.

Option 2 – Withdraw his investment from the risk-free security and invest the same in the index fund.

Option 3 – Apart from investing his entire funds in the index fund, Amos Mambo intends to borrow a sum equal to 20% of his available funds at risk-free rate and invest the same in the index fund.

Required:
(i)   The expected portfolio return under each of the three options.   (3 marks)

(ii)   The portfolio risk under each of the three options.   (3 marks)

(iii)   Comment on your answer in (c) (i) and (c) (ii) above based on the borrowing option.   (1 mark)

(d)   The table below shows the portfolio return and the benchmark return for a bond portfolio over a six-year period.

Period	Portfolio return (%)	Benchmark return (%)
2011	14.10	13.70
2012	8.20	8.00
2013	7.80	8.00
2014	3.20	3.50
2015	2.60	2.40
2016	3.30	3.00

Required:
Portfolio tracking risk.

(4 marks)
(Total: 20 marks)

QUESTION TWO

(a) Explain five steps of the risk management process. (5 marks)

(b) The estimated rate of return of six securities and their respective Beta coefficients are as shown below:

Security	Estimated rate of return (%)	Beta Coefficients
A	15	1.15
B	17	1.19
C	23	1.22
D	30	1.75
E	20	1.14
F	18	1.13
G	25	1.21

Additional information:
1. The risk-free rate of return is 9%.
2. The expected market rate of return is 21%.

Required:
(i) Using capital asset pricing model (CAPM), identify the securities that are correctly valued, overvalued or undervalued. (8 marks)

(ii) Illustrate, using a well labelled diagram, the results obtained in (b) (i) above. (2 marks)

(c) Modern portfolio theory (MPT) might not be directly applicable to "real world" portfolios since some of the underlying assumptions of MPT do not hold.

Required:
Discuss the impact of the following on the capital market line (CML):

(i) Taxes. (2 marks)

(ii) Different borrowing and lending rates. (3 marks)

(Total: 20 marks)

QUESTION THREE

(a) In relation to behavioural finance, explain five emotional biases that could affect financial decisions. (5 marks)

(b) Evaluate two factors that could affect portfolio diversification. (4 marks)

(c) The rates of return on company X's security and the market portfolios for 10 periods are given below:

Period	Return on company X's security (%)	Return on market portfolio (%)
1	20	22
2	22	20
3	25	18
4	21	16
5	18	20
6	–5	8
7	17	–6
8	19	5
9	–7	6
10	20	11

Required:
The security characteristic line (SCL) for company X's security. (8 marks)

(d) Melissa Onyango, a financial advisor interviewed a client so as to prepare a written investment policy statement (IPS). After the interview, Onyango established the following:

1. The client's earnings have exceeded pre-tax income of Sh.12 million each year for the past five years.
2. The client has no dependants.
3. The client's subsistence needs are approximately Sh.4.5 million per year.
4. The client feels uncomfortable with the lack of security markets knowledge.

5.   All of the client's current savings are invested in money market securities guaranteed by an agency of her national government.
6.   The client's response to a standard risk assessment questionnaire suggests that she has low risk tolerance.

Required:
Assess the client's ability to bear risk and willingness to take risk.   (3 marks)
(Total: 20 marks)

QUESTION FOUR

(a)   A medical foundation (MF) based in a developed country was established to provide grants in perpetuity. The foundation is expecting to receive Sh.450 million cash gift three months from now. The gift will greatly increase the size of the foundation's endowment from its current Sh.100 million. The foundation's grant making policy has been to pay out virtually all of its annual net investment income. Since its investment approach has been conservative, the endowment portfolio now consists of entirely fixed income securities. The foundation's annual grants must be at least equal to 5% of its assets' market value to maintain MF's tax exempt status, a requirement that is expected to continue indefinitely. The foundation expects to have no additional gifts or fundraising activities in the foreseeable future.

Given the changes in circumstances that the cash gift will make, the finance committee wishes to develop new grant making and investment policies. Annual spending must at least meet the 5% of the market value requirements, but the committee is unsure of how much higher spending can or should be. The committee intends to pay out as much as possible, however, it understands that preserving the real value of the foundation's assets is equally important in order to preserve its future grant making capabilities.

You have been tasked to assist the committee in developing appropriate policies:

Required:
Formulate and justify an investment policy statement for the foundation.   (12 marks)

(b)   Johnson Mwau is an investment consultant. One of the portfolios he consults for is ABC portfolio which is managed for a pension fund with a high risk aversion of 0.15. The portfolio manager for the ABC fund anticipates that the portfolio will generate a quarterly residual return of 0.5% with a residual risk of 1%.

XYZ is also a fund for which Mwau consults for and which is an actively managed, large capitalised portfolio. Mwau decides to use a market timing strategy. The portfolio manager for XYZ makes weekly bets on the direction of the large capitalised market. The portfolio manager is right 53% of the time. During a recent meeting, the manager said that he could increase his coverage by including small capitalised stocks but he was expecting to be correct only 52% of the time for the small capitalised sector. He would make the same number of bets in the small capitalised sector as the large capitalised sector. The manager states that the information sources for the large capitalised bets and small capitalised bets are uncorrelated.

Required:
(i)   The annualised value added for portfolio ABC based on the portfolio manager's estimates of residual risk and residual return.   (2 marks)

(ii)   The optimal level of annualised residual risk for portfolio ABC.   (3 marks)

(iii) The combined information ratio if the portfolio manager for XYZ includes small capitalised stocks along with large capitalised stocks in his strategy.   (3 marks)
(Total: 20 marks)

QUESTION FIVE

(a)   Sospeter Muhongo is the Chief Finance Officer (CFO) of Next Tech Limited (NTL), a computer manufacturing company that develops computer software. NTL operates a defined benefit (DB) pension scheme that is open to new participants. The DB scheme is entirely funded by NTL staff retirement contributions.

