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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)

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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:

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

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