The company's risk committee has requested Muhongo to assess how NTL's DB scheme compares to two competitor schemes; XYZ and ABC. He summarises selected financial data in Exhibit 1 and the scheme characteristics in Exhibit 2 for each of the three firms:

Exhibit 1
Selected financial data
For the year ended 31 December 2016

	NTL	XYZ	ABC
Sales (Sh."million")	500	300	800
Net income (Sh."million")	135	90	120
Projected benefit obligation (Sh."million")	520	409	201
Debt-to-equity ratio	1.30	1.10	1.40

Exhibit 2
Defined Benefit (DB) plan characteristics

	NTL	XYZ	ABC
Provision allowing lump-sum distributions	Yes	No	No
Provision allowing early retirement	No	No	Yes
Proportion of active lives (%)	62	57	·69
Plan funded status	Surplus	Deficit	Surplus

Required:
Citing one reason, determine the company's pension scheme with the lowest risk tolerance under the following categories:

(i)   Sponsor financial status.   (3 marks)

(ii)   Workforce characteristics.   (3 marks)

(b)   Doreen Nyamai, a financial analyst at Truepack Capital employs the Grinold - Kroner model in forecasting long-term developed market equity returns. Doreen makes the following forecasts:

1.   A 3.5% dividend yield on Kenyan equities, based on Nairobi Securities Exchange composite index.
2.   A repurchase yield of 1.5% for Kenyan equities.
3.   A long-term inflation rate of 4% per annum.
4.   Long-term corporate real earnings growth at 6% per annum, based on a 1.5% premium for corporate growth over her expected Kenyan gross domestic product (GDP) growth rate of 3%.
5.   An expansion rate for price-to-earnings (P/E) multiple of 0.25% per year.

Required:
Determine the expected rate of return on Kenyan equities using Grinold-Kroner model.   (3 marks)

(c)   Jonathan Rotich, a financial analyst has been presented with the following information relating to a portfolio of three companies' shares trading at the securities exchange.

Company's share	Opening price Sh.	Closing price Sh.
A	12	15
B	52	48
C	38	45

Required:
Based on holding period return (HPR), compute the following:

(i)   Arithmetic mean.   (2 marks)

(ii)   Geometric mean.   (2 marks)

(iii)   The value of the new index using the results obtained in (c) (i) and (c) (ii) above. Assume an initial index value of 131.   (2 marks)

(d)   The Metro Fund is a portfolio consisting of 42% fixed-income investments and 58% equity investments. The manager of Metro Fund recently estimated that the annual value at risk (VaR) as 5% assuming a 250-day trading year. The portfolio is worth Sh.1,367,000 based on the portfolio's market value of Sh.12,428,000.   The correlation between shares and bonds is zero.

Required:
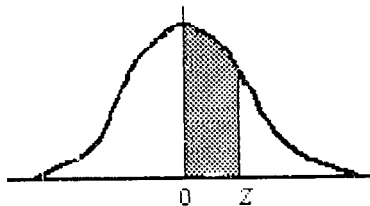The daily expected loss in bond position that will be exceeded 5% of the time assuming the annual loss in the equity position is only expected to exceed Sh.1,153,000.   (5 marks)
                                                                                           (Total: 20 marks)

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NORMAL CURVE

AREAS
under the
STANDARD
NORMAL CURVE
from 0 to z

z	0	1	2	3	4	5	6	7	8	9
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0754
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.201.	.2051	.2088	.2123	.2157	.2190	.2224
0.6	.2258	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2518	.2549
0.7	.2580	.2612	.2642	.2673	.2704	.2734	.2704	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2996	.3023	.3051	.3078	.3106	3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998
3.6	.4998	.4998	.4998	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.7	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.8	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.9	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000

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CIFA PART II SECTION 4

PORTFOLIO MANAGEMENT

FRIDAY: 26 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) The basic objective of portfolio management is to maximise investors' return and minimise risk. However, there are other auxiliary objectives as per the needs of each individual investor.

Required:
In relation to the above statement, highlight four auxiliary needs of an individual investor. **(4 marks)**

(b) Propose six measures that a portfolio management firm could establish to ensure that its portfolio managers remain independent and objective while undertaking their duties. **(6 marks)**

(c) The following information relates to the returns of security X and security Y over a five-year period:

	Returns (%)	
Year	Security X	Security Y
2012	10	20
2013	20	30
2014	30	50
2015	40	40
2016	50	60

Required:

(i) The securities beta. **(3 marks)**

(ii) The securities alpha. **(2 marks)**

(iii) The residual variance. **(2 marks)**

(iv) Interpret the results obtained in (c)(i), (c)(ii) and (c)(iii) above. **(3 marks)**

(Total: 20 marks)

QUESTION TWO

(a) Assess the following investor personality types that could offer an insight to a portfolio manager when predicting investors risk-taking appetite and their decision making styles:

(i) Cautious investors. **(2 marks)**

(ii) Methodical investors. **(2 marks)**

(iii) Spontaneous investors. **(2 marks)**

(iv) Individualist investors. **(2 marks)**

(b) Summarise four assumptions underlying capital asset pricing model (CAPM). **(4 marks)**

(c) An actively managed portfolio has a transfer coefficient (TC) of 0.50 and an unconstrained information ratio of 0.30. The benchmark portfolio has a sharpe ratio of 0.40 and a risk of 16.0%

Required:
(i) The optimal amount of aggressiveness in the actively managed portfolio. **(3 marks)**

(ii)   The sharpe ratio assuming that the actively managed portfolio is constructed with the amount of active risk.
                                                                                              (3 marks)
(iii)   Determine how the active risk can be lowered to the optimal level of 6.0% assuming that the constrained portfolio has an active risk of 8.0%.   (2 marks)
                                                                                        (Total: 20 marks)

QUESTION THREE
(a)   Explain three differences between "mutual funds" and "exchange traded funds (ETFs)" with reference to pooled investment products.   (6 marks)

(b)   Evaluate five items that could be included in a framework for a disciplined approach to setting capital market expectations.   (5 marks)

(c)   (i)   Examine four differences between "time-weighted rate of return" and "money-weighted rate of return".
                                                                                              (4 marks)

       (ii)   The following information relates to Akamba Ltd.'s portfolio for the month of March 2017:

                                                    Sh."000"
              Fair value (28 February 2017)   16,575
              Cash contribution (12 March 2017)   2,265
              Fair value (12 March 2017)   19,550
              Fair value (31 March 2017)   19,250

              Note: The fair value on 12 March 2017 includes a cash contribution of Sh.2,265,000 received and available for investment on 12 March 2017.

              Required:
              The time-weighted rate of return for the month of March 2017.   (5 marks)
                                                                                        (Total: 20 marks)

QUESTION FOUR
(a)   (i)   Explain the term "risk management".   (2 marks)

       (ii)   Discuss four techniques of managing credit risk.   (4 marks)

(b)   As a portfolio manager, explain how you could mitigate the following biases:

       (i)   Gamblers's fallacy.   (2 marks)

       (ii)   Overconfidence.   (2 marks)

(c)   Jose Kigen, aged 40 years is a manager at a public limited company. He plans to retire at the age of 55 years. He is a divorcee and a father of teenage children. He intends to fund a dedicated trust to provide for his children's needs until they reach the age of 25 years. He will require Sh.2.5 million in the next few months to fund the trust.

       Jose Kigen's income tax rate is 30%. Other than his cash reserve, he holds investment assets in a tax-exempt account with a current value of Sh.9 million. He saves Sh.250,000 of his after-tax income annually to the account and plans to do so until retirement. His next contribution will be made in one year's time. As part of his normal expenses, he provides Sh.300,000 annual contribution to St. Elizabeth's Children Home.

       When he retires in 15 years time, he plans to purchase a 25-year annuity that pays Sh.1 million after-tax annually. He will need Sh.16 million at retirement to fund the annuity. He expects the annual payout to be sufficient to meet all his needs on an inflation-adjusted basis. He does not plan to leave any estate at the time of his death.

       Required:
       (i)   The required annual return that would enable Jose Kigen to purchase the retirement annuity at the age of 55 years.
              Note: All cash flows occur at the end of each period.   (6 marks)

       (ii)   Discuss four reasons that would make Jose Kigen's ability to take risk to be considered above average.
                                                                                              (4 marks)
                                                                                        (Total: 20 marks)

QUESTION FIVE

(a) Ahmed Fadhili has decided to invest Sh.1 million by purchasing shares of two companies namely; ABC Ltd. and XYZ Ltd. The projections of returns from the shares of the two companies along with their probabilities are as follows:

Probability	Return projections (%)	
	ABC Ltd.	XYZ Ltd.
0.20	12	16
0.25	14	10
0.25	-7	28
0.30	28	-2

Required:

The proportion of each of the above shares required to formulate the minimum risk portfolio. (10 marks)

(b) Berry Charo, an assistant fund manager at Adco Ltd. pension scheme which practices a passive management strategy has been provided with the following information about the fund manager's annual returns for the last 5 years:

Period	Fund Manager's returns (%)	Market returns (%)
2016	9.7	10.1
2015	14.6	13.0
2014	15.3	14.7
2013	12.7	12.5
2012	10.5	10.0

Required:

(i) The fund manager's tracking error. (3 marks)

(ii) Comment on the results obtained in (b)(i) above. (2 marks)

(c) Zenith and Mackenzie Investment Consultants Ltd. employs a two factor arbitrage pricing theory (APT) model to measure portfolio risk and return for their clients investments.

The following information is available:

	Factor 1	Factor 2
Investment fund beta	1.5000	2.0000
Risk premium	0.0300	0.0125

The risk-free rate is 5%.

Required:

(i) The expected return for the investment fund. (2 marks)

(ii) Assume that Factor 1 improves by 33.33% while Factor 2 becomes adverse by 25.00%. Using suitable computations, establish whether there is any arbitrage gain in the expected return. (3 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:

$$PVIF_{r,t} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \dfrac{1}{(1+r)^n}}{r}$$

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	5.2732	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	6.2335	5.5482	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 II SECTION 4

PORTFOLIO MANAGEMENT

FRIDAY: 25 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)   The way investors think and feel affects the way they behave when making investment decisions.

In relation to the above statement, describe four behavioural biases that could be faced by financial analysts when conducting portfolio research. (4 marks)

(b)   The distribution of return of security F and that of the market portfolio P is given below:

Return (%)

Probability	Security F	Market portfolio, P
0.30	30	-10
0.40	20	20
0.30	0	30

Required:
(i)   The standard deviation of security F. (2 marks)

(ii)   The expected return of the market portfolio P. (2 marks)

(iii)   The beta for the security. (4 marks)

(c)   Amos Koech is a pension fund consultant in your country. He is at a meeting with a group of pensioners where they are discussing matters relating to making retirement portfolio decisions.

Required:
(i)   Discuss two risks which could be faced by investors when making retirement portfolio decisions. (4 marks)

(ii)   Suggest one way of mitigating each of the risks identified in (c) (i) above. (4 marks)

(Total: 20 marks)

QUESTION TWO
(a)   Explain the following terms as used in active portfolio management:

(i)   Alpha. (2 marks)

(ii)   Valued added. (2 marks)

(b)   Examine three assumptions underlying the fundamental law of active portfolio management. (6 marks)

(c)   John Muli is an equity analyst with Mali Mingi asset management firm. He currently follows 100 stocks and makes quarterly forecast. His information coefficient is 0.05.

Muli decides to follow an additional 100 stocks with quarterly forecast but with an information coefficient of 0.04.

Required:
The new information ratio for John Muli. (3 marks)

(d)   Summit Bank Limited (SBL) is a commercial bank with operations in East Africa.

Required:
Evaluate the effect of each of the following scenarios on SBL's investment objectives, constraints, or risk taking ability:

(i)   The target average maturity of loans is increased, with overall risk tolerance unchanged.   (1 mark)

(ii)   The Asset Liability Committee (ALCO) decides to increase SBL's credit standards for loans although the bank's overall risk tolerance is unchanged.   (1 mark)

(iii)   More opportunities exist for expanding net interest margins with low risk in SBL's loan portfolio in its securities portfolio.   (1 mark)

(e)   Jackline Moraa is a portfolio manager in a leading investment firm. She is interested in using Value at Risk (VaR) model to monitor risk exposure of her employer's government bond portfolio. The current information relating to the government bond portfolio is shown below:

- Portfolio value   Sh. 1,400 million
- Expected annualised rate of return   6%
- Standard deviation of annualised rate of return   7%

Note: The standard normal distribution Z-values for the 0.05 and 0.01 probability levels are 1.65 and 2.33 respectively.

Required:
The 1% monthly Value at Risk (VaR), in shillings, for the government bond portfolio.   (4 marks)
(Total: 20 marks)

QUESTION THREE
(a)   Discuss five elements of investment policy statement (IPS).   (5 marks)

(b)   With reference to Markowitz portfolio theory, examine three problems associated with instability of the minimum variance frontier.   (3 marks)

(c)   You have been appointed as a portfolio manager of a big fund. After evaluating the investment portfolio of the fund, you divide the market into four portfolios following two dimensions: Value/Growth and Small/Large. The weight of each portfolio in the index is given below. You designed the following model:

Portfolio	Weight (%)	Sensitivity to factor 1 (Market beta)	Sensitivity to factor 2 (Price/Book)	Sensitivity to factor 3 (Average capitalisation)
Small value	5	0.85	0.80	1
Small growth	5	0.95	0.30	1
Large value	40	0.90	2	8
Large growth	50	1.10	3	10
Risk premium		8%	-2%	0.10%

The risk free rate is 2%.

Required:
(i)   Using the arbitrage pricing theory (APT), determine the portfolio that has the highest expected return.   (4 marks)

(ii)   One of your competitors uses the capital asset pricing model (CAPM) to calculate the expected return. Based on the betas illustrated above, determine the portfolio that he should choose in order to maximise his expected return.   (4 marks)

(iii)   In order to diversify his perceived risk, another competitor wants to combine the small value and large growth portfolios. The new portfolio should have an overall sensitivity to factor 1 (market beta) of 1.

Show how your competitor should invest in the small value portfolio and by how much.   (4 marks)
(Total: 20 marks)

QUESTION FOUR

(a)   Explain the following terms as used in portfolio asset allocation:

    (i)   Horse Race or "equal balanced managers" system.   (2 marks)

    (ii)   Strategic asset allocation.   (2 marks)

    (iii)   Tactical asset allocation.   (2 marks)

(b)   Summarise four advantages of using Monte Carlo Simulation approach in personal retirement planning.   (4 marks)

(c)   A financial analyst has gathered the following information for the asset allocation of three portfolios:

Portfolio	Fixed Income (%)	Equity (%)	Alternative investments (%)
X	25	60	15
Y	60	25	15
Z	15	60	25

Required:
Giving a suitable reason, determine the portfolio that is appropriate for a client who has a high degree of risk tolerance.

(2 marks)

(d)   The following information relates to historic geometric rates of return for various asset classes:

Asset class	Geometric rate of return (%)
Equities	8.0
Corporate bonds	6.5
Treasury bills	2.5
Inflation rate	2.1

Required:

(i)   The real rate of return for equities.   (2 marks)

(ii)   The real rate of return for corporate bonds.   (2 marks)

(iii)   The risk premium for equities.   (2 marks)

(iv)   The risk premium for corporate bonds.   (2 marks)

(Total: 20 marks)

QUESTION FIVE

(a)   Outline three assumptions in behavioural finance that are necessary in specifying investors portfolios.   (3 marks)

(b)   (i)   Explain the term "financial engineering".   (2 marks)

    (ii)   Propose four factors responsible for growth in financial engineering in your country.   (4 marks)

(c)   Analyse four ethical responsibilities of a portfolio manager.   (4 marks)

(d)   An investor has a risk aversion of 5% with the following asset mix:

Asset allocation	Expected rate of return E(R) (%)	Standard deviation (σ) (%)
A	18	12
B	17	9
C	7	5

Required:
Using the risk-adjusted rate of return measure, advise the investor on the appropriate asset mix.   (4 marks)

(e) The information given below relates to the beta coefficient and the amount of investment for a fund:

Stock	Investment (Sh."million")	Stock's Beta Coefficient
A	120	0.5
B	100	2.0
C	60	4.0
D	80	1.0
E	40	3.0

The current risk-free rate is 7%, and the market return has the following probability distribution for the next one year:

Probability	Market return (%)
0.1	8
0.2	10
0.4	12
0.2	14
0.1	16

Required:
The rate of return on the fund.   (3 marks)
                                                                       (Total: 20 marks)

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KASNEB

CIFA PART II SECTION 4

PORTFOLIO MANAGEMENT

FRIDAY: 27 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) Analyse five constraints that investors are likely to face when making investment decisions. (5 marks)

(b) Paul Letting' wishes to invest in a securities exchange. He has obtained the following information relating to individual securities of interest:

Security	Expected return (%)	Beta	Unsystematic risk (%)
A	15	1.5	40
B	12	2.0	20
C	10	2.5	30
D	09	1.0	10
E	08	1.2	20
F	14	1.5	30

Additional information:
1. The market index variance is 10%.
2. The risk free rate of return is 7%.
3. Assume no short sales is allowed.

Required:
Determine the optimal portfolio. (10 marks)

(c) Highlight five benefits that would accrue to an investor who includes pooled investment products in his portfolio.

(5 marks)

(Total: 20 marks)

QUESTION TWO
(a) Explain the following types of risks associated with emerging market investments:

   (i)   Accounting convections. (2 marks)

   (ii) Settlement risk. (2 marks)

   (iii) Information barriers. (2 marks)

   (iv) Custodial facilities. (2 marks)

(b) A portfolio manager is provided with the following data relating to an investment account:

Date	1 November 2014 Sh. "000"	1 March 2015 Sh. "000"	1 August 2015 Sh. "000"	1 February 2016 Sh. "000"	1 April 2016 Sh. "000"
Account balance (Before deposit or withdrawal)	14,516	14,547	18,351	16,969	18,542
Deposit	-	3,000	-	2,500	-
Withdrawal	-	-	2,000	-	-

Required:
Annual effective yield rate using the time weighted method. (3 marks)

(c) Nicholas Timamo, the Chief Financial Officer (CFO) of Sinet Ltd., chairs the investment committee of the company's Sh.100 million defined benefit (DB) pension plan. Sinet Ltd. operates exclusively in the domestic market and has recently completed a five year early retirement program. As a result of this program, many long time employees decided to retire early at age 50 and receive full pension benefits.

The actuary of the pension plan has determined the following:

1. 60% of all participants in Sinet Ltd.'s DB pension plan are now retired and receiving their pension.
2. The required real rate of return based on actuarial assumptions for the pension fund is 5.5% annually.
3. The average age of active employees who will eventually collect retirement benefits is 45 years.
4. Inflation has been stable at 2% per annum. This rate is forecasted to remain the same for the foreseeable future.
5. The pension plan is currently fully funded and Nicholas would like to minimise the amount of the company contributions required in future.

Required:
Formulate an investment policy objective for Sinet Ltd.'s pension plan under the following headings:

(i) Return objective. (3 marks)

(ii) Risk tolerance. (3 marks)

(iii) Time horizon. (3 marks)
(Total: 20 marks)

QUESTION THREE

(a) (i) Discuss two factors that could affect the level of tracking error in a portfolio of ordinary shares. (4 marks)

(ii) The following information relates to Signature Investment Limited for the year ended 2015:

1. Risk free rate of return is 5.0%.
2. Benchmark standard deviation is 15.0%.
3. Beta of the benchmark index is 1.0.
4. Average annual rate of return is 19.8%.
5. Standard deviation of return of the company is 11.9%.
6. Sharpe ratio is 1.24.
7. Residual standard deviation is 11.5%.
8. Company's beta is 0.80.

Required:
Tracking error for Signature Investment Limited portfolio. (3 marks)

(b) Evaluate four categories of assets that could be used to construct a portfolio. (4 marks)

(c) Justus Mutinda, a portfolio manager for a money market fund at Alpha Asset Managers (AAM), provides advisory services to his two clients; Tricend Limited and Quantum Limited portfolios.

The following information is relevant to the two clients:

Tricend Limited:
The company's portfolio is managed on behalf of an endowment. Justus Mutinda employs a regression model using the data over the past eight years as shown below:

$$(R_{pt} - R_{ft}) = \alpha + B(R_{Bt} - R_{ft}) + \Sigma t$$

Where:
R_{pt}, R_{ft}, R_{Bt} = The return on the portfolio, risk free assets and benchmark at time t, respectively.
α, B = Regression intercept and slope coefficient, respectively.
Σt = Random regression error term.

Results:

Parameter	Coefficient estimate	Standard error
α	0.025	0.121
B	1.05	0.336

Quantum Limited:

The company's portfolio is managed on behalf of a pension fund with a high risk aversion ($\lambda = 0.15$). The portfolio is anticipated to generate quarterly residual return of 0.5% with a residual risk of 1%.

Required:

(i)   The ex-post information ratio (IR) for Tricend Limited portfolio.   (3 marks)

(ii)   The annualised value added (VA) for Quantum Limited portfolio using the estimates of residual risk and residual return.   (3 marks)

(iii)   The optimal level of annualised residual risk for Quantum Limited Portfolio.   (3 marks)
(Total: 20 marks)

QUESTION FOUR

(a)   An investor's background, past experiences and attitudes can play a significant role in decisions made during the asset allocation process.

Required:

In relation to the above statement, explain how investors could be classified under the following models:

(i)   Barnewall Two-Way model.   (4 marks)

(ii)   Bailard, Biehl and Kaiser (BKK) Five-Way model.   (5 marks)

(iii)   Highlight three limitations of classifying investors using both of the models identified in (a)(i) and (a)(ii) above.   (3 marks)

(b)   Cyrus Mwamba and his wife Lucy, aged 40 years and 39 years respectively are considering what to do with a recent windfall that they received from participating in an online sports game. The windfall is estimated to be Sh.2,500,000 (after taxes). Cyrus is currently a supervising mechanic at a local luxury car dealership and earns a salary of Sh.100,000 per month while Lucy is not employed. The couple has two children: Henry and Abby aged 12 and 10 years respectively. By design, the couple owe no debt and pay their expenses on a monthly basis. Family expenses last year amounted to approximately Sh.1,010,000.

In addition to the windfall, the couple have an additional Sh.1,250,000 in cash equivalents. Cyrus and his wife have approached you for assistance in managing their portfolio. The couple made the following statements at a recent client discovery meeting:

1. One of our goals at this stage in our lives is to pay for the university education of our children.
2. We expect our annual expenses to increase at the general rate of inflation of 5% per annum.
3. We want to retire at the age of 65 years and be able to live comfortably but not extravagantly.
4. We are taxed at the rate of 30% on both income and capital gains.
5. We believe our portfolio should never suffer an annual loss of more than 5%. In addition, we do not want to invest in any individual investment or security that is too risky.
6. We do not foresee any unsual expenses over the short-term. As always, we would like to have enough cash at hand for emergencies.

Required:

(i)   The couple's after-tax nominal return for the coming year.   (4 marks)

(ii)   The couple's risk tolerance.   (4 marks)
(Total: 20 marks)

QUESTION FIVE

(a)   With the aid of a well labelled diagram, illustrate the meaning of the following terms as used in portfolio theory:

(i)   An efficient frontier   (2 marks)

(ii)   A feasible set.   (2 marks)

(iii)   Capital market line (CML).   (2 marks)

(b) The returns on Hydromax Oil Corporation Limited ordinary shares has been found to be influenced by three risk factors: X_1, X_2 and X_3.

Where:

X_1 - An index reflecting energy cost.
X_2 - Changes in the level of market share prices.
X_3 - Changes in the exchange rate of the local currency relative to other currencies.

The following table indicates the risk factor, risk premium and the beta factor for the returns of the company:

Risk factor	Risk premium	Beta factor
X_1	4.5%	0.7
X_2	7.5%	0.3
X_3	11.25%	1.1

The risk free rate is 8.25%.

Required:

(i) The required rate of return of the company's share using the Arbitrage Pricing Theory (APT). (3 marks)

(ii) The required rate of return of the company's share using the Capital Asset Pricing Model (CAPM). (3 marks)

(iii) Highlight four assumptions of Arbitrage Pricing Theory (APT). (4 marks)

(c) Distinguish between "strategy breadth (BR)" and "information coefficient (IC)" in relation to active portfolio management. (4 marks)

(Total: 20 marks)

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KASNEB

CIFA PART II SECTION 4

PORTFOLIO MANAGEMENT

FRIDAY: 27 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)   Evaluate the three major steps involved in the portfolio management process.   (6 marks)

(b)   Outline four criteria which could assist a portfolio manager in specifying an asset class.   (4 marks)

(c)   The Joel Hospital has an operating budget of Sh.1.5 billion and has been operating at a budget surplus for the last two years. The hospital has a Sh.2 billion endowment whose sole purpose is to provide capital equipment for the hospital. The endowment's long term expected total return is 8.6% which includes a 3.3% income component. The hospital has no minimum payout requirement and expects no future contributions. Traditionally, the hospital board of directors has determined the annual payout based on current needs. Payouts have been rising steadily to Sh.137.5 million two years ago and to Sh.140 million last year.

The chief finance officer of Joel Hospital has requested for the hospital board's guidance in establishing a long term spending for the hospital. He has requested Sh.160 million to buy medical equipment. The inflation rate for the medical equipment price is 4% while the general consumer price index is 2.5%.

Required:
(i)   Discuss the implication of the current pressure on the hospital to increase spending.   (3 marks)

(ii)   Explain how Joel Hospital's time horizon would affect its risk tolerance.   (2 marks)

(iii)   Determine a long-term spending policy for Joel Hospital, including a spending rate as a percentage of assets. Justify the policy.   (5 marks)
                                               (Total: 20 marks)

QUESTION TWO
(a)   Analyse three tools that could be used by a financial analyst when formulating capital market expectations.   (6 marks)

(b)   Highlight four factors that could be used in predicting the beta of a company.   (4 marks)

(c)   The following financial data provides an analyst's expected return on two stocks listed at PASDAQ securities exchange:

Market Return	Aggressive Stock	Defensive Stock
6%	2%	8%
20%	30%	16%

Required:
(i)   The betas (β) of the two stocks.   (2 marks)

(ii)   Expected return on each stock if the market return is equally likely to be 6% or 20%.   (2 marks)

(iii)   Determine the Security Market Line (SML) if the risk free rate is 7% and market return is equally likely to be 6% or 20%.   (2 marks)

(iv)   Calculate the Alphas (α) of the two stocks.   (4 marks)
                                               (Total: 20 marks)

QUESTION THREE

(a) Propose four common errors that might occur in investment management. (4 marks)

(b) Esther Simiyu, aged 40 years has a steady job as a manager at a non-governmental organisation. She plans to retire at the age of 55 years. She is a mother of two teenage children and she intends to fund a dedicated trust so as to provide for her children's needs until they reach the age of 25 years. She will need Sh.250,000 within the next few months to fund the trust. Her investment assets are currently valued at Sh.1,600,000. Esther saves Sh.300,000 of her after-tax income every year and plans to continue doing so until retirement. The next contribution will be made in one year. As part of her normal expenses, she annually provides approximately Sh.100,000 of support to a local children charity foundation.

When she retires in 15 years time, she plans to purchase a 25 year annuity that would pay Sh.400,000 after-tax annually. She will need Sh.8,500,000 at retirement to fund the annuity. She expects the annual payout to be sufficient to meet all her needs on an inflation adjusted basis. She does not plan to leave any estate at her death.

Required:
(i) The required annual return that would enable Esther Simiyu to purchase the desired retirement annuity at the age of 55 years. (4 marks)

(ii) "Esther's ability to take risk could be considered above average". Giving three reasons justify this statement. (6 marks)

(c) Discuss three merits and three demerits of the application of arbitrage pricing theory (APT) in investment management analysis. (6 marks)

(Total: 20 marks)

QUESTION FOUR

(a) (i) Define the term "value of risk". (2 marks)

(ii) Summarise four limitations of value of risk (VaR). (4 marks)

(b) An analyst would like to know the VaR for a portfolio consisting of two asset classes; long term government bonds issued in Kenya and long term government bonds issued in Tanzania. The expected monthly return on Kenyan bonds is 0.85% and the standard deviation is 3.20%. The expected monthly return on Tanzanian bonds (in Kenya Shilling) is 0.95% and the standard deviation is 5.26%. The correlation between the Kenya Shilling return of Tanzania and the Kenyan bond is 0.35.

The portfolio market value is Sh.100 million and is equally weighted between the two asset classes.
Assume a year has 52 weeks.

Required:
The 5% weekly VaR using the analytical method. (5 marks)

(c) Discuss the following investor psychology theories:

(i) Prospect theory. (3 marks)

(ii) Regret theory. (3 marks)

(d) Outline three inputs necessary to aid in deciding whether to add an investment to an existing portfolio. (3 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Distinguish between the terms "Sharpe ratio" and "information ratio" as used in active portfolio management. (4 marks)

(b) (i) Explain the term "Fundamental Law of Active Management". (2 marks)

(ii) Patrick Waiharo is evaluating two investment managers:

- Manager X - He follows 500 shares index with annual forecasts, and the information coefficient for each of the forecasts is 0.03.

Manager Y - He follows 100 shares index with annual forecasts, and the information coefficient for each of the forecasts is twice that of Manager X's security forecasts.

Required:

Advise Patrick Waiharo on which manager to select using the Fundamental Law of Active Management.

(4 marks)

(c)   An analyst obtains the following annual rates of returns for a mutual fund:

Year	Return (%)
2012	14
2013	-10
2014	-2

Required:

(i)   The fund's holding period return (HPR) over the three-year period.   (2 marks)

(ii)   The fund's annual geometric mean return.   (2 marks)

(d)   A financial analyst has created the following data to illustrate the application of utility theory to portfolio selection:

Investment	Expected Return %	Expected Standard Deviation %
A	18	2
B	19	8
C	20	15
D	18	30

He uses the following utility function: $U = E(r) - \frac{1}{2} A \sigma^2$

Where: U = Expected utility.

$E(r)$ = Expected return.

A = Measure for risk aversion.

σ^2 = Variance of expected return.

Required:

(i)   Advise on which investment a risk-neutral investor should choose.   (2 marks)

(ii)   The investment that the risk-seeking investor should choose if a measure for risk aversion has a value of -2.

(2 marks)

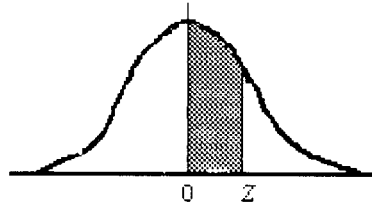(iii)   The investment that the risk-averse investor should choose if a measure for risk aversion has a value of 2.

(2 marks)

(Total: 20 marks)

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NORMAL CURVE

AREAS
under the
STANDARD
NORMAL CURVE
from 0 to z

z	0	1	2	3	4	5	6	7	8	9
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0754
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.201.	.2051	.2088	.2123	.2157	.2190	.2224
0.6	.2258	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2518	.2549
0.7	.2580	.2612	.2642	.2673	.2704	.2734	.2704	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2996	.3023	.3051	.3078	.3106	3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998
3.6	.4998	.4998	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.7	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.8	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.9	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000

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:

$$PVIF_{r,t} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

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 II SECTION 4

PORTFOLIO MANAGEMENT

PILOT PAPER

September 2015.   Time Allowed: 3 hours.

Answer any FIVE questions.   ALL questions carry equal marks.

QUESTION ONE

(a)   Briefly explain the drawbacks of the following composite measures of portfolio performance:

     (i)   Trenor's measure.   (2 marks)

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

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

(b)   Critically evaluate the assumptions of the capital asset pricing model.   (4 marks)

(c)   Orbit Ltd. is considering two investments; A and B. The risk return characteristics of the two projects are shown below:

	Project A	Project B
	%	%
Expected return	14	18
Risk (Standard deviation)	6	8

The company plans to invest 80% and 20% of its available funds in Project A and B respectively. The correlation coefficient of returns between Project A and B is 0.5

Required:

(i)   The expected return from the proposed portfolio comprising of Project A and B.   (2 marks)

(ii)   The total risk of the portfolio.   (2 marks)

(iii)   Suppose the correlation coefficient between Projects A and B is -1. Determine how the company should invest its funds in order to obtain zero portfolio risk.   (4 marks)

(d)   The following information relates to securities X and Y which lie on the Security Market Line (SML):

Security	Required rate of return	Beta coefficient
X	18%	1.0
Y	22%	1.5

Required:

Determine the risk free rate of return.   (2 marks)

(Total: 20 marks)

QUESTION TWO

(a)   Assuming that you work for an investment and financial analyst at Elite Investors. The portfolio manager provides you with the following annual rates of return for a portfolio and the relevant benchmark index for the years 2010 to 2014:

Year	Portfolio return (%)	Benchmark return (%)
2010	13	15
2011	15	11
2012	21	13
2013	15	17
2014	17	14

Required:

(i) The tracking error for the portfolio. (5 marks)

(ii) Appraise three ways in which the tracking error in a (i) above could have arisen. (3 marks)

(b) Amos Odongo is reviewing the performance of his largest asset, Fair Mutual fund for the month of December 2014. He obtained the following data to undertake the task:

	Fair Mutual fund	Market
Expected return (%)	14	12
Beta coefficient	1.2	1.0
Standard deviation (%)	28	26

The return on government treasury bonds is 5%.

Required:

(i) Evaluate the performance of the fund using:

    (a) Trenor's ratio. (3 marks)

    (b) Sharpe's measure. (3 marks)

    (c) Jensen's (Alpha) measure. (3 marks)

(ii) Explain whether Fair Mutual outperformed the market using the results obtained in (b) (i) above. (3 marks)

(Total: 20 marks)

QUESTION THREE

(a) In relation to portfolio management, explain the meaning of the following terms:

    (i) Passive portfolio management. (2 marks)

    (ii) Active portfolio management. (2 marks)

    (iii) Tactical asset allocation. (2 marks)

(b) Explain the term "window dressing" as used in portfolio management. (2 marks)

(c) An investment adviser is counselling Stephen Gerald, a client who recently inherited Sh.12,000,000 and has above average risk tolerance ($R_A = 2$). Because Gerald is young and one of his purposes is to fund a comfortable retirement, he wants to earn returns that will outpace inflation in the long term. Gerald expects to liquidate Sh.600,000 of the portfolio in 12 months, however, to make a down payment on a house. If that need arises, he states that it is important for him to be able to take out the Sh.600,000 without affecting the initial capital of Sh.12,000,000.

The following are the three alternative strategic asset allocations available to him:

	Investor's forecasts	
Asset Allocation	Expected return	Standard deviation of return
A	10	20
B	7	10
C	5.25	5

Required:

(i) Based only on Gerald's risk adjusted expected returns for asset allocations, identify the asset allocation that he would prefer. (5 marks)

(ii) Given Gerald's desire not to affect the Sh.12,000,000 principal, determine the shortfall level. (3 marks)

(iii) According to Roy's safety first criterion, identify the best of the three strategic asset allocation. (3 marks)

(iv) Recommend a strategic asset allocation for Gerald. (1 mark)

(Total: 20 marks)

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QUESTION FOUR

(a) Define the term 'portfolio upgrading' clearly stating any two principle objectives of portfolio upgrading. (4 marks)

(b) (i) Explain the term 'money weighted rate of return". (2 marks)

(ii) Explain the following terms in relation to active bond portfolio management strategies:

(a) Barbell strategy. (2 marks)

(b) Bullet strategy. (2 marks)

(c) Laddered strategy. (2 marks)

(c) The policy committee of Kubwa Investment Ltd. uses reports from various security analysts to develop inputs for the single index model consisting of the following efficient portfolios:

Portfolio	Expected return	Standard deviation of return
	%	%
A	9	4
B	11	7
C	14.5	5.2
D	18	11
E	21	19

The probability distribution of the market return is given as follows:

Probability	Market return
0.2	15
0.3	10
0.4	20
0.1	5

Required:

(i) The optimal portfolio at a risk free rate of 7%. (6 marks)

(ii) The required portfolio return at a standard deviation of 12%. (2 marks)

(Total: 20 marks)

QUESTION FIVE

(a) On 1 January 2014, Peter Njuguna, a Kenyan investor, invested 500,000 Kenya Shillings (KSh.) by buying shares in Ugandan Securities Exchange (USE) at Uganda Shillings (USh.) 30 per share.

Additional information:
1. The current spot rate (1 January 2014) was USh. 32/1KSh. and on 30 September 2014 the rate was USh.28/1KSh.
2. The market price per share on 30 September 2014 was USh.35.

Required:
(i) The total return on the investment as at 30 September 2014. (4 marks)

(ii) Comment on the relationship between the share price and foreign exchange rate based on your result in (a) (i) above. (2 marks)

(iii) In the context of behavioural finance, explain Festinger's theory of financial cognitive dissonance. (4 marks)

(b) Dani Kwendo, an investment specialist has been entrusted with Sh.10 million by a unit trust and instructed to invest the money optimally over a 2 year period. Part of the instructions are:

1. The funds be invested in one or more of the four specified projects and in the money market.

2. The four projects are not divisible and cannot be postponed.

3. The unit trust requires a return of 24% over the two year period.

The following are the details of the investment in the projects and the money market:

	Initial cost	Return over the two years	Expected standard deviation of return over the two years
	KSh. ('000')	%	%
Project 1 (P_1)	6,000	22	7
Project 2 (P_2)	4,000	26	9
Project 3 (P_3)	6,000	28	15
Project 4 (P_4)	6,000	34	13
Money Market (MM)	1,000 (minimum)	18	5

The correlation coefficient of returns over the two years are as follows:

Between projects	Between projects and market portfolio (mp)	Between projects and money market (mm)	Between money market and portfolio (mp)
P_1 and P_2 = 0.7	P_1 and mp = 0.68	P_1 and mm = 0.4	mm and mp = 0.4
P_1 and P_3 = 0.62	P_2 and mp = 0.65	P_2 and mm = 0.45	
P_1 and P_4 = 0.56	P_3 and mp = 0.75	P_3 and mm = 0.55	
P_2 and P_4 = 0.57	P_4 and mp = 0.88	P_4 and mm = 0.6	
P_3 and P_4 = 0.76			

Over the two year period, the risk free rate is estimated to be 16%, market portfolio return is 27% and the variance of returns on the market is 100%.

Required:

(i)   Using portfolio theory, evaluate how Dan Kwendo should invest Sh.10 million. (5 marks)

(ii)   Determine the beta coefficients and the required rate of returns for the portfolio. (2 marks)

(iii) Apply the capital asset pricing model (CAPM) to evaluate how Dan Kwendo should invest the Sh.10 million.
(3 marks)
(Total: 20 marks)

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